Perioperative Medicine

RESEARCH

Open Access

National Institute of Academic Anaesthesia (NIAA) research grants: analysis of awardee characteristics and preliminary grant outputs

Naomi Watson[1] and Gudrun Kunst[1,2*]

Abstract

Background The National Institute of Academic Anaesthesia (NIAA) is a major UK-based funder of academic anaesthesia and perioperative medicine. It holds two grant rounds per year. Since 2019, research outputs have been collected via a widely used online platform, enabling assessment of grant impact. The aim of our study was to report the characteristics of funding awards and awardees, including equality, diversity, and inclusion (EDI) data.

Methods We conducted a retrospective analysis of NIAA grant data submitted by award holders (2019–2023) and assessed EDI characteristics for all applicants and recipients, collected since 2022.

The primary objective was to assess grants by geographical distribution, type of institutions and research category. Secondary objectives included preliminary grant outputs and EDI characteristics of applicants and awardees.

Results Between 2019 and 2023, 63 grants totalling £2,488,857 were awarded. Grants were well-distributed across the UK and Ireland, with London-based research groups receiving the most ($n=16$, 25%) and securing £825,591 (33% of total funding). University-affiliated institutions received 38 grants (60%), while 25 grants (40%) were awarded to teaching and non-teaching hospitals. By research type, pre-clinical studies received 41% of funding ($n=26$), followed by clinical observational (24%, $n=15$), clinical interventional (14%, $n=9$), and epidemiological studies (13%, $n=8$). Fifty-one publications have been reported by 20 principal investigators across 30 journals, with a total of 1723 citations and a median of 17 citations per paper. More than half ($n=28$, 55%) were published in journals with an impact factor of 7 or higher. Most applicants were white, heterosexual males, but no EDI characteristic was significantly associated with application success.

Conclusion NIAA grants were geographically diverse and supported a broad range of research types. Most funded research was published in high-impact journals. However, a notable lack of diversity was observed among applicants, both successful and unsuccessful. Future NIAA strategies should focus on increasing diversity and representation among grant applicants.

Introduction

The National Institute of Academic Anaesthesia (NIAA) was founded in 2008 by the Royal College of Anaesthetists (RCoA), the Association of Anaesthetists of Great Britain and Ireland, and the journals *Anaesthesia* and the *British Journal of Anaesthesia* (BJA). Funding partners include multiple other anaesthetic societies and subspecialties including Cardiac, Paediatric, and Obstetric Anaesthesia, as well as the Difficult Airway Society

*Correspondence:
Gudrun Kunst
gudrun.kunst@kcl.ac.uk
[1] King's College Hospital NHS Foundation Trust, London, UK
[2] School of Cardiovascular and Metabolic Medicine & Sciences, King's College London, London, UK

(Table 1). Its aim is to fund, develop and deliver world-class research in the fields of anaesthesia, pain and perioperative medicine (NIAA Strategy 2023–2028 2024).

From 2008 to 2023, it awarded 299 grants totalling approximately £10 million across 28 funding rounds (typically two per year). On average, 11 grants were funded per round, with £275,000 awarded per round. Most grants provide initial funding for research projects (e.g. pilot or feasibility studies), while a smaller proportion supports Principal Investigators (PIs) at undergraduate, doctoral, and postdoctoral levels.

Before 2019, successful applicants could submit reports on grant-supported outputs for review to individual funders, but the submission was partly optional. Since then, the online portal Researchfish has been used to systematically track funding details and research outputs. Researchfish, a globally used tool for funders and universities, collects annual data on awarded grants and their outcomes (Researchfish 2024).

Engagement with Researchfish is now mandatory for NIAA grant recipients, ensuring comprehensive reporting. This allows funders to assess research impact and optimise future funding strategies.

Analysing the distribution of funding and diversity of applicants highlights potential targets for improving support, collaboration and inclusion. In 2019, the NIAA board established the Equality, Diversity, and Inclusivity (EDI) Task and Finish Group to address these issues and make recommendations. Since 2022, the NIAA has required anonymised EDI data reporting, collected separately from grant applications.

Here, we present an analysis of the characteristics of grant recipients, geographical distribution, institution type, research category, and scientific impact of NIAA grants awarded between 2019 and 2023. A full assessment of research impact remains limited, as some projects are ongoing, and publications often follow a time lag after completion. Additionally, we review EDI data from 2022 to 2024 grant rounds, including both successful and unsuccessful applicants.

Table 1 NIAA-affiliated organisations and societies

Association for Cardiothoracic Anaesthesia and Critical Care
British Journal of Anaesthesia
Royal College of Anaesthesia
Vascular Anaesthesia Society of Great Britain and Ireland
Association of Paediatric Anaesthetists of Great Britain and Ireland
Association of Anaesthetists of Great Britain and Ireland
Barema–Association for Anaesthetic and Respiratory Device Suppliers
Australian and New Zealand College of Anaesthetists
College of Anaesthesiologists of Ireland
Difficult Airway Society
Obstetric Anaesthetists' Association

Methods

Data sources

The governing body of the NIAA approved the analysis of the Researchfish database. Details of NIAA grants awarded between 2019 and 2023 were extracted, including grant type, value, award date, funder, and associated institution. Research outputs were recorded, including publications (with digital object identifiers [DOIs] and journal titles) and alternative outputs such as conference presentations, media coverage, social media attention, expert panel discussions, and contributions to scientific policy development.

Researchfish records are updated annually by grant holders during a 2-month window (February–March). Studies were classified as pre-clinical, clinical observational, clinical interventional, clinical qualitative, or epidemiological based on project titles and reported publications.

Citation counts (up to December 30, 2024) were determined using Google Scholar, while 2023 journal impact factors were obtained from Journal Citation Reports (Clarivate Analytics).

The NIAA introduced reporting of Equality, Diversity and Inclusivity (EDI) data in 2022 for all grant applicants and we analysed publicly available NIAA EDI data for all applicants in grant rounds between 2022 and 2024. This is self-reported and includes sex, gender, ethnicity, religion or belief, sexual orientation, disability, carer responsibilities and if English is their first language. Sex, a biological definition based on chromosomal characteristics, and gender, a non-binary social construct relating to how an individual identifies, are both reported; however, for the purposes of this article, we will refer to gender as we are discussing identity.

Outcomes

Our primary objective was to assess geographical distribution, the type of the associated institution and the type of research being funded. Secondary objectives included an initial assessment of the scientific impact of NIAA-funded publications and an analysis of EDI characteristics among applicants and awardees.

Statistical analyses

All data from Researchfish and the NIAA were anonymised and input into Microsoft Excel 2024 (Microsoft Corp, Redmond, WA, USA) for descriptive statistics. Statistical analyses were conducted using Stata 18 (StataCorp, College Station, TX, USA). Chi-square or Fisher's

exact tests were used to compare EDI data between successful and unsuccessful applicants, with $p < 0.05$ considered statistically significant.

Results

Between 2019 and 2023, NIAA-affiliated organisations awarded 63 grants totaling £2,488,857, with an average of £497,771 per round (Table 2). Three grants were returned due to COVID-19-related disruptions. The pandemic impacted funding availability, leading to suspended funding rounds in 2020 and 2021.

Thirteen organisations provided funding, some collaborating to offer larger grants (Fig. 1). The BJA/RCoA awarded the highest number of grants ($n = 24$) and the most funding (£1,517,588), followed by the Association of Anaesthetists/Anaesthesia Journal ($n = 21$, £336,419).

Geographical distribution

Figure 2 summarises the geographical distribution of NIAA grants, with London receiving the largest share—£825,591 (33% of total funding) for 16 grants (25%). London-based research groups also had the highest number of PIs with publications ($n = 8$, 40%) and alternative outputs ($n = 4$, 50%).

Beyond London, the North-East of England (including Yorkshire) and Scotland received the next highest funding allocations: £384,143 ($n = 9$ grants, 14%) and £373,553 ($n = 7$ grants, 11%), respectively.

Institution type

Most grants (38, 60%) were awarded to university-affiliated research groups, receiving 79% (£1,967,240) of total funding (Fig. 3). Non-university research groups based in teaching hospitals received £383,491 for 17 projects, while those in non-teaching hospitals received £138,126 for 8 projects (Fig. 3). Among PIs with publications,

Table 2 Summary of awarded grants and outputs

Total number of grants	63
Total grant sum	£2,488,857
Number of publications	51
Number of citations	1723
Number of other outputs	26

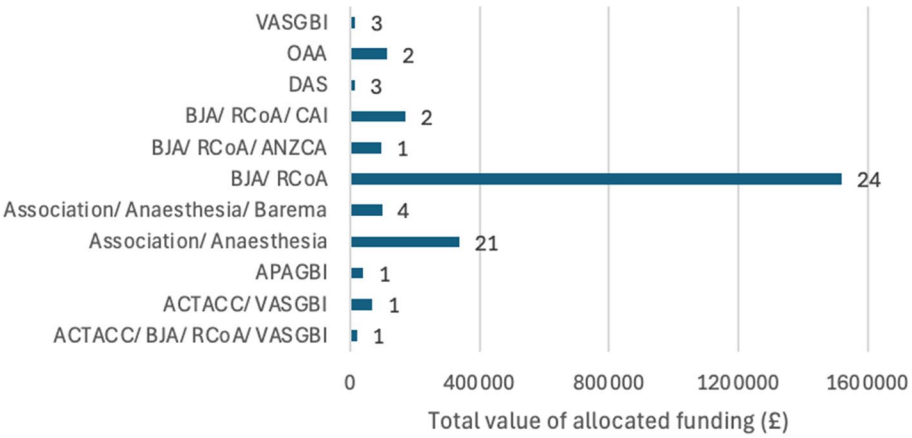

Fig. 1 NIAA funding sources. Values of funding provided by NIAA-affiliated organisations, with a number of grants awarded by each organisation. ACTACC, Association for Cardiothoracic Anaesthesia and Critical Care; ANZCA, Australian and New Zealand College of Anaesthetists; APAGBI, Association of Paediatric Anaesthetists of Great Britain and Ireland; Anaesthesia, Anaesthesia Journal; Association, Association of Anaesthetists of Great Britain and Ireland; Barema, Association for Anaesthetic and Respiratory Device Suppliers; BJA, British Journal of Anaesthesia; CAI, College of Anaesthesiologists of Ireland; DAS, Difficult Airway Society; OAA, Obstetric Anaesthetists Association; RCoA, Royal College of Anaesthesists; VASGBI, Vascular Anaesthesia Society of Great Britain and Ireland

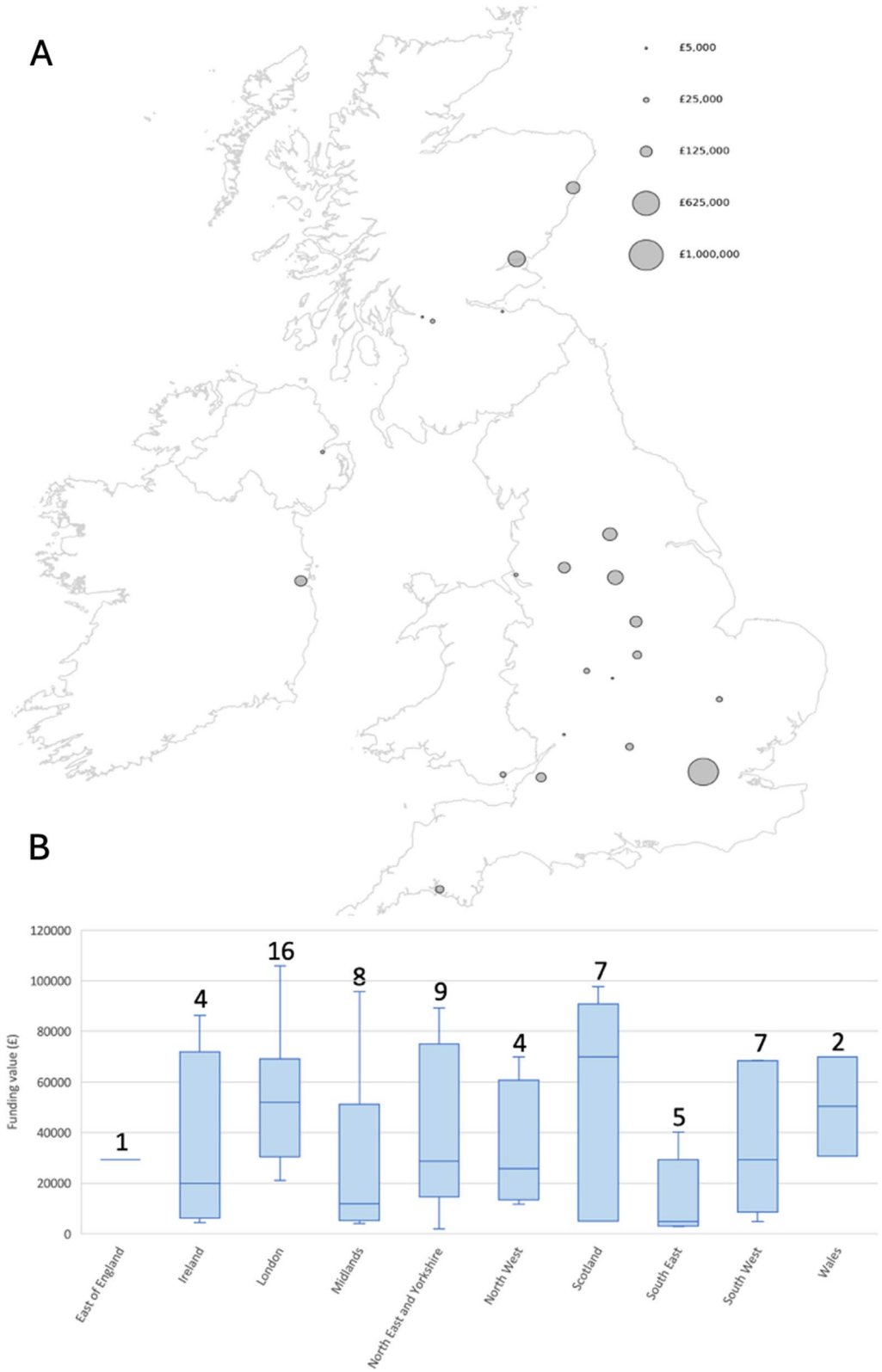

Fig. 2 Geographical distributions of grant income and number of grants in the United Kingdom and Ireland. **a** Heat map demonstrating the distribution of grants and funding allocations by geographical location. **b** Median, interquartile range, and range of funding allocations by region, with a number of grants allocated to each region above each plot. For regions with fewer than 3 grants, only the median ± range is shown

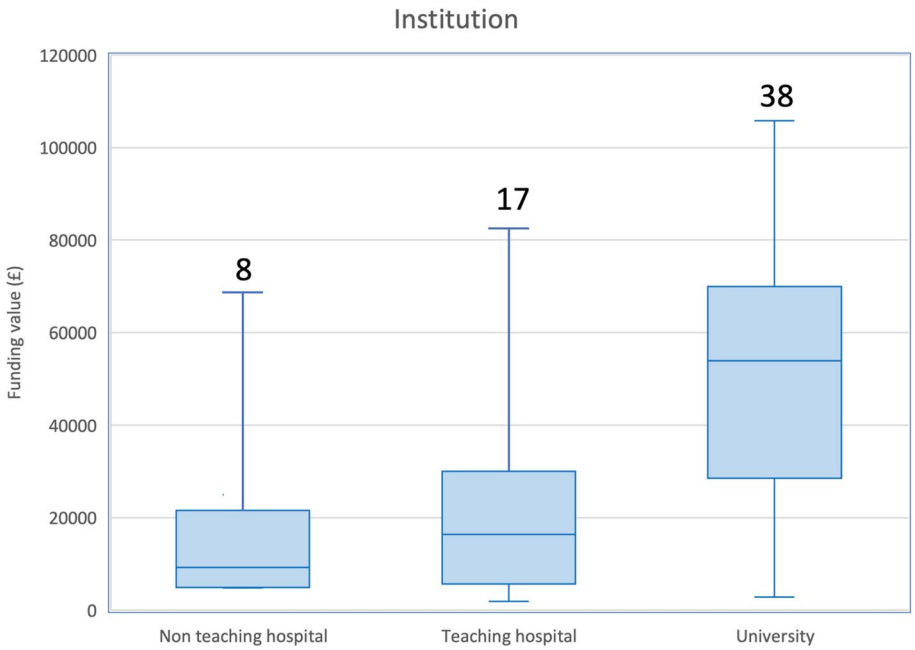

Fig. 3 Funding allocation by type of institution. Median, interquartile range and range of funding allocation by type of institution, with the number of grants allocated to each institution type above each plot

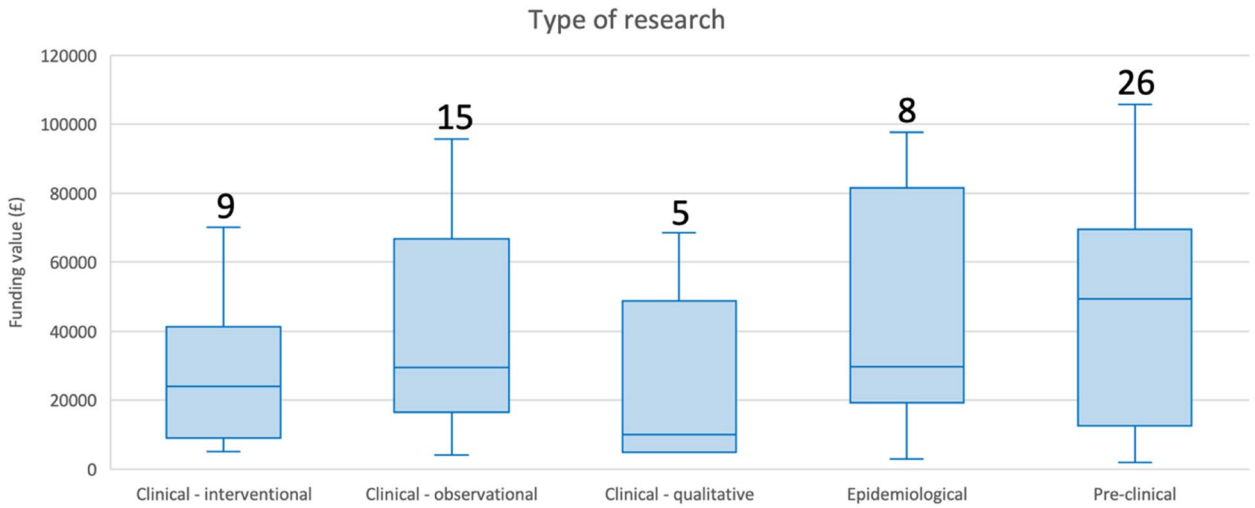

Fig. 4 Value of funding for different categories of research. Median, interquartile range and range of funding allocation for different categories of research, with the number of grants allocated to each category above each plot

85% (n = 17) were university-based, 10% (n = 2) were in teaching hospitals, and 5% (n = 1) were in non-teaching hospitals.

Research type

NIAA-funded research covered pre-clinical ($n=26$, 41%), clinical observational ($n=15$, 24%), epidemiological ($n=8$, 13%), clinical interventional ($n=9$, 14%), and clinical qualitative ($n=5$, 8%) studies. Pre-clinical research acquired the greatest proportion of available funds (£1,180,311, 47%), as well as having the highest median funding value (Fig. 4).

Grant outputs

NIAA research grant data covered 95% of funded projects, with 5% of funds returned due to COVID-19-related interruptions.

Table 3 Journals publishing NIAA-funded research with 2023 impact factor and number of publications per journal

Journals	Impact Factor (2023)	Number of Publications
The Lancet	98.4	1
American Journal of Respiratory and Critical Care Medicine	19.3	1
Science Translational Medicine	15.8	1
Journal of Extracellular Vesicles	15.5	1
Journal of Clinical Investigation	13.3	1
Proceedings of the National Academy of Sciences of the United States of America	9.4	1
British Journal of Anaesthesia	9.1	10
Critical Care (London, England)	8.8	1
The British Journal of Surgery	8.7	1
Seminars in Immunopathology	7.9	1
Annals of Surgery	7.9	1
Critical Care Medicine	7.7	2
Anaesthesia	7.5	6
British Journal of Pharmacology	6.8	2
Respirology	6.6	1
Frontiers in Immunology	5.7	1
Regional Anesthesia & Pain Medicine	5.1	1
The Journal of Physiology	4.7	1
FASEB Journal: Official Publication of the Federation of American Societies for Experimental Biology	4.4	1
European Journal of Anaesthesiology	4.2	1
American Journal of Physiology - Lung Cellular and Molecular Physiology	3.7	1
PLOS ONE	2.9	2
Intensive Care Medicine Experimental	2.8	1
International Journal of Obstetric Anesthesia	2.6	3
BMJ Open	2.4	1
Journal of the Intensive Care Society	2.1	1
Perioperative Medicine (London, England)	2	1
Trends in Anaesthesia and Critical Care	1.4	1
Anaesthesia & Intensive Care Medicine	0.2	1
BJA Open	n/a	3

Fifty-one peer-reviewed journal articles have been published by 20 award holders, accumulating 1723 citations (Table 2). Citation counts ranged from 0 to 497, with a median of 17 citations per paper. As many projects are still ongoing, these figures are expected to increase over the next 5–10 years. Of the 51 reported publications, 28 (55%) were published in journals with an impact factor of 7 or higher (Table 3).

Beyond journal publications, 26 alternative outputs were reported by 8 PIs, including 21 conference presentations, 4 press releases, and 1 media feature.

Figure 5 shows the relationship between grant funding and citation count per project, with higher funding values correlating with increased citations.

EDI characteristics

Between 2022 and 2024, 85 applicants applied for research funding and submitted EDI details, 19 of whom were successful. Overall, 69% ($n=59$) of all applicants and 74% ($n=14$) of successful applicants were male, 82% ($n=59$) of all applicants and 95% ($n=14$) of successful applicants were white, and 14% ($n=12$) of all applicants and 5% ($n=1$) of successful applicants were Asian.

Figures 6 and 7 present other EDI characteristics, including gender, sexual orientation, carer responsibilities, English as a first language, religion, and disability status. No EDI characteristic was statistically associated with application success (Supplementary Table S1).

Discussion

This study analyses NIAA research funding (2019–2023) and EDI data (2022–2024) using Researchfish metrics and NIAA EDI data. It provides a snapshot of funding distribution and outputs since 2019.

The average annual value of funding was lower than in previous years, with a mean of £497,771 per year in the period 2019–2023, compared to £777,778 in the period 2008–2016 (El-Boghdadly et al. 2018). This is likely to be due to the COVID-19 pandemic, which impacted funding availability and allocation, with funding rounds suspended during 2020 and 2021. Most grants were awarded to academic centres in major cities, particularly London, where a high density of universities (including five medical schools) and greater population size contributed to the higher funding allocation.

Institutional funding disparities

University-affiliated hospitals received a higher proportion of funding than non-university research groups, likely due to well-established researchers with grant-writing experience, institutional support, and dedicated research time. While academic institutions naturally attract more funding, their concentration in

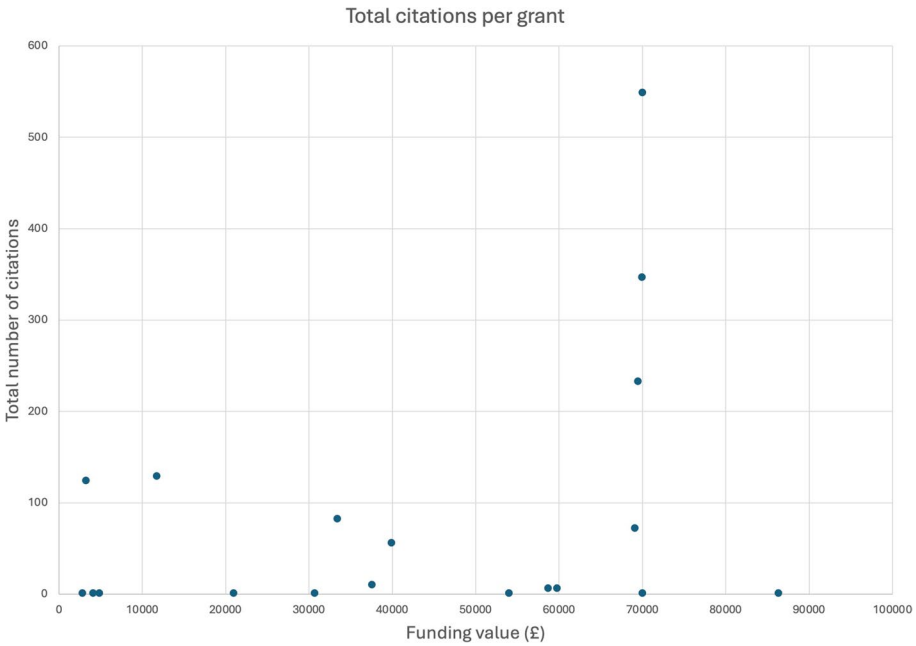

Fig. 5 Number of citations of projects achieving more than one citation, plotted against grant value

major cities may limit research access for rural populations. This underrepresentation could impact patient inclusion in research.

As a national body representing multiple anaesthetic societies, the NIAA can foster collaborations between academic and non-academic institutions, expanding research access.

Assessing research impact beyond citations

Assessing the impact of research funding on patients and the public is complex and requires a multi-faceted approach. Researchfish enables the collation of researcher-reported outputs and aims to encompass alternative metrics, such as media coverage, social media engagement and influence on scientific policy, in addition to the traditionally reported publications and citations. The latter are easily comparable, while the impact of alternative metrics is more difficult to quantify. Given the expanding role of social media in engaging patients and the public, building research networks and facilitating collaborations (Chen and Wang 2021), it is important to explore more nuanced ways of capturing these outputs, to facilitate quantification and comparison. Existing platforms, e.g. funders' websites, should continue to develop capturing the expanding role of social media within anaesthetic research in a meaningful way.

Funding and research output correlation

Our results suggest a broad association between higher funding and greater research output, though this is correlation, not causation. Notably, only projects receiving over £65,000 had more than 150 citations.

Larger grants support diverse research teams and essential resources (e.g. statisticians), whereas smaller grants (e.g. £10,000) may only fund, e.g. equipment without dedicated research time. Thus, limited and smaller funding amounts may reduce the quality of research projects and subsequently also their impact. A potential NIAA funding strategy could therefore involve setting a minimum grant threshold (e.g. £40,000) to enhance research quality, application strength, and output.

Gender disparities in academic anaesthesia

The lack of female PIs reflects a well-documented gender gap in academic medicine, particularly in leadership roles (Clark and Horton 2019). Research suggests this gap is due to fewer female applicants, not lower success rates (El-Boghdadly et al. 2018). This has been confirmed by the EDI results in this manuscript where we analysed the most recent NIAA data. The results revealed that female applicants comprise 28% ($n=24$) of total applicants and 26% ($n=5$) of successful applicants. For comparison, women are represented by approximately 50% of the medical workforce (The state of medical education and practice in the UK: workforce report 2024 2024), and 47% and 38% of anaesthetic trainees and consultants, respectively (The anaesthetic workforce:UK State of the Nation Report 2024 2024).

Despite various initiatives to address gender imbalances in anaesthesia (Reece-Nguyen et al. 2023; Leslie

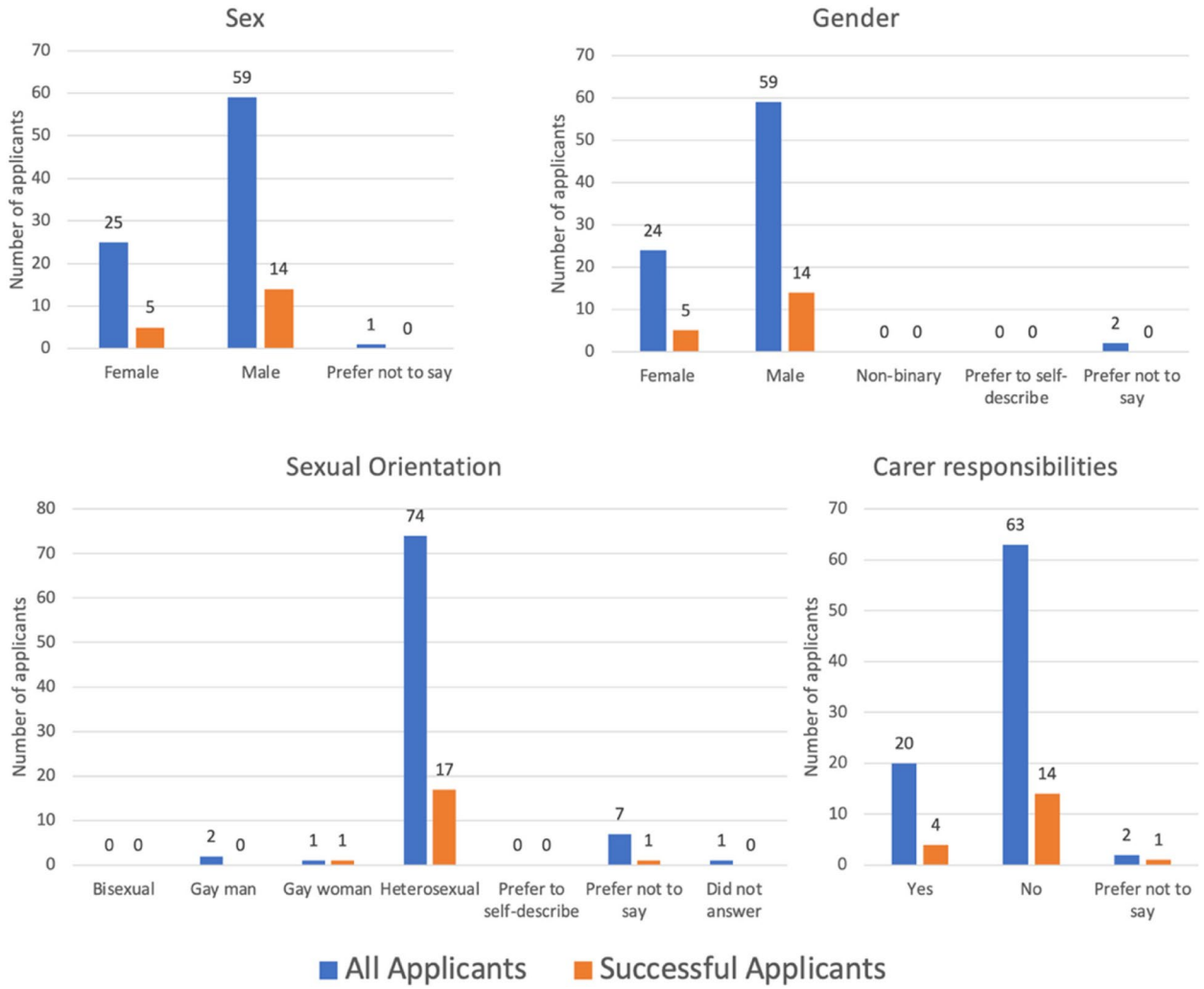

Fig. 6 Sex, gender, sexual orientation and caring responsibilities of applicants

et al. 2017; Carter et al. 2024), the proportion of female PIs remains unchanged from 2008 to 2015 (22%) (El-Boghdadly et al. 2018).

Potential barriers to recruitment and retention of female academic anaesthetists include lack of mentoring or representative role models, lack of social support structures (such as organised childcare or family care), prolonged training time and family care duties (Stundner et al. 2023). While the NIAA cannot necessarily tackle all of these barriers, the collection and presentation of EDI data is an important step in highlighting persistent inequalities and promoting future initiatives to mitigate these.

Ethnic diversity in academic anaesthesia

Data on academics with under-represented characteristics other than gender is limited, and this is an important area to address when considering the lack of diversity evident in the NIAA EDI data. Previous research found that 24% of academic anaesthetists came from ethnic minority backgrounds (Ratnayake et al. 2021); however, this data was obtained by estimation from names and/or pictures from websites. More widespread collection of self-reported EDI survey data, as demonstrated by the NIAA, will help inform regarding the ethnic diversity of the clinical academic anaesthetic workforce.

While it is vital to strive for equality, diversity and inclusivity regarding all protected characteristics, understanding whether inequalities exist is more challenging in personal characteristics aside from gender and ethnicity. Tracking this data over time, as done by the NIAA, and aiming for representation of all minority groups in academic organisations may help to inform future strategies to address this more in detail.

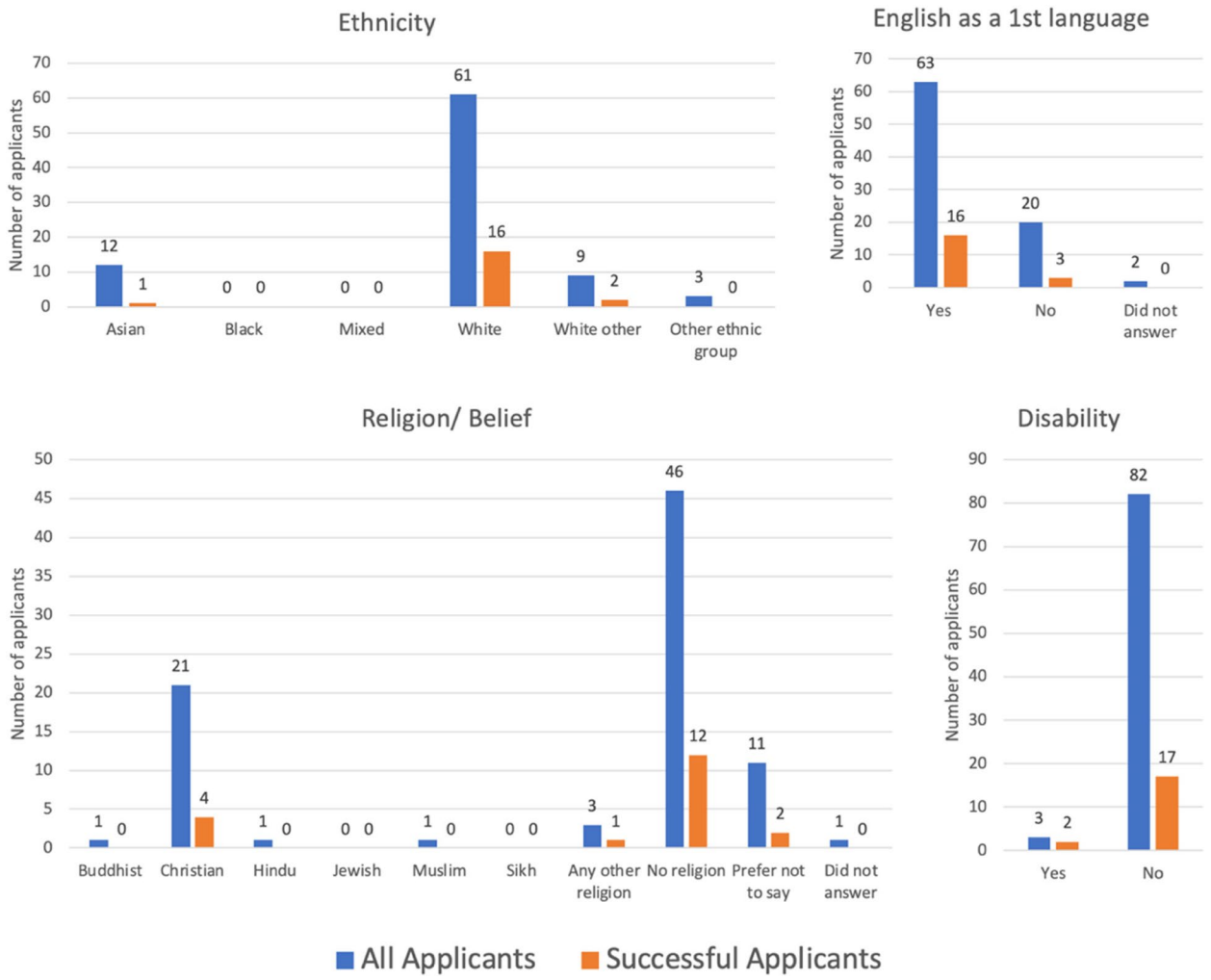

Fig. 7 Ethnicity, English as a 1st language, religion or belief and disabilities of applicants

Limitations

Interpreting research outputs is challenging due to the relatively short timeframe—many studies are ongoing and have yet to produce measurable results. This report therefore focusses on a descriptive analysis of research outputs rather than assessments and conclusions based on the number of publications. Researchfish data is captured annually from the beginning of the award until at least 5 years later. Therefore, a number of recently funded projects reported here will only have started their funding period and understandably not have any output, while others will be at the end of the funding period with more potential for output and publications. Furthermore, the period presented here spans the COVID-19 pandemic, which is likely to have disrupted or prolonged some of the NIAA-funded projects.

Researchfish relies on accurate reporting, so missing or incomplete data may affect findings. The categorisation of research projects proposed in this article is not intended to be exclusive but has been suggested in order to demonstrate the breadth of research supported by the NIAA.

Conclusions

Analysing NIAA grant distribution and EDI data is crucial for identifying areas to improve research support, collaboration, and diversity, and thus should inform future funding strategies of the NIAA. Our results revealed that grants were awarded across a broad geographic range and encompassed various types of research, with a majority of resulting publications appearing in high-impact journals. However, during the period analysed, there was a significant lack of diversity among applicants. Future initiatives should focus on mentoring underrepresented researchers, highlighting role models, and providing networking opportunities to address persistent imbalances in academic anaesthesia.

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s13741-025-00505-z.

Additional file 1: Supplementary Table S1: Prediction of successful application based on equality, diversity, and inclusion characteristics.

Acknowledgements
The authors would like to acknowledge the availability of NIAA EDI data by Pamela Hines.

Authors' contributions
N.W. analysed the data N.W. prepared all figures and tables N.W. and G.K. wrote the main manuscript text All authors reviewed the manuscript.

Funding
Dr. Naomi Watson is a National Institute of Health and Care Research-funded Academic Clinical Fellow.

Data availability
No datasets were generated or analysed during the current study.

Declarations

Ethics approval and consent to participate
Not applicable.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

Received: 12 August 2024 Accepted: 15 February 2025
Published online: 13 March 2025

References

Carter JC, Purcell N, Stewart CH, Pearce GC, Balkin M, Allen KJ. Still a 'boys' club': a qualitative analysis of how gender affects a career in anaesthesia in Australia and Aotearoa New Zealand. Anaesth. 2024;79(7):675–9. https://doi.org/10.1111/anae.16281.

Chen J, Wang Y. Social media use for health purposes: systematic review. J Med Internet Res. 2021;23(5):e17917. https://doi.org/10.2196/17917.

Clark J, Horton R. What is *The Lancet* doing about gender and diversity? Lancet. 2019;393(10171):508–10. https://doi.org/10.1016/S0140-6736(19)30289-2.

El-Boghdadly K, Docherty AB, Klein AA. Analysis of the distribution and scholarly output from National Institute of Academic Anaesthesia (NIAA) research grants. Anaesthesia. 2018;73(6):679–91. https://doi.org/10.1111/anae.14277.

Leslie K, Hopf HW, Houston P, O'Sullivan E. Women, minorities, and leadership in anesthesiology: take the pledge. Anesth Analg. 2017;124(5):1394–6. https://doi.org/10.1213/ANE.0000000000001967.

NIAA Strategy 2023-2028. https://www.niaa-hsrc.org.uk/article.php?newsid=20&textSize=1. Accessed 30 Dec 2024.

Ratnayake G, El-Boghdadly K, Pandit JJ. An analysis of the academic capacity of anaesthesia in the UK by publication trends and academic units. Anaesthesia. 2021;76(4):500–13. https://doi.org/10.1111/anae.15247.

Reece-Nguyen TL, Lee HH, Garcia-Marcinkiewicz AG, et al. Diversity, equity, and inclusion within the Society for Pediatric Anesthesia: A mixed methods assessment. Paediatr Anaesth. 2023;33(6):435–45. https://doi.org/10.1111/pan.14642.

Researchfish. Intelligent technology to track research and evidence impact. https://researchfish.com/. Accessed 30 Dec 2024.

Stundner O, Adams MCB, Fronczek J, et al. Academic anaesthesiology: a global perspective on training, support, and future development of early career researchers. Br J Anaesth. 2023;131(5):871–81. https://doi.org/10.1016/j.bja.2023.07.030.

The Anaesthetic Workforce: UK State of the Nation Report 2024. https://www.rcoa.ac.uk/policy-public-affairs/anaesthetic-workforce-uk-state-nation-report-2024. Accessed 30 Dec 2024.

The state of medical education and practice in the UK: workforce report 2024. https://medicaleducators.org/CPD-/the-state-of-medical-education-and-practice-in-the-uk-workforce-report-2024. Accessed 30 Dec 2024.

Publisher's Note