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Fostering diversity, equity, and inclusion in interdisciplinary marine science

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Interdisciplinary marine research is pivotal for addressing ocean sustainability challenges but may exclude diverse socio-economic, cultural, or identity groups. Drawing on perspectives of marine Early Career Researchers, we highlight the importance of Diversity, Equity, and Inclusion (DEI) in advancing interdisciplinary marine science and present ten recommendations to enhance DEI. As our ocean faces increasing threats, fostering DEI within this domain is not merely an aspirational goal but an ethical imperative.

In an era marked by a growing recognition of the interplay between the environment and human societies, interdisciplinary marine science stands as a relatively new and pivotal field¹. Poised to tackle some of the most pressing global challenges, interdisciplinary marine research integrates diverse perspectives and approaches from the natural and social sciences to create a more holistic understanding of marine social-ecological systems (SES)^{2–4}. However, interdisciplinary marine science may fail to reach its potential due to its lack of consideration of diversity, equity, and inclusion (DEI) (Table 1).

Marine science in general has been shown to fall short of considering DEI^{5,6}, with recent studies highlighting persistent imbalances related to gender equity^{7–9}, cultural representation, language (i.e., English) dominance of Global North institutions^{10–12}, the cost of leading on and participating in science¹³, sense-of-belonging¹⁴, and neurodiversity¹⁵, among other issues¹⁶. While there has been limited focus on the status of DEI in interdisciplinary marine research and the extent to which the field succeeds in bringing together diverse individuals and groups, we theorise that DEI issues, as well as the benefits of DEI, might be even greater in this field. This DEI dimension is particularly crucial for Early Career Researchers (ECRs) who represent the next generation of scientific leaders and play a key role in developing the field^{17–19}. To address this gap, this perspective draws on an online workshop organised by the Interdisciplinary Marine Early Career

Network (IMECaN) of the Integrated Marine Biosphere Research Project (IMBeR) on October 11, 2022. The workshop consisted of Plenary Sessions and Break-out Rooms focused on three questions: (1) What does DEI mean for your research community?; (2) What are the main challenges or barriers to DEI that you face as an interdisciplinary marine researcher?; and (3) How can DEI be improved or fostered within interdisciplinary marine research? We integrated the collective experiences and perspectives of marine ECRs on DEI in interdisciplinary marine science and used these to build arguments for three main statements: (1) Diversity is essential for delivering high-quality interdisciplinary marine science, (2) Interdisciplinarity can provide additional challenges and complexity for minoritised groups²⁰ when conducting science, and (3) Interdisciplinary marine science may exclude minoritised groups and be associated with discrimination, prejudice, and elitism. Finally, we discuss ways forward in fostering DEI in interdisciplinary marine research. Overall, we aim to highlight the importance of DEI in advancing interdisciplinary marine science and identify the benefits of embracing a more inclusive approach.

Diversity is crucial for interdisciplinary marine science. Interdisciplinary science is often understood as the integration of disciplines, but we must venture beyond this conventional notion and think about other integral dimensions of interdisciplinarity, that is, who is conducting the research and how to ensure better representation in interdisciplinary marine science to respond to global challenges²¹. As interdisciplinarity strengthens research and diversity strengthens science^{22,23}, we argue that diversity strengthens interdisciplinarity. Interdisciplinary marine research possesses several characteristics that can either enhance or present challenges in the context of DEI:

- i. Global nature of marine issues: Marine research addresses global concerns like climate change, biodiversity loss, migratory species, transboundary management of marine space and resources, and ocean health^{24,25}. The interconnected nature of the ocean, in combination with these concerns, inherently engages a diverse set of countries and cultures, making DEI considerations a necessity.
- ii. Marine practicum: Marine science often involves fieldwork and sea-going work (e.g. research cruises) which requires high-tech equipment where resource-limited countries face considerable barriers²⁶, may include research on topics that are gender-sensitive in certain cultures

Table 1 | Glossary of key terms used in this paper

Diversity is the presence of differences that may include race, gender, sexual orientation, ethnicity, nationality, socioeconomic status, language, (dis)ability, age, religious commitment, or political perspective.
Equity is promoting justice, impartiality, and fairness within the procedures, processes, and distribution of resources by institutions or systems. In contrast to equality, which often focuses on ensuring equal rights for all, equity also seeks to address existing inequalities to ensure equal access to opportunities.
Inclusion is an outcome achieved when participants, institutions, and programmes are truly welcoming to all, to the extent that varied individuals can engage fully in decision-making processes and development opportunities inside an organisation or group.
Early Career Researcher is here defined as an individual who is either undertaking their degree (Master or PhD), in the initial years following the completion of their PhD, or their first research appointment. Importantly, time since the graduation or first appointment must consider career leaves (e.g., for family care or health reasons).
Interdisciplinary research denotes research as a result of different academic disciplines working together to integrate disciplinary knowledge and methods to develop and meet shared research goals.
Transdisciplinary research denotes research integrating diverse types of knowledge, perspectives, and methods from academic and non-academic collaborators to develop and meet shared goals.
Interdisciplinary marine science integrates perspectives from the natural, physical, and social sciences, which were once pursued independently, to create synthetic understandings. It involves collaboration across these disciplines and facilitates knowledge exchange between science, policy, and practice. This approach enables a more holistic and comprehensive response to complex marine challenges. Here, the term is used broadly, and many researchers may find themselves working within this domain, sometimes engaging in interdisciplinary work at varying levels, depending on the specific needs and goals of their research.
IMECaN is an open network for marine science ECRs including students (Undergraduate, Masters, Ph.D.) and professionals with an appointment for less than 8 years. The network aims to provide: (1) a networking platform for ECRs to develop collaborations; (2) training and development in areas not traditionally provided through formal education and training programmes; and (3) leadership opportunities for ECRs, particularly from developing nations. The network currently has 1243 members from 103 countries on all continents. The research interests of IMECaN's members cover a wide range of topics and disciplines (https://imber.info/imecan-interdisciplinary-marine-early-career-network).
Minoritised is a social constructionist approach recognising that people are actively diminished by others rather than naturally existing as a minority, as the terms "racial minority" and "ethnic minority" imply.

(e.g., women interviewing fishers), and has lacked gender-sensitive considerations leading to harassment and inequity for non-male researchers^{27,28}. Marine research can involve work in areas beyond national jurisdictions (i.e., the high seas and deep seabed) where only wealthy nations are able to conduct research²⁹.

- iii. **Diverse stakeholders:** The marine environment affects various stakeholders and rights holders with different values, including Indigenous Peoples and local communities (IPLCs), policymakers, and industries such as fishing, shipping, mining, and tourism. Integrating and valuing DEI when conducting interdisciplinary research becomes critical to ensure that these diverse voices, interests, and values, including disparate and marginalised voices, are meaningfully included³⁰.
- iv. **Transdisciplinary collaboration:** Interdisciplinary marine research often requires collaboration between natural scientists, social scientists, policy experts, and other knowledge holders such as IPLCs. This diversity in expertise and knowledge systems opens the door to a wider range of perspectives and stakeholders, which can be leveraged for a more inclusive approach to research and a more holistic understanding of ocean challenges. Engaging with these diverse groups requires balancing the burden of doing transdisciplinary research and consideration of the power imbalances between actors^{31–33}.
- v. **Indigenous and Local Knowledge:** Interdisciplinary marine science needs to incorporate and operationalise multiple types of knowledge in the conservation and sustainable use of marine resources³⁴. Many IPLCs possess deep knowledge about marine environments. Yet, they have often been excluded, marginalised, or criminalised within ocean science and marine conservation projects^{35,36}. Recognising and incorporating this knowledge (with [their] participation and permission) and the historical legacy of marginalisation is critical not only for robust research but also for ethical considerations and DEI principles^{37,38}.

Therefore, to advance interdisciplinary marine science and respond to global sustainability challenges, the inclusion of diverse voices and

knowledge is paramount. Without a deliberate focus on DEI and concentrated efforts to advance it, interdisciplinary marine science falls short of its mission to encompass a wide range of perspectives and deliver comprehensive insights into marine science issues.

Interdisciplinarity can provide additional challenges and complexity for minoritised groups. Added complexity of conducting interdisciplinary science can have consequences for specific groups in marine science and may mean that some individuals and groups are more likely to be included than others^{31,33}. Here, we discuss how interdisciplinary marine science can be more challenging for ECRs and minoritised groups.

Interdisciplinary research may present additional challenges for ECRs, who make up a large portion of the academic workforce³⁹, but also face employment uncertainty, demanding workloads, and stress and burnout^{19,40}. The challenges faced can vary amongst ECRs and depend on the differences in institutional support and support from supervisors and mentors¹⁷. ECRs that engage in interdisciplinary research face even more challenges related to the complex problems, issues, and phenomena of linked social-ecological systems (SES), the need for a broader methodological toolbox, and the engagement with multiple stakeholders and perspectives⁴¹. Importantly, interdisciplinary ECRs require more diverse concepts and theories relevant to multiple disciplines, places, fields of study and processes⁴², and time (e.g., for communication and moderation), placing those from less established or resource-scarce positions at a disadvantage.

The challenges of interdisciplinary research may be even more substantial for ECRs from minoritised groups^{5,43}, as they already face institutional biases and structural barriers within academic and research institutions in marine science. This is due to intersecting systems of oppression and privilege, and legacies of colonialism in marine science, affecting multiple social identities such as gender^{8,44}, nationality⁴⁵, ethnicity⁴⁶, sexual identity, disability, economic class, and age⁴⁷. This can result in interlocking systems of racism, sexism, heterosexism, and classism

at the macro-social structural level^{48,49}. For example, research suggests that women of colour have been most affected by the COVID-19 pandemic⁵⁰ and have experienced the most harassment in Science, Technology, Engineering and Mathematics (STEM) fields⁵¹.

Minoritised groups face additional challenges to career progression due to stereotypes, biases, and a lack of sense of belonging in academia, combined with institutional and cultural barriers. Interdisciplinary marine science is often influenced by research priorities set by dominant groups in the field who often act as gatekeepers¹². This may lead to issues of credibility resulting from others viewing their interests or abilities as different or diminished due to their identity. Furthermore, the need to engage with multiple disciplines can expose researchers from minoritised groups to a wider range of institutional prejudices, potentially complicating their research endeavours. The intersection of these institutional barriers adds layers of complexity that can affect the degree to which ethnic minorities can undertake research (e.g., topics and concerns about being marginalised or overlooked) and publication rates⁵², simultaneously reducing the likelihood of women and ethnic minorities to attain leadership roles^{53,54}.

Interdisciplinary marine science risks being non-inclusive. In our collective experience, DEI is not sufficiently considered in interdisciplinary marine research. Here, we discuss four ways interdisciplinary marine science risks being non-inclusive.

First, there is a risk of a lack of diversity and representation of scientists and practitioners in the interdisciplinary marine science community. While STEM fields, in general, are often exclusive, emerging areas like interdisciplinary marine science can be particularly vulnerable to gatekeeping, elitism, and limited diversity⁵¹. In many cases, the norms and cultures within marine science, and academia more broadly, are centered around male and white-centric perspectives^{45,55}. This can lead to male white scientists being perceived as the primary 'knowledge holders' and 'gatekeepers,' resulting in inequitable access to opportunities such as jobs, publications, and funding. While there are ongoing efforts to increase opportunities for women, researchers from the Global South, and marginalised communities^{56,57}, there is still a long way to go in how to implement well-meaning measures equitably and avoid tokenism (e.g., use of a poster person for specific activities including ocean capacity building programmes²⁷).

Second, there is unequal access to interdisciplinary marine education. Interdisciplinary marine science is still evolving and, as a result, formal training is not provided in many places. Whether or not an ECR has access to interdisciplinary training largely depends on their institution, the funding they receive, their supervisor or advisor, and/or their geographical location⁴². These factors might also affect the degree to which they are able to undertake interdisciplinary research, as well as their credibility and legitimacy as a scientist. Previous research has shown that interdisciplinary research and scientists may not be taken seriously or valued by their peers, colleagues, or their institution⁵⁸. In addition to the lack of training and issues of credibility, ECRs can face other barriers such as limited funding, support, and opportunities to undertake fieldwork, attend conferences and access scientific literature, mentoring programmes, and networks. Such opportunities are critical for supporting ECRs, particularly those facing intersecting systems of oppression⁹. Recognising the above-mentioned challenges is important when improving DEI in interdisciplinary marine science. If these barriers are not overcome, interdisciplinary marine science and research will continue to exclude minoritised groups and further perpetuate discrimination, prejudice, exclusionary practices, and elitism.

Third, there is a lack of consideration of DEI in the design and implementation of interdisciplinary marine science, which has consequences for the quality and ethical practice of research. With a strong

focus on a handful of research institutions, many of which are in the Global North and rooted in Eurocentric and Western perspectives¹², interdisciplinary marine science does not often consider the realities and perspectives of the Global South, particularly in social-ecological contexts. Although there are some examples, in general, interdisciplinary marine science has lacked consideration and integration of diverse forms and sources of knowledge including local, traditional, and Indigenous knowledge^{33,59}. Ocean and coastal conservation and management based solely on scientific knowledge and principles can erase or exploit the situated and relational knowledge systems of IPLCs^{60,61}. Such knowledge needs to be incorporated through fit-for-purpose mixed methodologies and participatory approaches at all stages (Box 1).

Finally, despite extensive critique, the persistence of 'parachute science', where researchers study foreign contexts, geographical locations, or populations, extracting data and knowledge without engaging or benefiting local communities, remains a significant challenge^{62,63}. This phenomenon, rooted in a legacy of colonisation, is perpetuated not solely by individual researchers but also by systemic factors such as institutional and funding structures that prioritise international collaborations and outcomes but often lack mandates that ensure the benefit and/or involvement of local communities/partners. This not only has implications for representation in the field but often results in inequitable, and even harmful, research practises⁶². In contrast to in-country scientists and local communities, parachute scientists, often from the Global North, not have extensive contextual knowledge or networks, may lack genuine interest in supporting the development of the region, and the research and interventions may not align with local interests, needs and ways of knowing⁶⁴, potentially causing more harm than good^{65,66}. There is an increasing need for research and interventions that are co-designed or co-produced by in-country scientists, local stakeholders and communities, to ensure equity in the production, use, and communication of knowledge, and the equitable distribution of research outcomes⁶⁷. Such approaches can enhance the usability, legitimacy, credibility, and relevance of knowledge, ultimately leading to better social outcomes, including improved networking, awareness, learning, and trust-building⁶⁸.

Ways forward: Fostering Diversity, Equity, and Inclusion in interdisciplinary marine science. Our perspective underscores the lack of DEI in interdisciplinary marine science, impacting underrepresented groups and the richness and legitimacy of research-based knowledge as a result. To promote and maintain DEI, it is crucial to create a culture that values all voices. The absence of DEI limits expertise, cross-cultural knowledge exchange, innovation, and effective ocean management⁶⁹. To address this, we propose the following recommendations, enabling broader representation across marine science communities and disciplines for a more inclusive future (Fig. 1).

- 1) Implement targeted DEI actions at project and institutional levels**
While an increasing number of institutions have shown commitment to improving DEI, many efforts are based on voluntary commitments of dedicated groups and individuals. To advance DEI, this work needs to be valued through the allocation of resources and potentially complemented by broader measures, such as improved DEI training and DEI considerations as funding scoring criteria. DEI-related work is often undertaken by those from underrepresented groups, which is a DEI issue as it diverts time away from research (as exemplified by the work done for this article). To be successful, programmes need to be designed, implemented, and monitored by, or with the involvement of, specialists in DEI.

Box 1 | Positionality statement

Scholars engaged in social science research should assess how their own positioning might contribute to their interpretations of people's lived experiences (i.e., researchers are not separate from the social processes they study⁷⁰). Relevant researchers' positioning includes personal characteristics, such as gender, race, affiliation, age, sexual orientation, immigration status, personal experiences, linguistic tradition, beliefs, biases, preferences, theoretical, political, and ideological stances, and emotional responses to participants⁷⁰. Based on best practice, we provide a positionality and reflexive statement^{71,72}.

In total, 37 authors contributed to this perspective piece. The author team was composed of 24 women/females, 12 men/males and 1 non-binary/gender queer/gender-fluid individuals. Most authors were post-PhD, holding positions in academia or the research sector, including Postdoctoral Fellow ($n = 6$), Research Fellow ($n = 6$), Lecturer ($n = 3$) and Assistant Professor ($n = 2$). Other positions held included: Master's student ($n = 1$), consultant ($n = 2$), researcher or research scientist ($n = 3$) and research technician ($n = 1$). Eleven authors were studying, either for a PhD ($n = 9$) or undergraduate degree ($n = 2$). The authors were born in six different continents: Africa ($n = 5$), Asia ($n = 4$), Australia and New Zealand ($n = 1$), Latin America and the Caribbean ($n = 8$), Europe ($n = 16$) and North America ($n = 4$) (Some authors had dual nationalities; therefore, the total n does not equal the number of authors on the paper). Just under half of the authors ($n = 20$) were based in a different country to the one they were born in. Most commonly, researchers had moved to Europe, Australia and New Zealand, and North America. Authors came from 20 disciplinary backgrounds, with the most frequently mentioned being: marine social science ($n = 11$), marine biology ($n = 9$), marine ecology ($n = 4$) and

oceanography ($n = 3$). All but two authors had participated in interdisciplinary research projects before ($n = 35$).

The primary and secondary authors (LK & RJS) led the design, implementation and analysis of the workshop findings and agreed upon the three main statements for the paper. The paper was then written by the primary and secondary authors, alongside another co-author (RAO). The primary and secondary authors are ECRs originating from and living in the Global North (LK is from Finland, RJS is from the UK and resides in Australia), are white and began in marine science, but later moved into interdisciplinary marine science and marine social science during their PhD and job roles. RAO devised the ways forward section. RAO is an ECR originating from the Global South (Kenya) but living in the Global North (Sweden). She is black and has an interdisciplinary background mainly in natural sciences (both marine and freshwater science during her BSc, MSc, and job roles) and marine social science during her PhD and job roles focusing on empowering women in marine science. The three statements were discussed with all co-authors, and they had the opportunity to amend the statements. After gaining consensus, the full paper was sent to all co-authors to review and contribute. However, as the paper was written by three authors, this may have affected the positions, values, and findings of this piece. Although the workshop was advertised widely on social media and through IMBeR and IMECaN networks, we acknowledge that there was more representation from the global minority (e.g., Europe, North America, and Australia), compared to the global majority countries. Further, there was limited representation from gender-diverse groups. This could have affected the diversity of views, values, and beliefs represented in this perspective.

- 2) **Formulate comprehensive and transformative policies on discrimination** These should be used to help foster DEI in marine science in hiring, appointments, retention, and promotion. This will increase the participation of stakeholders or experts who are often excluded in marine science, research, governance, and decision-making processes. To support this, it is essential to embrace and follow anti-racist and non-discriminatory practices in research, teaching, and other scientific spaces.
- 3) **Support equitable international projects and networks** These can empower ECRs, providing access to connections, a sense of belonging to a community, and sharing views and skills. ECRs often lack research experience due to financial and social barriers, hindering their pursuit of marine science careers. Professional support and international collaborations, provided they are equitable and not exploitative, are vital in addressing these imbalances for young ocean scientists. Without this support, particularly for minoritised or marginalised groups, individuals may feel disconnected and, in some cases, may even give up on their aspirations. Through international networks, ECRs can create meaningful partnerships with international colleagues early on.
- 4) **Nominate designated DEI focal points in marine science institutions** This focal point can be a staff member or a group of staff members who are responsible for facilitating and promoting DEI in all the activities of the institution, including the hiring and promotion of staff. The focal point, ideally trained in DEI and recognised and compensated for this work, can be designated within the institution to monitor, and stimulate greater consideration and awareness of, DEI by providing information to staff or recruitment committees on policies relevant to advancing DEI in the workplace. However, support from institutional leaders, for example, by communicating that advancing DEI is an institutional priority and following up with appropriate support and resources, is critical for meaningful progress on DEI to occur.
- 5) **Improve participation and accessibility in international collaborations** It is important to recognise that limited access to funds, visa requirements, and waiting times often hamper the participation of experts in research projects as well as their participation in conferences and networking that requires travel. ECRs with limited access to funds should be included in funded projects or given grants to allow them to participate in conferences to share their knowledge, develop networks, and foster collaborations. While working online enhances accessibility, it can inadvertently limit access for individuals with poor connectivity or in diverse time zones, and the pros and cons of remote participation should be carefully considered when planning collaborations and events.
- 6) **Endorse meaningful inclusion of a diverse group of experts** From different countries, including ECRs, in interdisciplinary science. Meaningful inclusion means developing initiatives and support systems that ensure researchers are fully empowered, enriched with knowledge and practical experience, engaged fully in marine science activities or operations, and can participate equally at all levels, including management, decision-making, and leadership roles. Importantly, without sufficient support, ECRs facing precarious



Fig. 1 | Ten recommendations for fostering Diversity, Equity, and Inclusion in interdisciplinary marine science. (1) Implement targeted DEI actions at project and institutional levels; (2) formulate comprehensive and transformative policies on discrimination; (3) support equitable international projects and networks; (4) nominate designated DEI focal points in marine science institutions; (5) improve participation and accessibility in international collaborations; (6) endorse

meaningful inclusion of a diverse group of experts in research; (7) promote the value of diverse and inclusive interdisciplinary research within academic programs; (8) develop mentorship programmes for interdisciplinary ECRs; (9) consider opportunities for 'positive discrimination', when possible, to adequately; (10) highlight and nurture bright spots in fostering DEI.

conditions and limited guidance and resources may inadvertently engage in parachute research, either because it is more accessible, or because they lack the knowledge and means to pursue co-production and transdisciplinary research that would better align with local contexts and needs. Avoiding such harmful practices requires awareness about this issue and prompting scientists with funding for research in other countries to partner on equal grounds with local scientists, ECRs, and institutions instead of leading this research themselves. Funding bodies can also prioritise local institutions and researchers with experience in implementing transdisciplinary projects for funding calls and require detailed descriptions of how the local community will be involved and benefited from the research outcomes.

- 7) **Promote the value of diverse and inclusive interdisciplinary research within academic programmes** This should be done through actions and active communication, going beyond mere acknowledgement. It is important to raise awareness of the need for DEI in marine science through targeted workshops, training, conferences, and capacity-building sessions, but also through sessions on DEI within non-targeted events (e.g., regular science network meetings/conferences). These sessions will provide opportunities to address barriers that have not been properly tackled or addressed by different institutions. For instance, considering the benefits of

cultural and institutional changes needed to support hiring a diverse group of experts.

- 8) **Develop mentorship programmes for interdisciplinary ECRs** Providing mentorship opportunities can help ECRs access a diverse pool of mentors, learn skills, and create networks. This could include providing financial support for capacity-building/sharing and training opportunities while including them as part of the workload, rather than extra-curricular activities.
- 9) **Consider opportunities for 'positive discrimination'** When possible, to adequately pursue equity (equal access to rights and opportunities) instead of equality (equal rights). Recognising that existing power asymmetries and inequalities based on geographical locations, race and gender are deeply rooted in institutions and institutionalised practices, there is a need to actively prioritise and provide opportunities for marginalised researchers and knowledge holders in interdisciplinary science (i.e., decolonise science). Examples include providing translations to local languages, waiving publication and conference attendance fees, and actively including researchers from minoritised groups.
- 10) **Highlight and nurture bright spots in fostering DEI** Such as leadership opportunities for marginalised researchers, underrepresented countries and regions, and ECRs. Some examples include the ICES Journal of Marine Science's editor mentoring programme, the Edinburgh Ocean Leaders programme, the ASLO Amplifying Voices

Webinar Series and The Limnology and Oceanography Letters Early Career Publication Honor, networking and leadership opportunities provided by IMBeR and IMECa networks, capacity development programmes of the Scientific Committee on Ocean Research (SCOR), and the Black in Marine Science network. Such initiatives serve as inspiration, providing tangible examples of successful strategies and encouraging similar actions.

Conclusions

Addressing present and future ocean challenges requires interdisciplinary cooperation. Currently, there are still gaps in engaging a diverse group of individuals in interdisciplinary marine research. Fostering DEI within the global marine science community is paramount to cultivating a just, equitable, and welcoming scientific landscape that is well-equipped to embrace inclusive research communities while tackling pressing global challenges equitably. As the health of our ocean and coastal ecosystems is increasingly under threat, fostering DEI within this scientific domain is not merely an aspirational goal but an ethical imperative.

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Author contributions

L.K., S.A.S., R.S., K.M., S.G.M., C.A., B.S.D., I.G., and S.L. developed the initial ideas for the study and organised the workshop that led to this paper. L.K., R.J.S. and R.A.O. wrote the initial draft of the paper. L.K., R.J.S., S.A.S., R.A.O., B.S.D., S.L., C.I.A., I.G., K.M.M., S.G.M., J.P.A., S.J., M.A.P., V.A.G.A., C.A.B., C.B.B., S.B., L.I.D., J.D., A.D., S.C.A.F., E.J., J.J., E.M.G., D.B.K., S.M., L.M., K.O.L., A.O., K.O.C., S.O.A., D.R., S.S.R., S.S., N.V., C.W., M.S. contributed to the development and refinement of the ideas and reviewed the paper.

Competing interests

The authors declare no competing interests.

Additional information

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