

# BMJ Open Identifying research priorities in anaesthesia and perioperative care: final report of the joint National Institute of Academic Anaesthesia/James Lind Alliance Research Priority Setting Partnership

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## ABSTRACT

**Objective:** To identify research priorities for Anaesthesia and Perioperative Medicine.

**Design:** Prospective surveys and consensus meetings guided by an independent adviser.

**Setting:** UK.

**Participants:** 45 stakeholder organisations (25 professional, 20 patient/carer) affiliated as James Lind Alliance partners.

**Outcomes:** *First 'ideas-gathering' survey:* Free text research ideas and suggestions. *Second 'prioritisation' survey:* Shortlist of 'summary' research questions (derived from the first survey) ranked by respondents in order of priority. *Final 'top ten':* Agreed by consensus at a final prioritisation workshop.

**Results:** *First survey:* 1420 suggestions received from 623 respondents (49% patients/public) were refined into a shortlist of 92 'summary' questions. *Second survey:* 1718 respondents each nominated up to 10 questions as research priorities. *Top ten:* The 25 highest-ranked questions advanced to the final workshop, where 23 stakeholders (13 professional, 10 patient/carer) agreed the 10 most important questions:

- What can we do to stop patients developing chronic pain after surgery?
- How can patient care around the time of emergency surgery be improved?
- What long-term harm may result from anaesthesia, particularly following repeated anaesthetics?
- What outcomes should we use to measure the 'success' of anaesthesia and perioperative care?
- How can we improve recovery from surgery for elderly patients?
- For which patients does regional anaesthesia give better outcomes than general anaesthesia?
- What are the effects of anaesthesia on the developing brain?
- Do enhanced recovery programmes improve short and long-term outcomes?

## Strengths and limitations of this study

- Consensus-based, transparent decision-making at every stage of the priority setting process.
- The first opportunity to date for clinicians, patients and the public to contribute research suggestions and have an equal say in shaping the anaesthetic and perioperative research agenda.
- The large number of survey respondents and diversity of stakeholders sampled.
- The largest example to date of patient, carer and public involvement in setting the anaesthetic and perioperative research agenda.
- The likely variable effectiveness of survey promotion and publicity efforts within different stakeholder groups.
- The imprecise scope of certain research questions identified, resulting mainly from the process of refining a large number of individual suggestions into a manageable shortlist of 'summary' questions.

- How can preoperative exercise or fitness training, including physiotherapy, improve outcomes after surgery?
- How can we improve communication between the teams looking after patients throughout their surgical journey?

**Conclusions:** Almost 2000 stakeholders contributed their views regarding anaesthetic and perioperative research priorities. This is the largest example of patient and public involvement in shaping anaesthetic and perioperative research to date.

## INTRODUCTION

### Collaborative research priority setting

Medical research aims to investigate questions that remain as yet unanswered. Much

attention has focused in recent decades on refining research methodology, because flawed research may yield erroneous conclusions or ‘wrong’ answers. However, less consideration has been given to deciding what questions are most worth researching. The process of selecting questions for research funding—or deciding research priorities—is an area of increasing interest. Research funding bodies seeking the maximum benefit and impact from their investment in research are becoming increasingly aware of the need to concentrate funding on questions of real relevance and importance to both service users and healthcare professionals.

Traditionally, the medical research agenda has been driven mainly by researchers and scientists. The UK National Health Service (NHS) first developed formal research priority setting processes in 1991 with the launch of the NHS Research and Development Programme. This proposed ‘a systematic approach to identifying and setting R&D priorities in which NHS staff and the users of the Service are asked to identify important issues’<sup>1</sup> to address the concern that researchers’ priorities may not always align with those of service users.<sup>2–3</sup> However, effectively engaging patients and carers in setting research agendas has proved challenging, which may explain why patients and the public have only recently begun to play a significant role in influencing research priorities.

Several benefits of patient and public involvement (PPI) in research have been demonstrated, in terms of the quality and relevance of research, and for the patients involved.<sup>4–7</sup> However, the extent of PPI in anaesthetic and perioperative care research is seldom reported, and its influence on research outputs is therefore unclear.<sup>8–9</sup> Furthermore, there has been no research priority setting exercise to date in anaesthesia or perioperative care with widespread patient or public involvement.

The James Lind Alliance (JLA) is a non-profit making initiative that aims to identify research priorities in different disease areas by facilitating ‘Priority Setting Partnerships’ (PSPs). Its mission is to ‘bring patients, carers and clinicians together to identify and prioritise unanswered questions’, with particular emphasis on collaboration: ‘patients, carers and clinicians working together to agree which uncertainties matter most’.<sup>10</sup> With over 30 successful PSPs published to date, and having been recently incorporated within NETSCC (the NIHR Evaluation of Trials and Studies Coordinating Centre), the JLA process appeared suitable for a research priority setting exercise in anaesthesia and perioperative medicine.

### Priority setting in anaesthesia and perioperative medicine

The National Institute for Academic Anaesthesia (NIAA) conducted a research prioritisation exercise in 2009, in which 14 lay representatives of the Royal College of Anaesthetists’ Patient Liaison Group participated. Its objective was to identify research priorities for

presentation to major funding bodies to support applications for commissioned research.<sup>11</sup> However, in late 2012 the NIAA Research Council proposed that the exercise should be repeated on a larger scale with greater patient and public input. An application for a formal PSP was therefore made to the James Lind Alliance in early 2013, which was accepted later that year.

This paper describes the process and results of this research PSP, whose aims were as follows:

*AIMS:*

1. To bring together patients, carers and clinicians to identify and prioritise unanswered questions for research in anaesthesia and perioperative care;
2. To agree, by consensus, the ‘top ten’ most important unanswered questions from those identified;
3. To publicise the PSP’s results widely among the anaesthetic and perioperative community;
4. To disseminate the results to researchers and funding bodies and thus maximise their impact on the future research agenda.

### METHODS

The PSP was conducted in accordance with guidance issued by the JLA and overseen by an independent JLA adviser.<sup>12</sup> It was coordinated by the NIAA Health Services Research Centre, funded by the NIAA funding partners and managed by a Steering Group comprising representatives of the funding partner organisations, patients and carers and the JLA. Preparation for the PSP began in late 2013; it concluded in May 2015 with its Final Prioritisation Workshop (see figure 1).

### Inviting partner organisations

The first step involved engaging a diverse range of stakeholder organisations. Stakeholders were defined as ‘any person or organisation with an interest in anaesthesia and perioperative care’. In practice, this encompassed healthcare professionals (clinicians such as anaesthetists, surgeons, theatre staff, operating department

Stage 1	<b>ENROL PARTNER ORGANISATIONS:</b> stakeholder engagement meeting (October 2013); affiliation as partners
Stage 2	<b>IDENTIFY RESEARCH QUESTIONS:</b> online survey; suggestions from partner organisations (June – July 2014)
Stage 3	<b>CLASSIFY &amp; REFINE RESEARCH QUESTIONS</b> (August – October 2014)
Stage 4	<b>SHORTLISTING</b> (December 2014)
Stage 5	<b>LITERATURE REVIEWS</b> (December 2014 – January 2015)
Stage 6	<b>INTERIM PRIORITISATION:</b> second online survey (February – March 2015)
Stage 7	<b>FINAL PRIORITISATION:</b> Stakeholder representative consensus workshop (May 2015)
Stage 8	<b>PUBLICATION AND DISSEMINATION OF RESULTS</b> (June 2015 onwards)

**Figure 1** Summary of the James Lind Alliance Priority Setting Process.

practitioners, surgical ward and ITU nurses, general practitioners (GPs), community nurses, etc) and service users of anaesthesia, surgery and perioperative care (patients who have had, or may in the future have, surgery and their carers and relatives).

The PSP approached all subspecialist UK anaesthetic societies affiliated to the NIAA along with other organisations representing specific healthcare professional groups, plus a range of patient organisations. Relevant patient organisations were identified by various means: nominations from specialist anaesthetic societies; suggestions from INVOLVE (an arm of the National Institute for Health Research whose aim is 'to support active public involvement in NHS, public health and social care research');<sup>13</sup> and web-based searches for patient organisations representing surgical patients.

### Stakeholder engagement and PSP awareness meeting

Potential partner organisations were invited to a meeting in October 2013 at which the process and aims of the PSP were explained. Partner organisations that agreed to participate were subsequently enrolled (see

table 1); each partner organisation was then invited to nominate a volunteer for the PSP Steering Group. The Steering Group membership was finalised by agreement among the NIAA's main funding partners in November 2013, with the aim of including a broad range of professional and lay representatives; terms of reference and the PSP protocol were signed off by the Steering Group in early 2014.

### Definition of scope

Soon after its conception, the Anaesthesia PSP became the 'Anaesthesia and Perioperative Care PSP'. This followed discussion within the NIAA that concluded that anaesthesia could not sensibly be considered in isolation from the rest of the perioperative care process. However, we chose to exclude any questions related only to Intensive Care medicine, since the Intensive Care Society was in the final stages of its own PSP (the results of which have since been published).<sup>14</sup>

The scope was therefore defined as encompassing 'all aspects of anaesthesia and perioperative care, other than the surgery itself'. These terms were explained in the surveys as follows:

**Table 1** Partner organisations affiliated with the PSP

Professional organisations (25)	Patient/lay member organisations (20)
RCoA (Royal College of Anaesthetists)	Age UK
AAGBI (Association of Anaesthetists of Great Britain and Ireland)	AIMS (Association for Improvement in Maternity Services)
<i>BJA (British Journal of Anaesthesia—journal of the RCoA)</i>	The Colostomy Association
<i>Anaesthesia (journal of the AAGBI)</i>	Ehlers-Danlos Support UK
ACTA (Association of Cardiothoracic Anaesthetists)	Headway
AfPP (Association for Perioperative Practice)	IA (Ileostomy & Internal Pouch Support Group)
APAGBI (Association of Paediatric Anaesthetists of Great Britain and Ireland)	ICPV (Independent Cancer Patients' Voice)
APAA (Association of Physicians' Assistants (Anaesthesia))	Kangaroo Club
ARS (Anaesthetic Research Society)	Lay Committee of the RCoA
BARNA (British Anaesthetic and Recovery Nurses Association)	NCRI CLG (National Cancer Research Institute Consumer Liaison Group)
BSOA (British Society of Orthopaedic Anaesthetists)	National Childbirth Trust (NCT)
CARG (Cochrane Anaesthesia Review Group)	North Trent Cancer Research Network Consumer Research Panel
DAS (Difficult Airway Society)	Oesophageal Patients Association (OPA)
FPM (Faculty of Pain Medicine)	Patient Liaison Group of RCS (Eng) (Royal College of Surgeons (England))
NASGBI (Neuroanaesthesia Society of Great Britain and Ireland)	Patients Association
NIAA Health Services Research Centre	Polycystic Kidney Disease Charity
OAA (Obstetric Anaesthetists' Association)	Prostate Cancer Support Federation
RA-UK (Regional Anaesthesia UK)	Royal National Orthopaedic Hospital Patient Group
RCS (Eng) (Royal College of Surgeons (England))	The Swallows (Head & Neck cancer support)
SEA UK (The Society for Education in Anesthesia)	The Urostomy Association (UA)
SOBA (Society of Obesity and Bariatric Anaesthesia)	
SPARC (South Coast Periop Audit & Research Collaboration)	
SWARM (South West Anaesthesia Research Matrix)	
VASGBI (Vascular Anaesthesia Society of Great Britain and Ireland)	
WAAREN (Welsh Anaesthesia Audit, Research & Engagement Network)	

Organisations with at least one Steering Group member are shaded.

**Anaesthesia** concerns the use of drugs (including anaesthetic gas) given to a patient before, during or after an operation. This may be a general anaesthetic (to make the patient unconscious), or regional anaesthesia (to remove sensation and pain in one area, such as a limb), or general pain control.

**Perioperative care** comprises every aspect of patient care before, during and after surgery.

The ambiguities of these definitions, and potential overlaps with other disease areas, were acknowledged, but generally agreed to reflect the imprecise boundaries implicit in the field of perioperative medicine.

### Identifying research questions

Suggestions for research in anaesthesia and perioperative care were invited via an online 'ideas-gathering' survey. Advice from the Steering Group's lay representatives was sought regarding the clarity and ease of use for the lay public (with particular focus on the wording of the explanation of 'anaesthesia and perioperative care'); the survey was also piloted (before going live) among non-medical friends and family of the steering group members. The survey was open from 2 June to 31 July 2014 on the NIAA website and asked patients, carers and clinicians to submit up to three ideas for research as free text (with space for further explanation). Respondents were also asked for some basic demographic information and to consent to their suggestions being entered on the UK's National Institute of Health and Care Excellence's Database of Uncertainties of Effects of Treatments (DUETs).<sup>15</sup>

The survey was advertised and publicised through various routes using the Steering Group's collective expertise and resources. None of the Steering Group members had formal marketing or advertising experience or training, nor did we engage professional advice or assistance with promotional activities (other than (3) below). However, the group agreed in advance—in accordance with JLA methodology—that professional promotion was unnecessary as long as the survey achieved a reasonable spread of clinician and lay responses. Responses were monitored while the survey was live, and further promotion was deliberately targeted towards any under-represented stakeholder groups to ensure a roughly equal distribution of survey responses from different stakeholders. Examples of publicity and promotional activities undertaken included:

1. All partner organisations promoted the survey to their members via newsletters, emails, social media and advertising on their websites.
2. All anaesthetists on the Royal College of Anaesthetists membership database were emailed at least once regarding the survey.

3. Two professionally-designed posters advertising the survey were commissioned for display in outpatient clinics and GP practices.
4. Steering Group members were encouraged to disseminate the survey to friends, families and colleagues—the traditional 'word of mouth' approach.
5. The anaesthetic trainee-led research and audit groups, and the NIAA Health Service Research Centre's 'QuARC' (Quality, Audit and Research Coordinator) network, were contacted to promote and disseminate the survey within their own hospitals.

In addition to the individual responses received via the survey, partner organisations were invited to submit three research suggestions on behalf of their organisations, which were collected separately from the survey responses.

### Classifying research suggestions

A subgroup of Steering Group volunteers was selected to classify the suggestions into themes. The classification system proposed and agreed in advance by the Steering Group was based on the stage of perioperative care addressed (preoperative, intraoperative, or postoperative care), plus—where applicable—a subspecialty classification (eg, paediatric anaesthesia, regional anaesthesia and pain medicine). The subgroup, comprising five members (two anaesthetists, two lay representatives, plus the Steering Group coordinator: SH, MN, JG, MC and OB), held a face-to-face classification meeting in August 2014 chaired by the JLA adviser. Just under half the suggestions were classified during the meeting itself; the rest were classified during September 2014 by at least two subgroup members according to the agreed classification system. Where disagreement regarding classification occurred it was resolved via discussion with other subgroup members or the wider Steering Group.

Any questions deemed inadmissible or 'out of scope' were likewise classified according to why they were considered invalid. Given the broad scope of this PSP we adopted a high threshold for discarding suggestions. Where there was any doubt or disagreement among the subgroup the question was kept in. The final classification of initial survey questions was reviewed and signed off by the full Steering Group in October 2014.

### Refining suggestions into a shortlist

A further meeting of the subgroup was held in December 2014 to refine the longlist of classified research questions into a shortlist of indicative 'summary' questions. For each theme identified during the classification process between 4 and 15 'summary' questions were drafted. These were agreed by consensus to encompass all the individual questions received from the first survey.

This process inevitably led to similar suggestions being amalgamated into a summary question that was broader in scope than the individual suggestions contributing to

it. For example, the suggestions ‘Could taking preoperative vitamin D supplements reduce postoperative complications?’ and ‘Does a carbohydrate preload benefit patients with diabetes having surgery?’ were incorporated into a single summary question: ‘How can preoperative nutritional modifications improve outcomes after surgery?’ This was felt to be a strength rather than a weakness of the PSP methodology, since the overall aim was to identify important themes for future research rather than to generate rigid research hypotheses.

### Literature reviews

The existing anaesthesia and perioperative medicine literature was reviewed to ascertain whether any of the summary questions had already been answered, and to identify any additional research priorities not proposed in the original survey. The JLA defines a question as being unanswered if either (1) no recent (within the past 3 years) reliable systematic reviews of research evidence addressing the question exist; or (2) up-to-date systematic reviews of research evidence show that uncertainty still persists.<sup>16</sup> Literature searches were conducted, principally in the Cochrane Library and MEDLINE, for published systematic reviews relevant to each summary question. Where no systematic reviews were found, other relevant review articles summarising the primary evidence base were included; on occasion, national audit publications and large randomised controlled trials were also included if they were considered to constitute a significant part of the evidence base for a particular question.

All literature searches were conducted by the Steering Group coordinator (OB). This included reviewing the conclusions of all Cochrane reviews in anaesthesia and perioperative medicine for any additional research questions not covered by the summary questions in our shortlist. Expert advice regarding unpublished research (ie, work either currently in progress or planned for the future) was also sought from the specialist anaesthetic societies in their respective fields of expertise.

### Interim prioritisation

Following completion of the literature reviews we conducted a second online ‘prioritisation’ survey asking respondents to select the 10 most important research questions from the shortlist of 92 summary questions. As with the first survey, this survey was accessible via the NIAA website and open for approximately 2 months (2 February to 7 April 2015). It was advertised through similar channels, informed by our experience of what strategies had proved most effective previously. Specifically, more use was made of Twitter in targeting particular patient and professional audiences.

### Final prioritisation: deciding the ‘top ten’ priorities

Following closure of the interim prioritisation survey we examined the distribution of responses from clinicians and lay respondents (ie, patients and carers). It was

agreed a priori that, in the event of significant under-representation of either group, we would apply extra weighting to the under-represented group’s responses in accordance with JLA guidelines.<sup>12</sup> The steering group thus decided in advance that if either group totalled more than two-thirds of responses, the under-represented group’s responses would be given double weighting to ensure approximately even representation of professional and lay stakeholders.

JLA guidelines also recommend that only questions that are considered shared priorities across stakeholder groups should progress to the final prioritisation workshop. The steering group thus decided in advance to exclude any questions nominated overwhelmingly (defined as >90% of responses) by only clinicians or only lay respondents, since they were by definition not shared priorities.

After applying the weighting described above, we ranked the shortlist questions from most popular (ie, with the most nominations as a ‘top ten’ question) to least popular. We then excluded any that had been chosen only by one group. The most popular 25 questions were taken forward for the final prioritisation workshop.

The final prioritisation workshop, to which all partner organisations were invited to send a representative, was held on 12 May 2015. The workshop used a modified Delphi process to achieve consensus on the final ‘top ten’ priorities. Stakeholders were divided into three groups (each comprising similar proportions of clinicians and lay representatives) and discussed the 25 questions within their groups for an hour, establishing areas of agreement and disagreement about which were the most important. Each group then ranked the questions, before reconvening to compare rankings to identify any emerging consensus. The groups were then reassorted into different groups (maintaining the clinician/lay balance) and each new group spent a further hour discussing and ranking the questions again. In the final plenary session, the groups came together, and collectively discussed the emerging aggregate ranking, to identify and agree on the highest ranked questions. The final ranking and ‘top ten’ priorities were then presented to the group and ratified by mutual consensus.

### Publication and dissemination of results

This paper constitutes the first publication of results from the PSP. Summary results have also been sent individually to all partner organisations and other known funders of anaesthesia and perioperative research, and further publications are planned to maximise the impact of the PSP’s results in shaping the future research agenda. These will include an appraisal of the service user issues raised at various stages of the PSP, discussion of the PSP methodology and preparation of vignettes for the NIHR’s HTA programme.

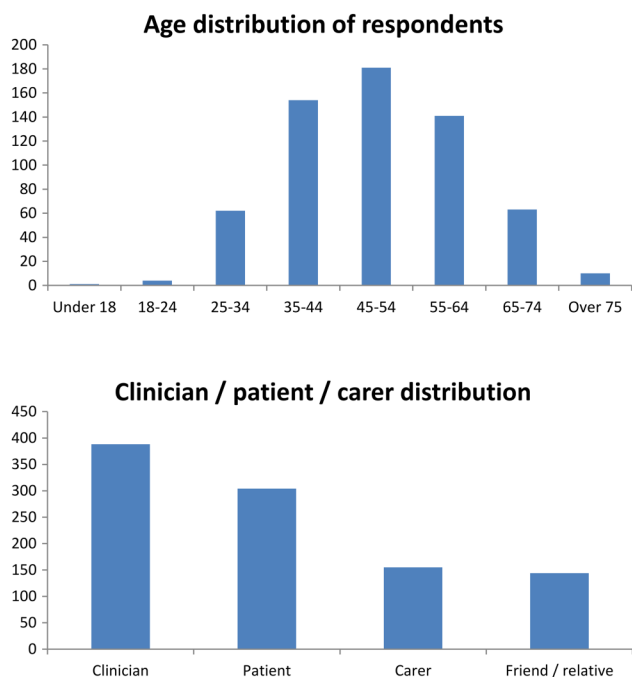
## RESULTS

### Initial survey

Six hundred and twenty-three individuals, almost all (98%) aged between 25 and 75 years old, submitted 1420 research suggestions in the initial ideas-gathering survey. Three hundred and eighty-eight (63%) identified themselves as healthcare professionals; 304 (49%) as patients with experience of surgery or anaesthesia, and 299 (48%) as carers or friends of patients who had undergone surgery or anaesthesia (participants were asked to tick all boxes that applied to them). Eleven partner organisations (three patient organisations, eight anaesthetic specialist societies) submitted a further 56 suggestions, yielding 1476 proposed research questions in total. The distribution of participants by age and background is shown below (figure 2).

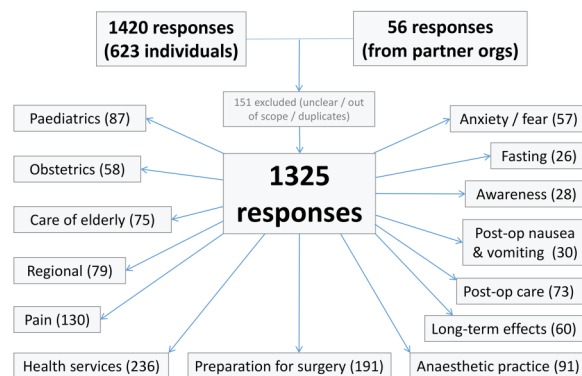
### Classification

One hundred and fifty-one responses were subsequently excluded from the list after agreement among the Steering Group, leaving 1325 responses that were classified and subsequently contributed to the shortlist of summary questions. Reasons for exclusion were 'unclear suggestion' (19 responses); 'duplicate response' (ie, same or near-identical set of questions already submitted from same web address, 29 suggestions); 'outside scope' (41); 'no discernible research question' (31); and, 'generic healthcare question' (31). A simplified classification of the questions submitted in the initial survey which was performed by a subgroup of the Steering Group and subsequently approved by the rest of the full Steering Group, is shown below (figure 3).



**Figure 2** Age and background of initial survey respondents.

### First survey: results



**Figure 3** Classification of research questions (minus those deemed out of scope) submitted.

### Shortlisting and literature reviews

A shortlist of 92 summary questions (see online supplementary appendix 1), divided into 16 broad 'themes', was approved by the Steering Group in January 2015. The subsequent literature review judged 31 of these to have been 'partly answered' by published research, and 61 as 'unanswered'. No question was judged fully answered (using the JLA criteria described above) and there were no additional questions revealed not already covered by the shortlist questions. All 92 questions were, therefore, included in the interim prioritisation survey.

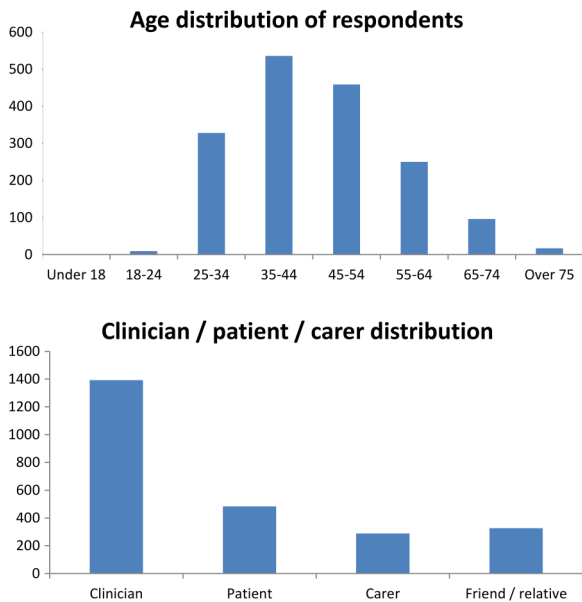
### Interim prioritisation

A total of 1718 respondents completed the interim prioritisation survey. Echoing the first survey, the vast majority (98%) were aged 25–75 years. In contrast to the first survey (where clinician/lay numbers were fairly evenly balanced), only 628 respondents (37%) described themselves as a patient, carer or friend/relative of someone who had undergone surgery or anaesthesia, compared with 1393 respondents (81%) who identified themselves as healthcare professionals. The distribution of respondents' ages and backgrounds is shown below (figure 4). As described in the methods, we therefore doubled the 'lay' vote for each question to achieve a more even representation of clinician and lay views when ranking the questions according to number of votes received.

After applying this correction factor the most popular 25 questions were identified (see online supplementary appendix 2). All had been nominated by both clinicians and lay respondents. When we examined the relative proportions of 'clinician' and 'lay' votes for each question, the largest skew was 70% clinician, 30% lay (one question); all others were closer to 50:50. All were therefore deemed suitable for inclusion at the final workshop.

### Final prioritisation workshop

The final workshop in May 2015 was attended by 23 partner organisation representatives (13 clinicians, 10



**Figure 4** Age and background of second (prioritisation) survey respondents.

patient and carer representatives). A final ‘top ten research priorities’ (see [box 1](#)) was agreed and signed off by all stakeholder representatives. The group deliberately avoided listing them in order of importance; all representatives unanimously agreed that the top ten priorities were all equally important.

(The results of the previous NIAA research priority setting exercise conducted in 2009 are shown in online supplementary appendix 3 for comparison).

### Planned outputs

The methods and results of the PSP, along with all associated documents describing the terms of reference, JLA

#### Box 1 Top ten research priorities for Anaesthesia and Perioperative Care (May 2015)

- What can we do to stop patients developing chronic pain after surgery?
- How can patient care around the time of emergency surgery be improved?
- What long-term harm may result from anaesthesia, particularly following repeated anaesthetics?
- What outcomes should we use to measure the ‘success’ of anaesthesia and perioperative care?
- How can we improve recovery from surgery for elderly patients?
- For which patients does regional (local) anaesthesia give better outcomes than general anaesthesia?
- What are the effects of anaesthesia on the developing brain?
- Do enhanced recovery programmes (fast-track surgery to speed up patient recovery) improve short and long-term outcomes?
- How can preoperative exercise or fitness training, including physiotherapy, improve outcomes after surgery?
- How can we improve communication between the teams looking after patients throughout their surgical journey?

methods and protocol, are accessible on the NIAA website: <http://www.niaa.org.uk/psp>. This includes the 25 most popular survey questions from which the top ten were identified, and the full list of 92 summary questions used in the prioritisation survey. All research suggestions received by the PSP will be entered in UK DUETs to facilitate access for researchers and research funding bodies.

While this manuscript represents the principal publication describing the PSP, others are planned to publicise the results as widely as possible to the PSP’s target audience and to explore specific aspects (such as the consensus methodology involved and patient care issues that were highlighted in the free text first survey). All partner organisations have received individual summary reports of the PSP’s main results, including additional information regarding questions not represented in the top ten which nonetheless may align closely with that organisation’s research interests. Finally, several presentations of the PSP’s results are also planned for relevant anaesthesia and perioperative medicine meetings and conferences.

### DISCUSSION

This PSP has successfully identified 10 ‘top priorities’ for future anaesthetic and perioperative care research. Furthermore, the wide range of stakeholders involved in each stage of the process means that these 10 topics can be considered to reflect the mutual research interests of clinicians, patients and carers. The PSP has also identified a ‘longlist’ of research topics, most of which, although not selected among the top ten priorities, also reflect shared research concerns among healthcare professionals and service users alike. These are all accessible on the NIAA website and via UK DUETs.

#### Strengths of the PSP

The PSP achieved a balance of different stakeholder groups at each stage of the process. Overall, engagement was high with well over 1000 clinicians and around 700 patients and carers contributing their views. Perhaps most significantly, this was the first national research priority setting exercise in anaesthesia and perioperative care to reach out to both clinicians and lay stakeholders. The range and number of responses suggest that this PSP achieved its aim of bringing together a large number of patients, carers and clinicians to identify unanswered questions in the field.

#### Were the methods valid?

The James Lind Alliance has considerable expertise in guiding PSPs and the methods involved in this PSP have thus been rigorously tried and tested in other research priority setting exercises. However, there is no agreed ‘best method’ for reaching a robust stakeholder consensus.<sup>17</sup> Group-based decision-making at every stage was facilitated by the enthusiasm and involvement of the 12 Steering Group members, and by guidance from an experienced, impartial JLA adviser provided objective

reassurance that the methods were consensual, equitable and transparent. All Steering Group members (healthcare professionals and service-users) are authors of this manuscript and approved both the process and outputs.

### Research question format

The 92 summary research questions in our shortlist were all fairly general in scope, in contrast to some of the highly specific individual research suggestions received in the initial survey. Indeed, certain participants at the final workshop voiced concerns that the questions under discussion were too general to be considered true research questions. Other PSPs have reported the same challenge—namely, that refining almost 1500 individual questions into a manageable shortlist of under 100 ‘summary’ questions inevitably entails some loss of detail. The Steering Group discussed this issue and agreed that, as long as all the individual questions were visible on the UK DUETs database so that researchers could see which ones had been incorporated into each summary question, those specific questions could be used in formulating research hypotheses. The Steering Group also agreed that the PSP’s remit was to identify overall themes that a range of different stakeholders considered important for future research, rather than formulating precise research hypotheses.

### Response numbers and distribution

Notwithstanding the fairly even overall balance of healthcare providers’ and service users’ views, some areas of over-representation and under-representation were noted among respondents for both surveys. Around 90% of clinicians completing each survey were anaesthetists; this clearly does not accurately reflect the range of clinicians delivering perioperative care, and likely resulted from more comprehensive promotion within the anaesthetic community than other non-anaesthetic professional organisations. The PSP was wholly funded by organisations represented on the NIAA Research Council and named accordingly, which most likely explains the predominance of anaesthetist responses; however, it might perhaps have achieved greater buy-in from other perioperative professional groups had their respective organisations had greater ownership of the process.

The Steering Group was conscious that patient responses might be coloured by the priorities of their specific organisations. Where we observed that promotion within certain groups was more effective (judged by respondent numbers) than others, we actively encouraged additional promotional efforts by those partner organisations with lower numbers. Enrolling 20 patient organisations as partners helped reduce the risk of any single patient group dominating the responses. Inevitably, some partner organisations were better represented than others, but the overall diversity of patient respondents suggests the PSP achieved its aim of including a broad range of patient perspectives.

Incomplete, ineffective or uneven promotion and publicity is an obvious limitation of PSPs such as this. Furthermore, even a well-advertised PSP that reaches the majority of its target audience may not achieve widespread engagement. Promotion and publicity efforts for this PSP were necessarily constrained by time, financial resources and the lack of advertising expertise of those involved. We deliberately avoided any pecuniary or other incentives to complete the surveys (or participate in the final workshop) as we believed it would risk encouraging responses for reasons other than a genuine interest in future anaesthesia or perioperative care research.

Survey promotion and efforts to maximise respondent numbers constituted a significant workload for this PSP. The success of our efforts—though difficult to quantify—was clearly variable across different media and different audiences. The Steering Group was satisfied that this PSP achieved an excellent response rate and appropriate balance of clinicians and lay respondents in both surveys. Nonetheless, our sample of respondents clearly represents a minority of the clinician population of interest (UK anaesthetists and perioperative healthcare professionals) and a small proportion of the target ‘service-user’ population (all those who have had, or may have, surgery in the future). One might observe that, with over 11 000 anaesthetists in the UK and several million patients undergoing surgery every year, the survey responses represent only the ‘tip of the iceberg’ of relevant stakeholder views; however, clearly not all patients and carers (or indeed clinicians) have a view on future anaesthetic research, and the validity of a consensus process such as a PSP does not rest on receiving input from a majority of stakeholders. Furthermore, the number of responses achieved was considerably higher than other PSPs (many of which receive fewer than 1000 responses)<sup>10</sup> which supports the notion that there was a high degree of professional and service-user buy-in compared with other areas.

### Comparison with the previous NIAA research priority exercise

Both this PSP and the NIAA’s 2009 priority setting exercise employed similar methodology, with an initial research ideas-gathering stage followed by a second prioritisation stage and a final consensus-based stage to agree the foremost research priorities. However, this PSP sought engagement of patients and carers, as well as non-anaesthetist clinicians, to a greater extent than the previous exercise, which was more anaesthetist-focused. The previous exercise also relied in large part on postal surveys (sent to fellows of the Royal College of Anaesthetists and members of the Association of Anaesthetists of Great Britain and Ireland), whereas this PSP used online surveys only.

Notwithstanding these differences, the research priorities identified in each exercise are strikingly similar. Several topics—for example, enhanced recovery, preventing chronic pain, preoperative exercise training,



postoperative recovery and the potential benefits of regional anaesthesia—feature in the top priorities from both exercises.<sup>11</sup> The considerable overlap suggests that both exercises succeeded in identifying genuine priorities for future research. Furthermore, the emergence of many of the same research themes 5 years after the initial exercise emphasises the continuing importance of those themes to the specialty, as well as the reliability and validity of the methods used.

The ‘top ten’ research priorities identified in this PSP are, however, perhaps more ‘patient-centred’ than those from the 2009 exercise. This is most likely a function of the process itself, that is, of the greater contribution of patients and the public to this PSP—and demonstrates the effect of involving patients and the public in research agenda setting.

While most questions were voted for fairly evenly by both lay respondents and clinicians, we did note certain areas that were more popular with clinicians than patients and carers (or vice versa), as can be seen from online supplementary appendix 2. Thus questions addressing specific aspects of perioperative care and physiology (such as cardiac output monitoring, or enhanced recovery programmes) tended to be ranked higher among clinicians, whereas those relating to communication, or to long-term adverse effects of anaesthesia, tended to be ranked higher by lay respondents. Indeed, the responses to both surveys provided useful insights into (non-research related) patient concerns and priorities regarding perioperative care; separate publications are planned to explore these themes in greater detail.

### Implications of this PSP

This PSP provides valuable insights into two important aspects of the future research agenda. First, it has elucidated ongoing uncertainties (‘what we still don’t know’) in anaesthesia and perioperative medicine; second, it has prioritised those uncertainties for future research (‘what we most urgently want to find out’). The proof of the PSP’s success will be the extent to which the identified research priorities are translated into tangible anaesthetic and perioperative research outputs over the coming decades, and the subsequent impact on clinical standards and the care delivered to patients. Further work will be required in the future to evaluate its impact in this regard.

The significant involvement of patients and the public at all stages of the PSP (not just in contributing and prioritising research suggestions, but also as members of the Steering Group) provides the most wide-ranging example to date of engaging patients and the public in anaesthetic and perioperative research. Beside its impact on future anaesthetic and perioperative research, the PSP should thus help promote the public profile of anaesthesia and perioperative medicine and strengthen the ties between the anaesthetic profession and the patients it serves.

Finally, the collaboration between clinicians, patients, and the public in this (and other) PSP’s raises the issue of whether patients and the public should also collaborate with clinicians and researchers in allocating research funds. Given the recognised practical and ethical justifications for involving patients in all aspects of research,<sup>5 6</sup> their contribution to deciding which research applications should receive funding seems a logical extension of the democratic principles underlying patient and public involvement in setting research agendas.

### Future research

Identifying research priorities via widespread consultation of appropriate stakeholders is an important step in defining the research agenda. As new research sheds light on current uncertainties, research priorities for the discipline will need to be re-identified periodically, thus enabling the maintenance of an up-to-date resource for research funders and investigators to access research topics of importance across stakeholder groups. Indeed, regular, ongoing reappraisal of the research agenda in all disciplines—but especially those as fundamental to patient care as anaesthesia and perioperative medicine—is desirable to maximise the relevance and utility of future research.

In addition, the methodology used in research priority setting is new, particularly in regard to how best to achieve valid consensus among a range of stakeholders. Priority setting methodology is thus itself likely to be a subject of future research. Finally, the increasing trend for national and international collaboration in anaesthetic and perioperative research may soon warrant research priority setting exercises at an international level.

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**Contributors** OB (Steering group coordinator from May 2014) organised Steering Group meetings and teleconferences, contacted and enrolled partner organisations, designed the surveys, liaised with partner organisations throughout the PSP, conducted the literature reviews, wrote regular website updates and progress reports for the RCoA Bulletin and JLA newsletter, and wrote the majority of the final manuscript. MG (Steering group coordinator prior to May 2014) and NB made the initial application to the JLA for an Anaesthesia and Perioperative Care PSP, organised the initial awareness-raising meeting, and contacted and enrolled partner organisations. MG, NB, MB, SD, SH, MHN and MPWG collectively drafted the PSP protocol, with advice from LM as JLA chair. LM (JLA chair) chaired all meetings and teleconferences, organised and led the final workshop and ensured compliance with JLA methodology throughout. MB, NB and SD organised dates, venues and facilities for meetings and teleconferences, including the final workshop, and liaised with partner organisations throughout, particularly with reference to funding. MB and NB drafted and circulated minutes of every meeting and teleconference. OB, MC, JG, SH, MPWG and MHN classified the suggestions received from the first survey, and subsequently compiled the shortlist of 92 summary questions, with guidance from LM. MHN wrote news articles regarding the PSP for Anaesthesia News. All authors collectively drafted and approved the PSP protocol and terms of reference. All authors attended a majority of teleconferences, and all attended the final workshop; all authors collectively signed off on steering group decisions (as guided by LM). All authors actively promoted and disseminated both surveys to their respective partner organisations, and to other stakeholder groups where relevant; EH organised additional promotional activities (poster advertising for first survey). All authors made comments and suggestions for the final manuscript, and approved it before submission.

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