

## Original Article

## The definition and aims of Anesthesia: a Delphi-based consensus statement



Joana Berger-Estilita<sup>a,b</sup>, Basak Ceyda Meco<sup>c</sup>, Edoardo DeRobertis<sup>d,e</sup>, Wolfgang Buhre<sup>e,f</sup>, Peter Kirkegard<sup>g,h</sup>, Karina Jakobsen<sup>g,i</sup>, Martin Soehle<sup>j</sup>, Federico Bilotta<sup>k</sup>, Falk von Dincklage<sup>l</sup>, Idit Matot<sup>m</sup>, Yotam Weiss<sup>m</sup>, Vincent Bonhomme<sup>n,o</sup>, Lian Kah Ti<sup>p</sup>, Ivan Rimstad<sup>q</sup>, Clifford Shelton<sup>r,s</sup>, Bartosz Kozlowski<sup>t</sup>, Sarah Saxena<sup>u,v</sup>, Paul McConnell<sup>w</sup>, Anil Hormis<sup>x</sup>, Ahd Zeidan<sup>y,z</sup>, Jan Mulier<sup>u</sup>, Lisbeth Evered<sup>A,B,C</sup>, Paola Aceto<sup>D,E</sup>, Daniel Shmukler<sup>F,G</sup>, Patrice Forget<sup>H,I</sup>, Claudia Marquez Simoes<sup>J</sup>, Luiz Fernando Falcao<sup>K</sup>, Maria Wittman<sup>j</sup>, Ismail Gönegür<sup>L</sup>, Finn Michael Radtke<sup>g,i,\*</sup>

<sup>a</sup> Institute of Anaesthesiology and Intensive Care, Salem Spital, Hirslanden Hospital Group, Bern, Switzerland

<sup>b</sup> Institute for Medical Education, University of Bern, Bern, Switzerland

<sup>c</sup> University of Ankara School of Medicine, Department of Anaesthesiology and ICU, Hacettepe Mahallesi, Ankara, Turkey

<sup>d</sup> Division of Anaesthesia, Analgesia, and Intensive Care, Department of Medicine and Surgery, University of Perugia, Perugia, Italy

<sup>e</sup> European Society of Anaesthesiology and Intensive Care Medicine, Brussels, Belgium

<sup>f</sup> Division of Anaesthesiology, Intensive Care and Emergency Medicine, Department of Anaesthesiology, University Medical Centre Utrecht, The Netherlands

<sup>g</sup> Department of Anaesthesiology, Sjaellands University Hospital (SUH), Nykøbing Falster, Denmark

<sup>h</sup> Department of Clinical Medicine, University of Copenhagen, Copenhagen, Denmark

<sup>i</sup> Department of Anesthesiology, University of Minnesota Medical School, Minneapolis, MN, United States of America

<sup>j</sup> Department of Anaesthesiology and Intensive Care Medicine, University Hospital Bonn, Bonn, Germany

<sup>k</sup> Department of Anaesthesiology, Critical Care and Pain Medicine, Sapienza University of Rome, Rome, Italy

<sup>l</sup> Klinik für Anästhesie, Intensiv-, Notfall- und Schmerzmedizin, Universitätsmedizin Greifswald, Greifswald, Germany

<sup>m</sup> Division of Anaesthesia, Intensive Care, and Pain Management, Tel-Aviv Medical Center, Tel Aviv Medical School, Tel Aviv University, Tel Aviv, Israel

<sup>n</sup> Department of Anaesthesia and Intensive Care Medicine, Liege University Hospital, Liège, Belgium

<sup>o</sup> Anaesthesia and Perioperative Neuroscience Laboratory, GIGA-Consciousness Thematic Unit, GIGA-Research, Liege University, Liège, Belgium

<sup>p</sup> Department of Anaesthesia, NUS Yong Loo Lin School of Medicine, National University Health System, Singapore, Singapore

<sup>q</sup> Department of Anaesthesiology, Division of Emergencies and Critical Care, Oslo University Hospital, Oslo, Norway

<sup>r</sup> Lancaster Medical School, Lancaster University, Lancaster, United Kingdom

<sup>s</sup> Department of Anaesthesia, Wythenshawe Hospital, Manchester University NHS Foundation Trust, Manchester, United Kingdom

<sup>t</sup> Faculty of Medicine, University of Science and Technology, Bydgoszcz, Poland

<sup>u</sup> Department of Anaesthesiology, Helora, Mons, Belgium

<sup>v</sup> Department of Surgery, UMons, Research Institute for Health Sciences and Technology, University of Mons, Mons, Belgium

<sup>w</sup> Anaesthetic Department, Royal Alexandra Hospital, Paisley, United Kingdom

<sup>x</sup> Department of Anaesthesia & Critical Care, The Rotherham NHS Foundation Trust, Rotherham, United Kingdom

<sup>y</sup> Department of Anaesthesiology, King Fahad Specialist Hospital, Dammam, Saudi Arabia

<sup>z</sup> Lebanese University, Faculty of Medicine, Beirut, Lebanon

<sup>A</sup> Department of Anesthesiology, Weill Cornell Medicine, New York, NY, United States of America

<sup>B</sup> Department of Anaesthesia and Acute Pain Medicine, St Vincent's Hospital, Melbourne, Victoria, Australia

<sup>C</sup> Department of Critical Care Medicine, University of Melbourne, Melbourne, Victoria, Australia

<sup>D</sup> Department of Emergency, Anesthesiologic and Reanimation Sciences, Fondazione Policlinico Universitario Agostino Gemelli IRCCS, Rome, Italy

<sup>E</sup> Department of Basic Biotechnological Science, Intensive and Peri-operative Clinics, Catholic University of the Sacred Heart, Policlinico Gemelli, Rome, Italy

<sup>F</sup> Netcare Linksfield Hospital, Johannesburg, South Africa

<sup>G</sup> South African Society of Anaesthesiologists, Glenashley, South Africa

<sup>H</sup> School of Medicine, Medical Sciences and Nutrition, University of Aberdeen, Aberdeen, United Kingdom

<sup>I</sup> Department of Anaesthesia, NHS Grampian, Aberdeen, United Kingdom

<sup>J</sup> Department of Anaesthesiology, Instituto Do Câncer Do Estado de São Paulo, Faculdade de Medicina da Universidade de São Paulo, Hospital Sírio-Libanês, São Paulo, SP, Brazil

<sup>K</sup> Federal University of São Paulo, São Paulo, SP, Brazil

<sup>L</sup> Department of Surgery, Centre for Surgical Science, Zealand University Hospital, Institute for Clinical Medicine, Copenhagen University, Koge, Denmark

Abbreviations: AoA, Aims of Anaesthesia; ADQI, Acute Dialysis Quality Initiative; CREDES, Guidance on Conducting and Reporting Delphi Studies; HDU, High-Dependency Unit; ICU, Intensive Care Unit; IQR, Interquartile Range; PACU, Post-Anaesthesia Care Unit; PONV, Postoperative Nausea and Vomiting; PREM, Patient-Reported Experience Measures; PRO, Patient-Reported Outcomes; SPSS, Statistical Package for the Social Sciences.

\* Corresponding author.

E-mail address: [finnmradtke@me.com](mailto:finnmradtke@me.com) (F.M. Radtke).

<https://doi.org/10.1016/j.accpm.2025.101614>

2352-5568/© 2025 The Author(s). Published by Elsevier Masson SAS on behalf of Société Française d'Anesthésie et de Réanimation (SFAR). This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

## ARTICLE INFO

## Article history:

Available online 27 September 2025

## Keywords:

Delphi consensus  
Patient-centred care  
Precision anaesthesia  
Perioperative outcomes  
Anaesthesia definition

## ABSTRACT

**Background:** Anaesthesia is crucial in ensuring patient comfort and safety during surgical procedures by inducing a temporary loss of sensation, memory, and consciousness. However, its multifaceted nature presents challenges in defining its aims and expected outcomes. This study aimed to establish a consensus on anaesthesia's definition and core aims using a structured Delphi process.

**Methods:** We conducted a modified three-round eDelphi method involving 23 international experts. Participants engaged in iterative online surveys to refine a consensus definition and aims. Consensus was predefined as achieving  $\geq 80\%$  agreement. The process included external expert reviews to enhance objectivity and validity. Statistical analyses included median, interquartile range (IQR), and agreement percentages.

**Results:** The Delphi process resulted in consensus on 49 aims and a refined definition of anaesthesia. The final definition emphasises safe, effective, individualised, patient-centred, and empathetic care, ensuring optimal surgical conditions while enhancing patient outcomes. Key aims included preoperative optimisation, stress and pain reduction, organ function preservation, prompt emergence and recovery, interdisciplinary teamwork, continuous outcome assessment, and sustainability in anaesthesia practices. The final agreement rate for the updated definition was 82.6% (median: 10, IQR: 9–10). Additionally, environmental sustainability was recognised as an integral aim.

**Conclusion:** The consensus developed in this study provides a structured framework for defining anaesthesia's objectives, improving patient-centred care, guiding clinical practice, and fostering research. By incorporating sustainability and long-term patient outcomes, the consensus supports the evolution of precision anaesthesia. Future research will validate these defined aims in various perioperative settings and refine the consensus based on real-world applications.

© 2025 The Author(s). Published by Elsevier Masson SAS on behalf of Société Française d'Anesthésie et de Réanimation (SFAR). This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

## Introduction

Anaesthesia is pivotal in ensuring patient comfort and safety during surgical procedures. It encompasses a broad spectrum of medical interventions designed to induce temporary loss of sensation, memory, and consciousness. Ultimately, it promotes successful procedures and improves surgical outcomes by facilitating optimal surgical conditions.

However, the multifaceted nature of anaesthesia presents challenges in defining its aims and outcomes. The goals of anaesthesia encompass pain relief, lack of awareness or sensation, physiological stability, control of surgical stress, surgical procedure facilitation, and a smooth recovery process. Each aim is interconnected, requiring a delicate balance of pharmacological agents, monitoring techniques, and meticulous care. Anaesthesia providers must navigate the complexities of individual patient characteristics, diverse surgical procedures, and advancing medical technologies, making it difficult to establish precise aims and outcomes. Other crucial aspects further contribute to the complexity of anaesthetic care. First, there is a risk of losing focus on patient-centred outcomes and care, mainly when the main onus lies in the intraoperative phase [1]. Recognising this challenge is essential to ensure patient-centred care during anaesthesia. Second, educating staff about the clear and explicit focus of anaesthetic care can enhance the overall quality of the provided services. Lastly, the paucity of intermediate and long-term outcomes underscores the need to explicitly state and emphasise these outcomes to align them with clinical efforts.

It is important for various stakeholders [2] to establish clear definitions of anaesthesia's aims. Precise definitions offer a framework for anaesthesia providers to guide their practice and set benchmarks for patient care [3]. They enhance communication among healthcare professionals, fostering a shared understanding of goals and facilitating interdisciplinary collaboration. Well-defined aims and outcomes enable the development of standardised protocols and guidelines, optimising patient safety and the quality of care [4,5].

There is currently a lack of consensus on providing clinical outcome data [6–8] in anaesthesia. Although core outcome sets relevant to research [2] or specific sub-populations [9–11] have been published, no core aims have been developed for patient-centred anaesthesia. This manuscript seeks to establish a consensus on the definition and aims of anaesthesia. The need for a definition and aims arises from the multifaceted nature of anaesthesia. The purpose is to advance patient-centred precision care by providing anaesthesia clinicians with recommendations for improved perioperative outcomes. With this work, we report eDelphi Group results to define anaesthesia and identify the aims of fundamental importance to anaesthesia care providers.

## Materials and methods

### Ethics

This study followed the World Medical Association Declaration of Helsinki Ethical Principles for Medical Research Involving Human Subjects [12] and complied with the Swiss Human Research Act. The Cantonal Ethics Committee of Bern (KEK Bern) waived the need for ethics approval (BASEC-number: Req-2023-00845). All participants gave their consent to participate. A cover letter explaining the purpose of each round accompanied all questionnaires. We followed the Guidance on Conducting and Reporting Delphi Studies (CREDES) [13]. While preparing this work, the authors used ChatGPT 4.0 and Grammarly (Grammarly, Inc., San Francisco, CA, USA) to improve readability. After using these services, the authors reviewed and edited the content as needed and take full responsibility for the publication's content.

### Study design and setting

We used a modified three-round Delphi technique to establish a definition of the aims of anaesthesia [14,15]. We used the Delphi technique because it enables stakeholders to work remotely with various target group representatives [16,17] and allows opinions from

a broad range of experts to be consolidated into a manageable number of precise statements [14]. This technique defines “pooled intelligence” as the capture of the collective opinion of stakeholders [18]. Briefly described, stakeholders answer questionnaires in rounds, after which an external facilitator summarises the forecasts [14,15]. This way, stakeholders can revise their former answers in light of the result that the group will converge towards a “consensus” [19].

### Procedure

The eDelphi Working Group met in Potsdam, Germany, on February 2nd and 3rd, 2023, to identify research priorities. During this meeting, a collaborative group of diverse international experts from different anaesthesia subdisciplines was tasked with developing consensus-based recommendations for anaesthesia definitions and aims.

The Aims of Anaesthesia (AoA) process was based on an established modified Delphi process already successfully used in the Acute Dialysis Quality Initiative (ADQI) conferences [20], including the following iterative steps: (1) building consensus around the most critical questions related to the topic, (2) a literature review of the topic raised by each question, and (3) sequential steps of content development and refinement until an agreement is achieved and a consensus document is created. After the initial meeting, a literature search was conducted in Medline based on predefined questions and previously published literature [2,21]. Upon the conclusion of the preliminary search phase, a comprehensive compilation of aims, along with their respective conceptual clarifications, was synthesised. The synthesis involved combining and organising the search results into well-defined thematic dimensions. The final step of content development and consensus refinement involved a three-round, stepwise Delphi consensus process that took place online. Finally, plenary group members voted to signal formal agreement or disagreement with the final statements/recommendations.

### Study participants

The consensus meeting participants were recruited based on their expertise in perioperative medicine (Appendix 1, List of Experts). We aimed to include 25 stakeholders as participants [22,23]. A set of 30 invitations to stakeholders was sent out to obtain sufficient participants in addition to the experts attending the meeting. The process of selecting collaborators was carried out systematically and with careful consideration. Anaesthesiologists were identified based on their involvement in executing, researching, or imparting education in anaesthesia. They were chosen based on their role in shaping how patients are treated and their impact on discussions in local and global settings. The geographic dispersion was purported to encapsulate a diverse spectrum of ethnodemographic backgrounds, thus reflecting different theoretical orientations and clinical practices.

### Data collection and management

We followed a modified eDelphi technique [15]. In the first round, all participating stakeholders were invited by email to answer the questionnaire. Ten days after the first invitation, they received a second e-mail reminder. All stakeholders participating in round 1 were invited via email to the following online rounds.

The response formats for rounds 1 and 2 were a 10-point Likert scale (strongly disagree = 1 to strongly agree = 10). After the first and second rounds, we calculated the median and Interquartile Range [IQR] for each statement and percentage of agreement by adding points 9 and 10 and checking their proportionate part of the total answers for each given question.

### Consensus definition

Although a uniform set of guidelines and unanimous agreement for Delphi studies is absent in the existing literature, most Delphi studies characterise consensus as a specific percentage of participants agreeing on a certain statement. In this study, a consensus was predefined as having  $\geq 80\%$  agreement, denoting that a minimum of 80% of participants needed to categorise their stance as Strongly Agree (9 or 10) on a ten-point Likert scale. This threshold used was deemed most appropriate considering that consensus thresholds are typically set at  $\geq 70\%$ ,  $\geq 75\%$ , or  $\geq 80\%$  agreement, with  $\geq 80\%$  representing a very rigorous level of agreement [24]. Items with agreement and consensus were added to the final list. Items with disagreement (less than 50% agreement) were immediately excluded.

After completing each round, the facilitator (JBE) read all the comments, edited and merged similar answers, and grouped them into categories to organise the following round questionnaire. BCM double-checked the results. After each round, stakeholders were given the median ratings from the previous findings and levels of agreement for each statement. All items without consensus had to be re-rated. Items included in the questionnaire were again re-piloted, and final edits were made based on the received feedback. In round 3, participants could only answer “yes” or “no”, deciding whether the remaining items should be included in the final aims list. Items with 80% or more of stakeholder agreement were accepted, and the remaining were discarded. The pre-final list was sent again to all stakeholders for comment and/or approval (flowchart illustrating all rounds; Fig. 1).

To ensure a high-quality survey instrument, all rounds of questionnaires were developed iteratively through consultation and feedback. The online version was pilot-tested with two steering committee stakeholders (BCM and FR) and one native English speaker (CS) to affirm the comprehensibility of the questionnaire and the usefulness of the response options. At the end of round 3, a final item list and an updated definition were developed. The final version was then distributed to all members who were required to reply to or otherwise support the final document. Some minor changes were made according to the consensus at this final stage. In addition, an external review of the Delphi findings was conducted to ensure impartial evaluation and validation of the consensus-building process. This external scrutiny aimed to enhance the credibility and robustness of the study outcomes by obtaining independent expert perspectives on the panel’s deliberations and resultant conclusions. The engagement of external reviewers, who were not directly involved in the Delphi rounds, introduced an additional layer of objectivity and critical appraisal to the consensus achieved. This rigorous external assessment contributed to the overall validity and robustness of the study’s consensus outcomes. In the end, all recommendations were unanimously approved unless stated otherwise.

### Data handling

Each questionnaire result was descriptively analysed. Data from the consecutive rounds were stored in Google Forms<sup>®</sup>, password-protected, and only accessible to the facilitator (JBE).

### Statistical analysis

Descriptive statistics were used to analyse the responses across all three Delphi rounds. The median and interquartile range (IQR) were calculated for each statement to determine the participants’ degree of agreement and variability. The percentage of consensus for each statement was determined by calculating the proportion of participants rating the statement as 9 or 10 on the Likert scale

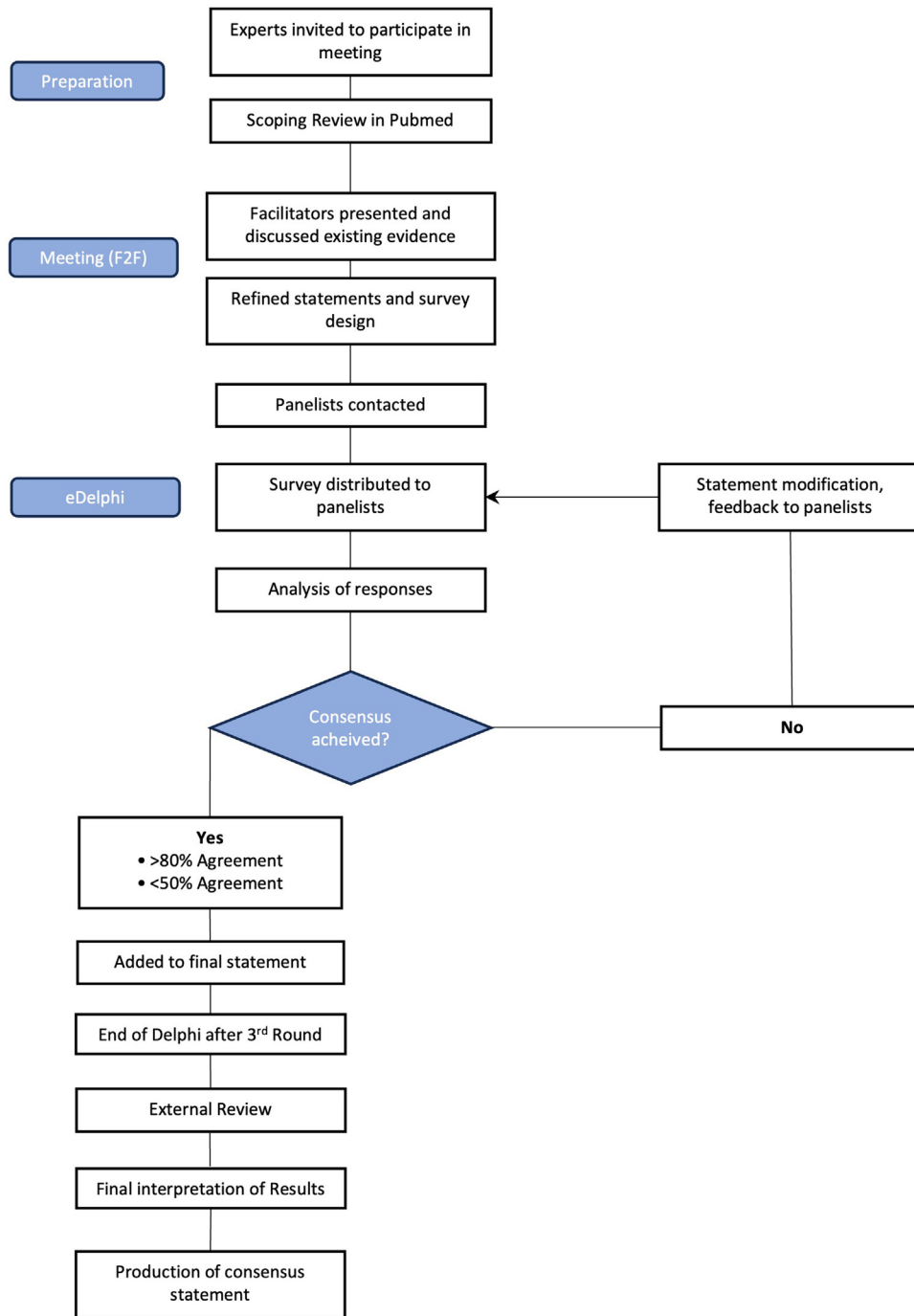


Fig. 1. Study Flowchart.

(strong agreement). In round 3, the percentage of “yes” votes was calculated for each statement. All statistical analyses were conducted using IBM SPSS Statistics Version 27 (IBM Corp, Armonk, NY, USA). Results were reported with medians, IQRs, and consensus percentages for transparency.

**Results**

Data were collected between May and July 2023. Round 1 took 15 days and enrolled 23 participants. Round 2 took 17 days, and round 3 took 5 days. There were no dropouts after enrollment.

*First proposal list of aims and definition of anaesthesia*

After the Potsdam meeting and literature review, we proposed an initial definition and 44 aims of anaesthesia (shown in Table S1, Delphi Round 1 results). All of these were organised into a framework based on six domains. These domains were listed as preoperative (n = 7, 16%), intraoperative (n = 12, 27%), and postoperative (n = 8, 18%) aims. In addition, there were anaesthesia aims at hospital discharge (n = 7, 16%), long-term outcomes (n = 6, 14%), patient-centeredness (n = 2, 5%), and environmental impact of anaesthesia (n = 2, 5%).

The initial proposed definition of the Aims of Anaesthesia was: The aim of Anaesthesia is to provide exceptional patient care (1) through safe and effective administration of the anaesthetic procedure (2) while ensuring optimal surgical conditions (3). This involves minimising stress and anxiety (4), maximising comfort (5) and cognitive function (6), ensuring prompt awakening (7) and recovery (8), reducing adverse events (9), and facilitating early discharge (10). The general perioperative approach and communication are patient-centred (11). The basis for exceptional patient care (12) will be achieved through teamwork (13) and effort for efficiency (14) in a sustainable fashion (15).

#### First Delphi round results

The response rate was 100% (n = 23 participants). The median and percentage of agreement for each item are shown in Table S1 (Delphi Round 1 Results). Sixteen items (36%) were accepted as consensual.

The overall agreement for round 1 was 72.8%. Overall agreement for each dimension was as follows: preoperative: 77.9% (items with consensus 3/7, 42%), intraoperative: 76.4% (items with consensus 7/12, 58%), postoperative: 67.2% (no items with consensus 0/8, 0%), at hospital discharge: 72.0% (items with consensus 2/7, 29%), long-term outcomes: 69.4% (items with consensus 2/6, 33%), patient-centeredness: 85.4% (items with consensus 2/2, 100%), and environmental impact: 56.3% (items with consensus 0/2, 0%). No items were excluded. Twenty-eight (64%) items showed disagreement and were taken up in round 2, along with nine new aims added by stakeholder suggestions.

#### Second round results

The response rate was 100%. The median and percentage of agreement for each item are shown in Table S2 (Delphi Round 2 results). Twenty-five items (68%) were accepted as consensual.

The overall agreement for round 2 was 82.6%. Overall agreement for each dimension was as follows: preoperative: 88% (items with consensus 4/4, 100%), intraoperative: 75.3% (items with consensus 2/6, 33%), postoperative: 84.3% (items with consensus 5/8, 62.5%), at hospital discharge: 86.1% (items with consensus 5/5, 100%), long-term outcomes: 82.6% (items with consensus 2/4, 50%), patient-centeredness: 87% (items with consensus 4/5, 80%), and environmental impact: 84.3% (items with consensus 3/4, 75%). One new item, classified as the dimension “economy”, was excluded. Eleven (30%) items showed disagreement and were taken up in round 3, along with two new aims added by stakeholder suggestions. The overall agreement with the updated definition of anaesthesia was 87.0%, M:9, IQR [9,10].

We also updated the definition of the Aims of Anaesthesia, which read: “The aim of anaesthesia, following a shared-decision making process (0), is to provide state-of-the-art (1), safe (2), and effective (3) individualised (4), patient-centred (5) empathetic care (6). Its focus is on maintaining or enhancing patient outcomes (7) while ensuring optimal conditions for surgery and other procedures (8), executed sustainably and efficiently (9). This involves preoperative optimisation (10), minimising stress (11), anxiety (12), and pain (13), maximising comfort (14), and preserving or enhancing organ function (15), inclusive of brain and cognitive function (16). The goal encompasses prompt emergence (17) and recovery (18), and fostering an environment conducive to facilitating a timely discharge (19). Outstanding patient care (20) is accomplished through effective teamwork (21), continuous and systematic review with learning from outcomes (22), adherence to sustainable healthcare practices (23), and the promotion of both clinical and economic efficiency (24).”

#### Third round results

All twenty-three stakeholders assessed the remaining thirteen items for inclusion in the final document. All items with an 80% or more agreement were selected for the final listing. This round reached a consensus for eight items (62%). Overall agreement was 76.2%. Table S3 (Delphi Round 3 results) shows all included items during this round. After merging redundant items, we had 49 items to be included in the Aims of Anaesthesia (Table 1).

#### Final updated definition of the Aims of Anaesthesia

After the three Delphi rounds, the final definition reads: The aim of anaesthesia, following a shared and supported decision-making process, is to provide state-of-the-art, safe, effective, individualised, patient-centred, empathetic care. Its focus is on maintaining or enhancing patient outcomes while ensuring optimal conditions for surgery and other procedures, executed in a sustainable and efficient manner, M: 10, IQR [9,10], Agreement 82.6%.

This involves preoperative optimisation (10), minimising stress (11), anxiety (12), and pain (13), maximising comfort (14), and preserving or enhancing organ function (15), inclusive of brain and cognitive function (16). The goal encompasses prompt emergence (17) and recovery (18), and fostering an environment conducive to facilitating a timely discharge (19) and ongoing recovery. Outstanding patient care (20) is accomplished through effective, interdisciplinary teamwork (21), a continuous and systematic review with learning from outcomes (22), adherence to sustainable healthcare practices (23), and the promotion of both clinical and economic efficiency (24), M: 9, IQR [9,10], Agreement 87.0%]

#### External review

We used NASA’s recommendation [14] to have our results externally reviewed upon completion of data handling. Five anaesthesiology and surgical experts (MW, LFF, CMS, DS, and IG) were selected as external reviewers to briefly comment on the validity and usefulness of our methodology and results. The selection process involved identifying individuals with extensive expertise in anaesthesiology and surgery, ensuring a diverse range of experiences and perspectives. The criteria for selection included a track record of scholarly contributions, experience in clinical practice, and expertise in research methodology relevant to the study. These external reviewers evaluated the methodology, data handling, and validity of the study findings while also assessing their practical usefulness in the fields of anaesthesiology and surgery. Their analysis encompassed comparisons of the definition and list of aims with existing research, interpretation, clarity, ethical considerations, and recommendations for future research, all contributing to the overall quality and impact of the study.

#### Discussion

The Delphi process resulted in developing a comprehensive list of 49 anaesthesia aims, categorised into seven domains: preoperative, intraoperative, postoperative, at-hospital discharge, long-term outcomes, patient-centeredness, and environmental impact. The Delphi process achieved consensus on many aims (16 in Round 1 and 25 in Round 2). Eight additional aims were included in the final document, highlighting the approach’s success in generating clear and agreed-upon objectives.

The active inclusion of anxiety, stress, and well-being as parameters in the aims and definition of anaesthesia underscores the paramount importance of patient-centred care and a holistic view of the quality of life after anaesthesia [25]. By acknowledging

**Table 1**  
Aims of anaesthesia as per delphi consensus.

Preoperative	PRE1	To minimize stress and anxiety
	PRE2	To maximize patient comfort and wellbeing
	PRE3	To reduce thirst, fluid fasting times and dehydration
	PRE4	To establish baseline values for patient-reported outcomes
	PRE5	To protect cognitive functions and avoid postoperative delirium
	PRE6	To prevent pain and optimize patient reported outcomes (PROs)
	PRE7	To identify frail and other high-risk patients and focus on their outcomes
Intraoperative	INT1	To provide optimal surgical conditions
	INT2	To maintain homeostasis
	INT3	To avoid unnecessary harm
	INT4	To provide anaesthesia so that surgery can occur
	INT5	To deliver sufficient analgesia/nociception
	INT6	To prevent postoperative nausea and vomiting (PONV)
	INT7	To provide a sufficient level of sedation/anaesthesia and to avoid oversedation
	INT8	To maintain normothermia, normovolaemia and targeted and stable hemodynamic management
	INT10	The absence of intra-operative complications due to anaesthesia
	INT11	The absence of intra-operative adverse effects of drugs
	INT12	To avoid unexpected admission to high-dependency unit (HDU) / intensive care unit (ICU) due to anaesthesia
Postoperative	POS1	To ensure prompt emergence and recovery of the patient
	POS2	To provide early postoperative care in a safe environment (well-designed post-anaesthesia care unit [PACU]) with hemodynamic, respiratory and cognitive monitoring, and pain management
	POS3	To ensure comfort after the surgical procedure
	POS4	To assure adequate pain control after the surgical procedure
	POS5	To avoid airway discomfort after surgery
	POS7	To ensure patient satisfaction with the in-hospital experience
	POS8	To assess the patient's wellbeing after anaesthesia
	At hospital discharge	DIS1
DIS2		To avoid postoperative complications that might delay recovery
DIS3		To avoid organ failure after surgery
DIS4		To avoid postoperative delirium
DIS5		To avoid cognition dysfunction
DIS6		To achieve high patient satisfaction
DIS7		To assess the patient's wellbeing at discharge
Long-Term outcomes	LTO1	To assess the patient's wellbeing after discharge
	LTO2	To (at least) maintain the patient's quality of life
	LTO4	To restore the patient's previous physical activity/functional capacity
	LTO5	To avoid postoperative complications that might cause permanent disability
	LTO6	To avoid long-term cognition disturbances
	LTO7	To avoid chronification of pain
Patient-Centeredness	PC1	To have an individualized approach
	PC2	To have a safe approach
	PC3	To work in partnership with your patient and coordinate with other specialties to the benefit and safety of the patient
	PC4	To ensure that anaesthesia is provided by appropriately trained healthcare professionals
	PC5	To balance the complexities of the requirements of the surgery/diagnostic procedure with those of safe anaesthetic care.
	PC6	To reduce the negative effects of anaesthesia on the patient
	PC7	To work in collaboration with other perioperative specialties and the multidisciplinary team to the benefit of the patient
Sustainability	SUS1	To practice anaesthesia in an environmentally sustainable way
	SUS2	To have a low environmental footprint
	SUS3	To provide a system for the safe and environmentally responsible disposal of anaesthetic gases and other medications
	SUS4	To have knowledge about the environmental footprint of intravenous and inhalational anaesthetic agents

Preoperative (PRE): Aims related to the period before surgery, focusing on patient preparation and well-being; Intraoperative (INT): Aims pertaining to the surgical procedure itself, emphasising the safe and effective administration of anaesthesia; Postoperative (POS): Aims for the period immediately following surgery, emphasising patient comfort, recovery, and monitoring; At Hospital Discharge (DIS): Aims to ensure a smooth patient transition from the hospital and prevent complications; Long-Term Outcomes (LTO): Aims concerning the patient's well-being and quality of life beyond the immediate postoperative period; Patient-Centeredness (PC): Aims promoting personalised, safe, and collaborative anaesthesia care.

Sustainability (SUS): Aims for environmentally responsible anaesthesia practices, minimising the ecological impact of anaesthesia procedures.

and addressing these psychologically essential facets, the consensus statement emphasises a comprehensive approach that extends beyond the physical aspects of medical interventions and aligns with other studies [21]. This alignment highlights the multidimensional nature of patient care, requiring effective teamwork, communication, and shared decision-making to ensure optimal outcomes [25]. By introducing these elements into the aims and definition of anaesthesia, this consensus acknowledges the interconnectedness of physical and psychological well-being during and after anaesthesia.

Recording baseline values of PROMs emerged as a surprising yet fundamental aim in anaesthesia research [26]. This practice enables assessments, benchmarks intervention effectiveness, and facilitates tailored patient care, ultimately supporting a patient-centred approach and enhancing anaesthesia practices [27].

Introducing a novel category, "environmental", as an aim of anaesthesia indicates a forward-looking and comprehensive approach to anaesthesia practice. This addition holds remarkable importance because it recognises the broader implications of anaesthetic interventions on the environment and embraces the imperative for sustainable medical approaches. Viewing environmentally responsible practice as an aim of anaesthesia underscores the ethical responsibility of healthcare providers to minimise the ecological footprint of medical procedures, thus fostering a more sustainable and conscientious healthcare system [28]. Notably, this category corresponds with the principles outlined in the Glasgow Declaration on Sustainability in Anaesthesiology and Intensive Care [29]. By aligning with the principles outlined in the Glasgow Declaration [29], which emphasises sustainable practices in anaesthesia and intensive care, the incorporation of environmental impact as an aim of anaesthesia further strengthens the

commitment of healthcare professionals to holistic well-being, paving the way toward a future where medical interventions not only enhance patient recovery but also contribute positively to the long-term health of both individuals and the planet. The relatively modest initial agreement on sustainability aims may reflect both a lack of standardised metrics in this domain and a broader opportunity to define further and expand this critical area of anaesthetic practice.

Of note, patient experiences were not considered as explicit outcomes. The traditional emphasis on objective, measurable outcomes, alongside the assumption that improving clinical measures enhances experiences, may have contributed to these results. However, contemporary healthcare increasingly recognises the significance of patient-reported experience measures (PREMs), and the research group is committed to addressing the patients' perspectives in future studies.

The comprehensive application of the Delphi process successfully culminated in the development of a consensus-based, well-defined, and patient-centred definition of anaesthesia. This achievement represents a significant stride toward enhancing clarity and precision within the field of anaesthesia. The robustness of this definition hinges on its emphasis on preserving physiological equilibrium, ensuring patient comfort, establishing optimal surgical conditions, and promoting a smooth recovery. By encapsulating these core dimensions, the goals of anaesthesia become more explicit, empowering anaesthesia providers to implement measures for patient-centric care effectively. Moreover, recognising the vital link between anaesthesia and post-surgery quality of life in the years that follow, this definition serves as a foundation for improving long-term patient outcomes and overall well-being.

In addition, these clear and transparent anaesthesia objectives can serve as fundamental stepping stones towards realising precision, patient-centric anaesthesia care. Precision anaesthesia aims to provide the right anaesthetic, in the right dose, at the right time, and to the right patient [30]. The present definition of anaesthesia's aims can accelerate the evolution of precision anaesthesia care. By tailoring anaesthetic interventions to individual patient needs and optimising outcomes, precision anaesthesia strives to improve clinical outcomes while minimising side effects.

Finally, the eDelphi technique has proven effective in aligning the results with the aim of anaesthesia. By leveraging expert opinions and fostering consensus within a panel of anaesthesia professionals, the Delphi method ensures the validity and reliability of the findings. The anonymous nature of the process allows for unbiased contributions, further enhancing the quality of the results. This alignment with the aim of anaesthesia reinforces the importance of the defined aims and their potential impact on patient care and outcomes. Clear aim definitions are paramount for all stakeholders involved in the anaesthetic act. Patients benefit from enhanced comprehension and expectations, leading to patient-centred care. Surgeons gain valuable insights for intraoperative decision-making, potentially optimising surgical outcomes. Hospital administrators can efficiently allocate resources and ensure quality control with clear aims. Moreover, periodic updates to aim definitions align anaesthesia practices with evolving techniques and interventions, enabling precision care.

While the study has made significant progress in defining the aims of anaesthesia, limitations should also be acknowledged. The reliance on expert opinions inherent to all Delphi processes might introduce bias, even with a diverse panel of international experts. Additionally, it's essential to consider that the generalizability of these findings to settings with fewer available resources may be restricted, given the primary focus on anaesthesia within contexts characterised by more abundant resources. Future research should

address these limitations to ensure the relevance and inclusivity of the defined aims and remaining stakeholders relevant to anaesthesia practice.

Moving forward, the AoA project seeks to implement and validate the defined aims across a range of perioperative clinical settings and stakeholders, including patients, surgeons, and c-suite stakeholders. The AoA project seeks to present these findings at professional conferences, develop objective measures for the highest-priority aims, and actively collaborate with key anaesthesiology societies to broaden the discussion and support implementation at local and international levels. However, assessing the applicability and relevance of these current aims in real-world practice will serve as a foundation for their effective implementation and influence. This work can provide valuable insights, and the broader implementation of these aims should be considered a collaborative effort. Future work should aim to prioritise and refine the most impactful aims within each domain, allowing for a more focused and practical implementation of the AoA framework across diverse clinical contexts. Therefore, the next logical step is to view this manuscript as a starting point for discussions and establishing partnerships, such as research groups.

Finally, the study's methodology, employing the Delphi process, could serve as a blueprint for other healthcare domains seeking to define clear aims that enhance practice. By establishing a robust and evidence-based framework, anaesthesia providers can advance precision anaesthesia care, ultimately improving patient outcomes and safety.

#### **CRedit authorship contribution statement**

Conceptualisation: JBE, BCM, KJ, EDR, WB, FR.  
 Data Curation: JBE, BCM, KJ, EDR, WB, FR.  
 Formal Analysis: JBE, BCM, KJ, EDR, WB, FR, CS.  
 Funding Acquisition: None.  
 Investigation: PK, MS, FB FvD, IM, YW, VB, LKT, IR, CS, BK, SS, PMC, AH, AZ, JM, LE, PA, DS, PF, CMS, LLF, MW, IG.  
 Methodology: JBE, BCM, KJ, EDR, WB, FR, CS.  
 Project Administration: JBE, BCM, KJ, EDR, WB, FR, CS.  
 Resources: PK, MS, FB FvD, IM, YW, VB, LKT, IR, CS, BK, SS, PMC, AH, AZ, JM, LE, PA, DS, PF, CMS, LLF, MW, IG.  
 Software: JBE, BCM, KJ, EDR, WB, FR.  
 Supervision: JBE, BCM, KJ, EDR, WB, FR.  
 Validation: DS, PF, CMS, LLF, MW, IG.  
 Visualization: PK, MS, FB FvD, IM, YW, VB, LKT, IR, CS, BK, SS, PMC, AH, AZ, JM, LE, PA, DS, PF, CMS, LLF, MW, IG.  
 Writing – JBE, BCM, KJ, EDR, WB, FR.  
 Writing – PK, MS, FB FvD, IM, YW, VB, LKT, IR, CS, BK, SS, PMC, AH, AZ, JM, LE, PA, DS, PF, CMS, LLF, MW, IG.

#### **Financial support and sponsorship**

None.

#### **Data sharing statement**

The authors confirm that the data supporting the findings of this study are available within the article and its ary materials.

#### **Declaration of competing interest**

JBE, BCM, PM, CS, AH, and YW were supported with travel expenses from Medtronic.

AH received speaker fees from Medtronic /Sedana Medical and Pacira. KJ received speaker fees from Medtronic. CS received speaker/advisory board fees from Fresenius, Cristalia, and Ache.

EDR received speaker/ advisory board fees for Drager, GE, MSD, Fisher & Paykel, Baxter, and Fresenius. SS received speaker fees from MSD, Merck, and Medtronic. PK received speaker/advisory board fees from Paion and Medtronic. PF received speaker/advisory board fees from Oncomfort, Grünenthal, and GE Healthcare. VB has had financial relationships with Orion Pharma, Medtronic, Edwards Medical, and Elsevier. MS received honoraria for lectures from Medtronic and MT Monitortechnik. The remaining authors declare no conflicts of interest.

## Acknowledgements

None.

## Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:<https://doi.org/10.1016/j.accpm.2025.101614>.

## References

- [1] Kodner DL, Spreuwenberg C. Integrated care: meaning, logic, applications, and implications—a discussion paper. *Int J Integr Care* 2002;2:e12.
- [2] Boney O, Moonesinghe SR, Myles PS, Grocott MPW, StEP-COMPAC group. Core Outcome Measures for Perioperative and Anaesthetic Care (COMPAC): a modified Delphi process to develop a core Outcome set for trials in Perioperative Care and anaesthesia. *Br J Anaesth* 2022;128(1):174–85.
- [3] RCoA RCoA. Guidelines for the Provision of Anaesthesia Services (GPAS). In: *Guidelines for the Provision of Anaesthesia Services for Perioperative Care of Elective and Urgent Care Patients 2023*. Royal College of Anaesthetists; 2023.
- [4] Preckel B, Staender S, Arnal D, Brattebo G, Feldman JM, French-O'Carroll R, et al. Ten years of the Helsinki Declaration on patient safety in Anaesthesiology: an expert opinion on peri-operative safety aspects. *Eur J Anaesthesiol* 2020;37(7):521–610.
- [5] Wacker J. Measuring and monitoring perioperative patient safety: a basic approach for clinicians. *Curr Opin Anaesthesiol* 2020;33(6):815–22.
- [6] Haller G, Stoelwinder J, Myles PS, McNeil J. Quality and safety indicators in anaesthesia: a systematic review. *Anesthesiology* 2009;110(5):1158–75.
- [7] Murphy PJ. Measuring and recording outcome. *Br J Anaesth* 2012;109(1):92–8.
- [8] Benn J, Arnold G, Wei I, Riley C, Aleva F. Using quality indicators in anaesthesia: feeding back data to improve care. *Br J Anaesth* 2012;109(1):80–91.
- [9] Dworkin RH, Turk DC, Farrar JT, Haythornthwaite JA, Jensen MP, Katz NP, et al. Core outcome measures for chronic pain clinical trials: IMMPACT recommendations. *Pain* 2005;113(1–2):9–19.
- [10] McNair AG, Whistance RN, Forsythe RO, Macefield R, Rees J, Pullyblank AM, et al. Core outcomes for colorectal cancer surgery: a consensus study. *PLoS Med* 2016;13(8):e1002071.
- [11] O'Donnell CM, Black N, McCourt KC, McBrien ME, Clarke M, Patterson CC, et al. Development of a Core Outcome Set for studies evaluating the effects of anaesthesia on perioperative morbidity and mortality following hip fracture surgery. *Br J Anaesth* 2019;122(1):120–30.
- [12] World Medical Association, WMA. In: *Declaration of Helsinki: Ethical principles for medical research involving human subjects*; 2018, <https://www.wma.net/policies-post/wma-declaration-of-helsinki-ethical-principles-for-medical-research-involving-human-subjects/>.
- [13] Jünger S, Payne SA, Brine J, Radbruch L, Brearley SG. Guidance on Conducting and Reporting DELphi Studies (CREDES) in palliative care: Recommendations based on a methodological systematic review. *Palliative Medicine* 2017;31(8):684–706.
- [14] Nasa P, Jain R, Juneja D. Delphi methodology in healthcare research: how to decide its appropriateness. *World J Methodol* 2021;11(4):116–29.
- [15] Savic LC, Smith AF. How to conduct a Delphi consensus process. *Anaesthesia* 2023;78(2):247–50.
- [16] Atkinson NL, Gold RS. Online research to guide knowledge management planning. *Health Educ Res* 2001;16(6):747–63.
- [17] De Vet E, Brug J, De Nooijer J, Dijkstra A, De Vries NK. Determinants of forward stage transitions: a Delphi study. *Health Educ Res* 2005;20(2):195–205.
- [18] de Villiers MR, de Villiers PJ, Kent AP. The Delphi technique in health sciences education research. *Med Teach* 2005;27(7):639–43.
- [19] Rowe Wright. The Delphi technique as a forecasting tool: issues and analysis. *Int J Forecasting* 1999;15(4).
- [20] Kellum JA, Bellomo R, Ronco C. Acute Dialysis Quality Initiative (ADQI): Methodology. *Int J Artif Organs* 2008;31(2):90–3.
- [21] Moonesinghe SR, Jackson AIR, Boney O, Stevenson N, Chan MTV, Cook TM, et al. Systematic review and consensus definitions for the Standardised Endpoints in Perioperative Medicine initiative: patient-centred outcomes. *Br J Anaesth* 2019;123(5):664–70.
- [22] Murphy MK, Black NA, Lamping DL, McKee CM, Sanderson CF, Askham J, et al. Consensus development methods, and their use in clinical guideline development. *Health Technol Assess* 1998;2(3):1–88.
- [23] Okoli C, Pawlowski SD. The Delphi method as a research tool: an example, design considerations and applications. *Inf Manage* 2004;42(1):15–29.
- [24] Diamond IR, Grant RC, Feldman BM, Pencharz PB, Ling SC, Moore AM, et al. Defining consensus: a systematic review recommends methodologic criteria for reporting of Delphi studies. *J Clin Epidemiol* 2014;67(4):401–9.
- [25] Granziera E, Guglieri I, Del Bianco P, Capovilla E, Dona' B, Ciccarese AA, et al. A multidisciplinary approach to improve preoperative understanding and reduce anxiety: a randomised study. *Eur J Anaesthesiol* 2013;30(12):734–42.
- [26] Wang XS, Gottumukkala V. Patient-reported outcomes: is this the missing link in patient-centered perioperative care? *Best Pract Res Clin Anaesthesiol* 2021;35(4):565–73.
- [27] Bernard H, Foss M. Patient experiences of enhanced recovery after surgery (ERAS). *Br J Nurs* 2014;23(2):100–2. 4–6.
- [28] McGain F, Muret J, Lawson C, Sherman JD. Environmental sustainability in anaesthesia and critical care. *Br J Anaesth* 2020;125(5):680–92.
- [29] Buhre W, De Robertis E, Gonzalez-Pizarro P. The Glasgow declaration on sustainability in Anaesthesiology and Intensive Care. *Eur J Anaesthesiol* 2023;40(7):461–4.
- [30] Berger-Estilita J, Marcolino I, Radtke FM. Patient-centered precision care in anaesthesia - the PC-square (PC) 2 approach. *Curr Opin Anaesthesiol* 2024;37(2):163–70.