

Establishing the research priorities for major trauma in the United Kingdom: a Delphi study of nurses and allied health professionals

Abstract

Background

Research prioritisation exercises are used to determine which areas of research are important. In major trauma care, nurses and allied health professionals are central to the delivery of evidence-based care but their opinions on research priorities are under-represented in the literature.

We aimed to identify the research priorities of major trauma nurses and allied health professionals in the UK.

Methods

A three-round electronic Delphi study was conducted in the UK between November 2019 and May 2021. Round one aimed to generate research questions with rounds two and three rank ranking questions in order of priority. In stages two and three responses were analysed using descriptive statistics to compute frequencies and proportions for the ranking of each question.

Results

Survey rounds were completed by 180, 100 and 91 respondents respectively. The first round generated 285 statements that were condensed into 71 research questions. Analysis of rankings in subsequent rounds prioritised 54 research questions across themes of adult / children's acute care, psychological care and workforce, training and education.

Discussion

Nurses and AHPs are well-positioned to determine research priorities in major trauma care. Focusing on these priorities will guide future research and help to build an evidence-base in trauma care.

Keywords

Trauma Nursing; Multiple Trauma; Emergency Nursing; Allied Health Occupations; Delphi technique; Research Priority

Background

There is no universally accepted definition of what major trauma is, and broadly it relates to life-threatening or life-changing physical injuries [1]. Major trauma care in the UK is rapidly evolving and is characterised by increasing patient numbers, changing systems of care and development of new ways of working. In this context it is important that major trauma care is delivered using the best available research evidence.

Research is key to the development of innovative treatments and better patient outcomes. Research prioritisation exercises help to ensure that research capacity and funds are used in the most effective way with the greatest health impact [2]. In major trauma care, research priorities have been established in pre-hospital care [3], major bleeding [4], trauma in older people [5,6] and education [7]. Despite the increasing number of prioritisation surveys relating to major trauma, in studies where professional respondent characteristics are reported, nurses and allied health professions (AHPs) such as physiotherapists and occupational therapists are poorly represented. Of 1st round responses, studies where there are nurse respondents report participation at 11% [3], 8% [6], and 0% [5].

Of the professional groups working with major trauma patients, nurses and AHPs are the largest and are central to delivery of high-quality care. AHPs include, but are not limited to, paramedics, therapists, and clinical psychologists. Whilst increasing evidence-based practice and research has become a focus for health professions regulatory bodies and government agencies in the UK [8,9] individual engagement in these groups remains low. Increasing the contribution to research of those working with major trauma patients requires a research agenda that is relevant to their clinical roles.

In the UK there is no recognised specialty of major trauma nursing and diverse clinical, education and management roles across multiple care environments exist. Nurse and AHP professional expertise offers a specialist perspective on care of major trauma patients and the system in which they work. For this reason, they are uniquely placed to identify areas of clinical practice where there are challenges or gaps in the knowledge base that could be addressed through research. The aim of this work was to obtain consensus on the research priorities for major trauma care in the UK.

Methods

A three-round electronic Delphi (e-Delphi) survey was conducted in the UK between November 2019 and May 2021. The Delphi-technique is a common method for gaining expert group consensus in a particular topic area. It constitutes a series of iterative, sequential steps where experts are asked to rank-order statements through a series of structured questionnaires [10,11].

Each round is followed by interpretation and analysis before results are presented back to experts for further comment until there is convergence of opinion [12]. It is a well-documented method of establishing research priorities and has the advantage of enabling large numbers respondents to contribute, with electronic Delphi's adding further benefit by being convenient, quick, and allowing participation across a wide geographical area [13].

An 'expert' or stakeholder should have knowledge of the topic under investigation and be able to provide an opinion informed by experience [14]. As there is considerable cross-over of clinical roles and practice in the multi-professional team, experts were nurses and allied health professionals involved in the delivery of clinical care to people injured due to major trauma. This could include clinical services and academics in universities. There were no restrictions on seniority of respondents as the aim was to develop research priorities relevant to anyone working with major trauma patients.

A non-probability convenience sample was used. Key stakeholders were members of the UK National Major Trauma Nursing Group (NMTNG) and National Major Trauma Rehabilitation Group (NMTRG) who were contacted by email; other self-nominated stakeholders responded through links placed on social media.

Planning and design

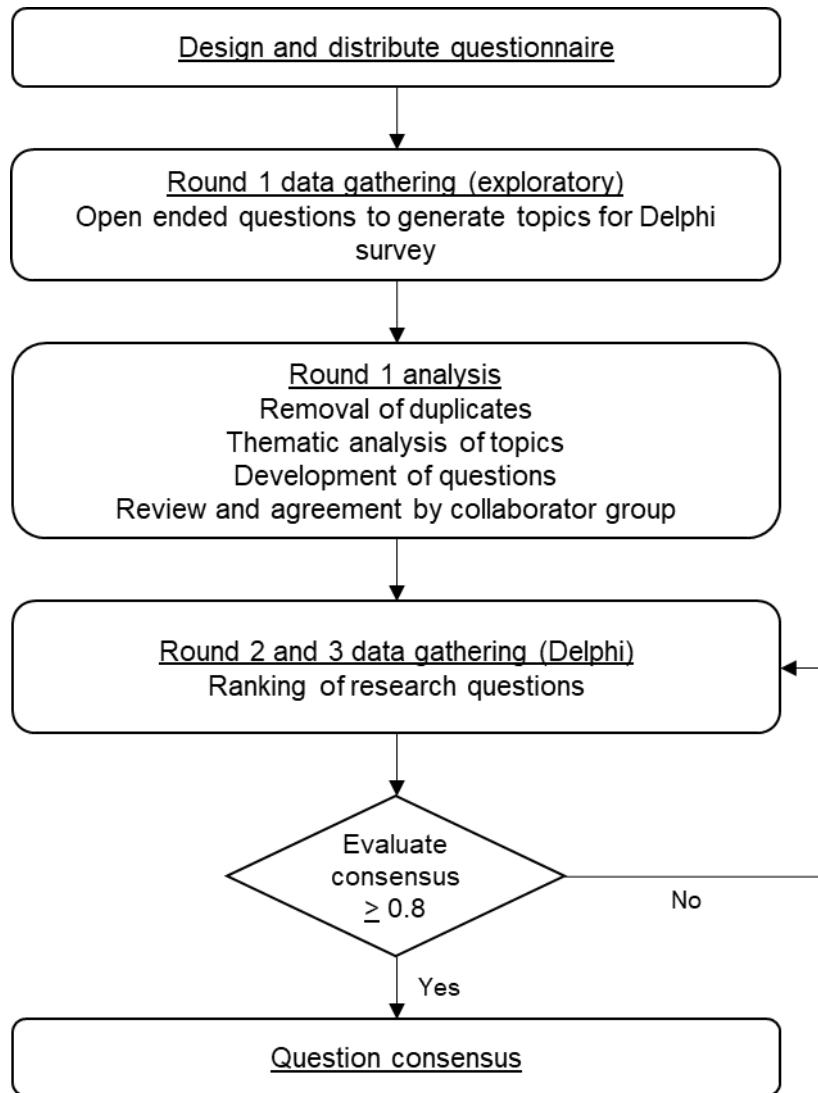
An online survey was built by one researcher (HJ) using Microsoft Forms (Microsoft Office 365 E3, Redmond, Washington, US) and tested by the

researcher team. All rounds collected respondent's demographic information (professional group, workplace setting) and started by introducing the purpose of the survey.

The first round used a single open-ended exploratory question: "What are the most significant practice challenges in your clinical trauma practice that you think may be resolved with focussed research activity?". Due to the diversity in the experience of respondents they were not asked to formulate specific research questions. Up to three statements could be entered.

Second and third rounds consisted of questions generated following analysis of responses from the preceding round. In these rounds respondents were asked to rate the importance of each question on a 4-point scale from "not important" to "very important". Questions in these rounds were not mandatory as the breadth of subjects covered meant that not all respondents would have expert knowledge or opinion in specific practice areas (figure 1).

FIGURE 1: study process



Analysis

Respondent characteristics were analysed using descriptive statistics. To provide structure to subsequent rounds, the thematic analysis framework of Braun and Clarke [15] was used to identify themes within the responses. All statements were independently reviewed by the researcher group and coded into themes. Coded data was discussed and duplicates or incomplete statements were removed. Statements were rewritten to condense similar

topics into research questions, assigned to themes and sub-themes and differences amongst researchers reconciled. The questions and themes were presented to collaborators from the NMTNG and NMTRG not involved in the coding or theme development. The themes and research questions were further refined by the collaborator group and then presented to respondents in subsequent rounds.

Defining consensus

In stages two and three frequencies and proportions for the ranking of each research question were calculated. Consensus on whether a research question was taken forward to the next round was determined as those with a content validity index (CVI) of ≥ 0.8 . This was calculated as the number of respondents rating the individual question as moderately (3) or very important (4) divided by the total number of respondents for the theme. Questions not achieving the pre-determined CVI were not taken forward to subsequent rounds. Final rankings were calculated by theme using mean response scores.

Procedure

The survey was disseminated through existing email contact lists and on the social media site for the NMTNG and NMTRGs. Each round remained open for 4 months with monthly reminders. The timeframe for analysis between rounds varied from nine months between rounds 1 and 2 (caused by limited researcher availability during the global pandemic), and two months between rounds 2 and

3. Non-participation in previous rounds did not preclude involvement in subsequent rounds.

Ethics and consent

As this survey study contained no patient level data, and was distributed using professional collaborative networks, ethical approval from the UK Health Research Authority and Research Ethics Committee was not required. All data was handled in accordance with the UK Data Protection Act 2018 (UK implementation of the EU General Data Protection Regulation (GDPR)). Respondents were informed at the start of each survey that completion was deemed to be consent and that results would be disseminated and published.

Results

The survey rounds were completed by 180, 100 and 91 respondents respectively with consensus on 54 research priorities. These results report the findings related to major trauma nursing; the findings specific to major trauma rehabilitation will be reported separately. Across all rounds the predominant professional group was nurses. Demographic characteristics for participants are presented in Table 1.

Table 1. Characteristics of respondents

Demographic variable	Stage 1 Exploratory (n = 180)		Stage 2 Delphi 1 (n = 100)		Stage3 Delphi 2 (n = 91)	
	n	%	n	%	n	%
<i>Current role</i>						

Advanced Clinical Practitioner / trainee Advanced Clinical Practitioner	4	2.22	12	12	9	9.89
Nurse	103	57.22	43	43.0	59	64.83
All Allied Health Professions	73	40.56	45	45.0	23	25.24
Clinical Psychologist	1	0.56	1	1.0	0	1.10
Dietician	3	1.67	4	4.0	1	3.30
Occupational Therapist	10	5.56	7	7.0	3	3.30
Operating Department Practitioner	3	1.67	1	1.0	3	1.10
Paramedic	3	1.67	5	5.0	1	16.48
Physiotherapist	49	27.22	22	22.0	15	1.10
Radiographer	1	0.56	0	0	0	0
Speech and Language Therapist	3	1.67	5	5.0	0	0
<i>Patient group</i>						
Work mainly with adults	107	59.44	61	61.0	57	62.64
Work mainly with children	26	14.44	24	24.0	20	21.98
Work with adults and children	47	26.11	15	15.0	14	15.38
<i>Role</i>						
Clinical	99	55.00	59	59.0	48	52.75
Education / Practice Education	22	12.22	3	3.0	14	15.38
Research / Quality Improvement	7	3.89	3	3.0	3	3.30
Trauma coordination	29	16.11	18	18.0	19	20.88
Leadership / Management	23	12.78	17	17.0	7	7.69
<i>Work setting</i>						
Major Trauma Centre	122	67.78	63	63.0	56	61.54
Trauma Unit	37	20.56	22	22.0	26	28.57
Local Emergency Hospital	15	8.33	5	5.0	0	0.00
Pre-hospital	5	2.78	5	5.0	2	2.20
University / HEI	1	0.56	0	0	5	5.49
Other (specialist centre, not known)	0	0.00	5	5	2	2.20
<i>Area of practice</i>						
Pre-hospital care	4	2.22	7	7.0	0	0.00
Emergency care	59	32.78	27	27.0	35	38.46
Perioperative care	6	3.33	1	1.0	6	6.59
Critical care	10	5.56	8	8.0	7	7.69
Major trauma ward	16	8.89	10	10.0	5	5.49
Ward (other) that admits major trauma patients	13	7.22	0	0	0	0.00
Rehabilitation	36	20.00	19	19.0	12	13.19
Community	4	2.22	0	0	1	1.10
Hospital-wide	32	17.78	23	23.0	24	26.37

Other	0	0.00	5	5.0	1	1.10
-------	---	------	---	-----	---	------

Round 1. the initial exploratory survey was accessed 510 times. Following removal of blank entries, 180 respondents submitted 376 separate statements. Following steering group review 91 incomplete or broad statements (e.g. ‘critical care’ or ‘training’) were removed leaving 285. Statements were reviewed and allocated into themes and subthemes: adult acute trauma care, children and young people’s trauma care, psychological care, and workforce, education and training (Table 2). Psychological care was an overall theme but also formed questions specific to children and young people. Statements specifically relating to specialist rehabilitation were removed for separate analysis (n=40). Grouped statements were reviewed by subject experts from nursing and therapies disciplines and 71 research questions were devised.

Table 2: Summary of research themes, subthemes and responses

Theme	Subthemes	Stage 2		
		Total questions	Round 1	Round 2
		Total (n)	CVI \geq 0.8 (n)	CVI \geq 0.8 (n)
1. Adult acute trauma care	Pre-hospital & resuscitation	14	8	8
	Thoracic trauma	4	4	4
	Older People	4	3	3
	End of Life Care	2	2	2
	Spinal trauma	5	5	5
	Diagnostic imaging	3	3	3
	Major trauma pathways	9	6	5

2. Children and young people's trauma care		9	8	7
3. Psychological care		7	7	6
4. Workforce, education, and training	Workforce	4	4	3
	Education and training	10	9	9
Total questions		71	59	54

Round 2. In the 1st phase of the Delphi 100 respondents ranked 71 research questions. 12 received less than the predetermined CVI of 0.8 and were not taken forward to round 3.

Round 3. In the 2nd phase 91 respondents ranked the 59 questions. Of these only 5 did not achieve consensus and were removed. As the level of agreement between round 2 and 3 was high no further rounds were completed. 54 questions were included in the final list of research priorities, grouped under themes (Table 3).

Table 3 Prioritised research questions

	Mean	Std. deviation
Theme: Adult acute trauma care (top ten)		
What are the best systems or processes for the early identification of older patients who have sustained major trauma?	3.78	.48
In older patients sustaining major trauma what is the optimal pathway to address physical and psychological needs?	3.73	.48
How do clinicians make end of life care decisions in major trauma?	3.71	.57

What is the most effective approach to spinal immobilisation in the hyper acute phase of injury or suspected injury?	3.69	.66
What are the optimal ways to provide palliative care support to major trauma patients and their families?	3.68	.64
What is the impact of having a major trauma ward and a major trauma consultant on patient outcomes?	3.67	.66
In a pre-hospital setting, what are the best systems or processes for the identification of patients who have sustained major trauma?	3.58	.79
What is important for patients and their relatives in trauma care?	3.57	.65
What is the feasibility of delivering 1:1:1 blood components during trauma resuscitation?	3.53	.80
What is the optimal composition of the trauma team?	3.52	.82
Theme: Children and Young People's trauma care		
What are the optimal ways to support the psychological wellbeing of children and young people sustaining major trauma?	3.87	.35
What outcomes are important for children and young people who have sustained major trauma, their families and staff?	3.86	.36
What are the long-term psychological effects on children and young people sustaining major trauma?	3.57	.63
What is the optimum configuration of major trauma services to care for adolescents who have sustained major trauma?	3.43	.8
What are the optimal ways to support the wellbeing of babies and their families affected by shaken baby syndrome?	3.42	.82
Are children and young people who have sustained major trauma compared to children and young people hospitalised for other reasons more likely to have safeguarding concerns?	3.31	.68
Which factors are associated with improved longer-term outcomes in children and young people following traumatic injury?	3.29	.73
Psychological care		

How do major trauma psychology services impact on patient outcomes?	3.65	.58
Which factors provide optimal psychological support to trauma patients and families after discharge from hospital?	3.46	.68
How can the trauma admission be used to best engage a stabbing victim in support of their mental health to reduce the risk of repeat gang violence?	3.45	.71
What are the processes and outcomes of psychological support for trauma patients and their families?	3.43	.74
What are the psychological support needs for patients with mild-moderate traumatic brain injury?	3.33	.77
What are the benefits of supporting communication through alternative and augmentative communication and technology in major trauma settings?	3.16	.8
Workforce, education and training (top ten)		
What is the impact of trained trauma nurses on patient outcomes?	3.69	.67
What is the benefit of trauma coordinators on the patient experience in major trauma centres?	3.67	.61
How can major trauma knowledge and skills be maintained in nurses working in busy emergency departments?	3.65	.71
Does the implementation of a trauma competency framework influence education and development in practice?	3.64	.56
What education and training do trauma nursing and rehabilitation staff require in order to provide appropriate psychological support?	3.51	.68
How are knowledge and skills of paediatric staff maintained in units with limited exposure to major trauma cases?	3.51	.68
Is there evidence to suggest that specific education of the workforce improves outcomes in trauma care?	3.50	.77
What psychological support training should be given to the multi-disciplinary team who deliver care to major trauma patients?	3.47	.77
What are the most effective strategies for continuing professional development in major trauma?	3.46	.81

Do bedside nurses' impact on trauma patients' recovery?	3.43	.76
---------------------------------------------------------	------	-----

Discussion

This Delphi study comprised the first UK major trauma nursing research priority setting. The final questions covered areas of patient experience, clinical care, and organisation of care representing pre-hospital, ED and ward care. A particular strength is the focus on priorities of nurses and AHPs from across the spectrum of trauma care whose views are under-represented in similar work.

Theme 1: adult acute major trauma care

The two highest ranked priorities both related to care of older people following major trauma. This is similar to other trauma research prioritisation studies where questions relating to older major trauma featured in the 'top ten' [16,17]. This focus may result from the increasing numbers of older major trauma patients, with UK data identifying the proportion of major trauma patients aged over 75 rising from 8.1 to 26.9% between 1990 and 2013 [18]. This represents a significant proportion of the trauma workload. The need for early identification of older patients at risk of significant injury is a priority that is supported by evidence of under-recognition and under-treatment of injuries in this group [19,20]. The need for more research into the most appropriate methods for identification of this group echoes a consensus building exercise specific to older trauma [5].

Our study identified 2 priority questions on end-of-life care. Goals of care and palliation discussions are an expanding part of treatment in severely injured patients and can reduce inappropriate interventions in patients not likely to survive [21]. End of life planning improves patient and family satisfaction, but studies indicate that its use in major trauma can be as low as 2.1% of patients who die within 180 days of discharge [22]. In setting research priorities for older major trauma in the US, the need for research into prognostication discussions and their influence on goals of care (i.e. palliation, hospice) was identified [6], and a Delphi on care priorities amongst trauma clinicians in Australia identified the need for tools to support decision-making in palliation [23].

A unique topic raised, and not found in other trauma-related prioritisation exercises, was the impact on patient outcomes of a dedicated cohort ward and consultant for major trauma. The UK has a requirement for major trauma centres to have both these components [24] although the number of centres who have adopted this model is not known. The evidence for cohorting major trauma patients in a single location is lacking and the provision of a dedicated ward has proved difficult alongside competing services demands. Thus, evaluating any impact of this was raised as a research priority in this study.

Theme 2: children and young people's (CYP) trauma care

Seven questions relating to children and young people's trauma care reached consensus. Of these, the majority (5) were on clinical issues. The top two ranked questions had the highest mean score across all priorities. The

management of children and young people following trauma was ranked highly as an area for more research by Curtis et al [17]. A specific paediatric trauma Delphi from the US identified themes of impact of nursing care on outcomes, initial resuscitation and critical care [25]. This study goes further than identifying research themes by formulating key research questions. A US survey on resuscitation, patient evaluation, imaging and management of trauma did not feature children and young people's care in its prioritised research questions [26], and only one question relating to children was submitted, but not prioritised in a UK study [16].

Theme 3: psychological care

Six questions under the theme 'psychological care' reached consensus. In addition, there were two questions relating to psychological care of children within the CYP theme and two in the workforce, education and training theme. The National Institute for Health and Care Excellence in the UK published guidance on rehabilitation after traumatic injury in 2022 which identified the low-quality evidence on psychological support following trauma [27]. The importance of timely psychological support for patients following major trauma is highlighted in the literature as a means to reduce long-term psychological problems [28] however, there is a lack of specialist psychological support services in the UK [29,30]. In the UK clinical guidance for psychological support of patients following major trauma states "All practitioners involved in the person's care should provide immediate psychological and emotional support for people who are mentally distressed and/or cognitively impaired after a

traumatic injury.” [27, p12]. This has led to the development of training initiatives to increase awareness and ability to provide psychological support in non-specialists such as nurses and AHPs. The need to provide an evidence base to this training was a question reaching consensus in the education and training theme in this work.

Theme 4: workforce, education and training

The final theme contained questions relating to workforce, education and training. This is an area where there has been little emphasis in other prioritisation surveys. Since the development of the UK major trauma networks in 2012 there has been considerable investment in the training and education of the workforce, with investment made in several major trauma focused courses across all areas of practice. National guidance makes specific recommendation on the need for healthcare professionals to have training in major trauma [31], with specific contractual obligations for major trauma centres to have nurses certified advanced trauma training [32]. In 2016 the National Major Trauma Nursing Group launched a set of education and competency standards for emergency department nurses in major trauma that have been adopted as part of UK NHS quality monitoring standards [33], with further standards subsequently being set in ward-based, critical care and children’s major trauma nursing. Compliance with these standards for trauma education across nursing groups has been low [34]. Nurses and AHPs are faced with these and multiple other training initiatives required for practice roles causing competing priorities for time and resource. In this context research priorities were identified on the

impact of training and competency-based assessments on patient outcomes and practice in major trauma.

The impact of nursing roles on major trauma patients featured as a prioritised outcome. The benefit of the trauma coordinator role on patient experience was one such question. In the UK national major trauma guidance recommends coordinators are in place to facilitate the patient pathway and coordinate the multi-professional team [32]. The development of trauma coordinators has lacked standardisation and formal guidance on the role leading to widespread variation in how they have been implemented and what function they serve [35,36]. There is some international evidence on the role of trauma coordinators [37,38,39]. (Curtis and Leonard 2012, Jarrett and Emmett 2009, Curtis et al 2008) but comparison with the UK is difficult due to the variations in practice and role.

Limitations

This study has several strengths due to its broad recruitment approach that allowed the survey to be as inclusive of all areas of major trauma practice as possible. This is reflected in the breadth of areas of questions generated.

Limitations of the survey are reflected in what is already known about the Delphi survey methodology in their predisposition to respondent attrition through the rounds and the change between respondents in between rounds. Despite this, this survey represented the largest response rate from UK nurses to a prioritisation exercise in major trauma.

We acknowledge that the views of patients and public were not gathered at this stage, but we propose to involve relevant stakeholder groups in the development of future projects stemming from this work.

Conclusions

This study identifies important research priorities for nurses and allied health professionals working with major trauma patients in the UK. It builds on previous work in setting research priorities but adds the unique professional perspective of nurses and AHPs which has been underrepresented in other surveys. The questions identified in this study move away from medical and biomedical aspects of care to patient-focused outcomes and evaluating the psychological impact of major trauma.

References

- 1 National Institute for Health and Care Excellence (UK) Major Trauma: Assessment and Initial Management. 2016 Available from <https://www.nice.org.uk/guidance/ng39/ifp/chapter/About-this-information> Accessed 30/05/2022
- 2 Terry RF, Charles E, Purdy B, Sanford A. An analysis of research priority-setting at the World Health Organization. *Health Res Policy Syst* 2018;16:116. doi:10.1186/s12961-018-0391-0.
- 3 Thompson L, Hill M, Lecky F, Shaw G. Defining major trauma: A delphi study. *Scand J Trauma Resusc Emerg Med*; 2021;29:63 doi:10.1186/s13049-021-00870-w
- 4 Wong HS, Curry NS, Davenport RA, Yu LM, Stanworth SJ. A Delphi study to establish consensus on a definition of major bleeding in adult trauma. *Transfusion*. 2020;60:3028-3038. doi:10.1111/trf.16055.
- 5 Alshibani, A., Banerjee, J., Lecky, F., Coats, T. J., Prest, R., Mitchell, Á, et al. A consensus building exercise to determine research priorities for silver trauma. *BMC Emergency Medicine*. 2020;20:1-63. doi:10.1186/s12873-020-00357-4
- 6 Joseph B, Saljuqi AT, Phuong J., Shipper E, Braverman MA., Bixby P, et al. Developing a national trauma research action plan (NTRAP): Results from the geriatric research gap delphi survey. *Journal Tr Acute Care Surg*. 2022, PublishAheadofPrint doi:10.1097/TA.0000000000003626

- 7 Whiting D, Cole E. Developing a trauma care syllabus for intensive care nurses in the united kingdom: A delphi study. *Int Crit Care Nur*, 2016;36:49-57. doi:10.1016/j.iccn.2016.03.006
- 8 NHS England. Making research matter Chief Nursing Officer for England's strategic plan for research. 2021. Available from <https://www.england.nhs.uk/wp-content/uploads/2021/11/B0880-cno-for-englands-strategic-plan-fo-research.pdf> Accessed 28/05/2022
- 9 Nursing & Midwifery Council. The code: Professional standards of practice and behaviour for nurses, midwives and nursing associates. 2018. <http://www.nmc.org.uk/globalassets/sitedocuments/nmc-publications/revised-new-nmc-code.pdf> Accessed 21/05/2022
- 10 Barrett D, Heale R. What are Delphi studies? *Evid Based Nurs*. 2020;23:68-69. doi:10.1136/ebnurs-2020-103303.
- 11 Humphrey-Murto S, Varpio L, Wood TJ, Gonsalves C, Ufholz LA, Mascioli K, et al. The Use of the Delphi and Other Consensus Group Methods in Medical Education Research: A Review. *Acad Med*. 2017;92:1491-1498. doi:10.1097/ACM.0000000000001812.
- 12 Beiderbeck D, Frevel N, von der Gracht H, Schmidt S, Schweitzer V. Preparing, conducting, and analyzing Delphi surveys: Cross-disciplinary practices, new directions, and advancements. *MethodsX* 2021. doi.org/10.1016/j.mex.2021.101401.
- 13 Donohoe H, Stellefson M, Tennant B. Advantages and limitations of the e-Delphi technique: Implications for health education researchers. *American Journal of Health Education*. 2020;43:38–46.
- 14 Hasson F, Keeney S, McKenna H. Research guideline for the Delphi survey technique. *Jour Adv Nur*. 2000;32:1008–1015.
- 15 Braun V, Clarke V. Using thematic analysis in psychology, *Qualitative Research in Psychology*. 2006;3:2:77-101 doi:[10.1191/1478088706qp063oa](https://doi.org/10.1191/1478088706qp063oa)
- 16 McElroy L, Robinson L, Battle C, Laidlaw L, Teager A, de Bernard L, et al. Use of a modified delphi process to develop research priorities in major trauma. *Euro J Tr Em Surg* 2021;48:1453-1461. doi:10.1007/s00068-021-01722-z
- 17 Curtis K, Nahidi S, Gabbe B, Vallmuur K, Martin K, Shaban RZ, Christey G. Identifying the priority challenges in trauma care delivery for Australian and New Zealand trauma clinicians. *Injury*. 2020;51:2053-2058. doi:0.1016/j.injury.2020.07.033.
- 18 Kehoe A, Smith JE, Edwards A, Yates D, Lecky F. The changing face of major trauma in the UK. *Emerg Med J*. 2015;32:911-5. doi:10.1136/emered-2015-205265.
- 19 Fröhlich M, Caspers M, Lefering R, Driessen A, Bouillon B, Maegele M, et al. Do elderly trauma patients receive the required treatment? Epidemiology and outcome of geriatric trauma patients treated at different levels of trauma care. *Eur J Trauma Emerg Surg*. 2020;46::1463-1469. doi:10.1007/s00068-019-01285-0.
- 20 TARN (2017) Major Trauma in Older People. www.tarn.ac.uk/content/downloads/3793/Major%20Trauma%20in%20Older%20People%202017.pdf Accessed 21/05/2022.
- 21 Wycech J, Fokin AA, Katz JK, Tymchak A, Teitzman RL, Koff S, et al. Reduction in Potentially Inappropriate Interventions in Trauma Patients following a Palliative Care Consultation. *J Palliat Med*. 2021;24:705-711. doi:10.1089/jpm.2020.0218.

- 22 Lilley EJ, Lee KC, Scott JW, et al. The impact of inpatient palliative care on end-of-life care among older trauma patients who die after hospital discharge. *J Trauma Acute Care Surg*. 2018;85:992–998. doi:10.1097/TA.0000000000002000.
- 23 Curtis K, Gabbe B, Shaban RZ, Nahidi S, Pollard Am C, Vallmuur K, et al. Priorities for trauma quality improvement and registry use in Australia and New Zealand. *Injury*. 2020;51:84-90. doi:10.1016/j.injury.2019.09.033.
- 24 National Institute for Health and Care Excellence (UK). Trauma Quality Standard. 2018 <https://www.nice.org.uk/guidance/qs166> Accessed 30/05/2022
- 25 Roney L, McKenna C. Determining the Education and Research Priorities in Pediatric Trauma Nursing: A Delphi Study. *J Trauma Nurs*. 2018;25:290-297. Doi:10.1097/JTN.0000000000000390.
- 26 Costantini TW, Galante JM, Braverman MA, Phuong J, Price MA, Cuschieri J, et al, NTRAP Acute Resuscitation Panel. Developing a National Trauma Research Action Plan (NTRAP): Results from the Acute Resuscitation, Initial Patient Evaluation, Imaging, and Management Research Gap Delphi Survey. *J Trauma Acute Care Surg*. 2022. doi:10.1097/TA.0000000000003648. Epub ahead of print.
- 27 National Institute for Health and Care Excellence (UK). Rehabilitation after traumatic injury. 2022 www.nice.org.uk/guidance/ng211 Accessed 21/05/2022
- 28 O'Donnell ML, Lau W, Tipping S, Holmes AC, Ellen S, Judson R, et al. Stepped early psychological intervention for posttraumatic stress disorder, other anxiety disorders, and depression following serious injury. *J Trauma Stress*. 2012;25:125-33. Doi:10.1002/jts.21677.
- 29 Kellezi B, Beckett K, Earthy S, et al. Understanding and meeting information needs following unintentional injury: comparing the accounts of patients, carers and service providers. *Injury*. 2015;46:564–571. doi:10.1016/j.injury.2014.11.035.
- 30 Kettlewell J, Timmons S, Bridger K, Kendrick D, Kellezi B, Holmes J, et al. A study of mapping usual care and unmet need for vocational rehabilitation and psychological support following major trauma in five health districts in the UK. *Clin Rehabil*. 2021;35:750-764. doi:10.1177/0269215520971777.
- 31 National Institute for Health and Care Excellence (UK) Major Trauma: Service Delivery. 2016. Available from <https://www.nice.org.uk/guidance/ng40> Accessed 31/05/2022
- 32 NHS England. NHS Standard Contract for Major Trauma Service (all ages). 2013. www.england.nhs.uk/wp-content/uploads/2014/04/d15-majortrauma-0414.pdf Accessed 11/05/2022
- 33 NHS England. Major Trauma Services Quality Indicators [Online] 2016. Available at [tquins_resources_measures_major_trauma_measures_final_230416_7 .pdf](http://tquins_resources_measures_major_trauma_measures_final_230416_7.pdf) (wymtn.com) Accessed 31/05/2022
- 34 NHS England. Major Trauma and Quality Surveillance/Peer Review [Online] 2018. Available from <https://nebula.wsimq.com/50180182d6b1df343d6248674294118e?AccessKeyId=71C7B1EA5618F4C499E1&disposition=0&alloworigin=1> Accessed 31/05/2022
- 35 Ross J, Ashby N. Role of coordinators in national and international major trauma services. *Emergency Nurse*. 2016;24:22-25.
- 36 Crouch R, McHale H, Palfrey R, Curtis K. The trauma nurse coordinator in England: a survey of demographics, roles and resources. *Int Emerg Nurs*. 2015;23:8-12. doi:10.1016/j.ienj.2014.05.003.

37 Curtis K, Leonard E. The trauma nurse coordinator in Australia and New Zealand: demographics, role, and professional development. *J Trauma Nurs.* 2012;19:214-20. doi:10.1097/JTN.0b013e3182759a7d.

38 Jarrett LA, Emmett M. Utilizing trauma nurse practitioners to decrease length of stay. *J Trauma Nurs.* 2009;16:68-72. doi:10.1097/JTN.0b013e3181ac91c1

39 Curtis K, Donoghue J. The trauma nurse coordinator in Australia and New Zealand: a progress survey of demographics, role function, and resources. *J Trauma Nurs.* 2008;15:34-42. doi: 10.1097/01.JTN.0000327324.37534.02.