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Responsible Research Assessment of Faculty: maximizing quality, transparency, and trustworthiness of scientific research in Research-Performing Organizations

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eLife Assessment

This Tools & Resources manuscript presents **important** findings that can help the implementation of research assessment reform in research-performing institutions. The authors employ a three-part Delphi method involving researchers, funders, journal editors, and academic leaders, ultimately reaching consensus on six standards. The manuscript's accompanying appendix provides helpful, modular guidance for research-performing organizations seeking to adopt these six parameters. Overall, the evidence presented is **solid**, and the manuscript makes a practical contribution that will add value. However, a significant limitation is the lack of evidence demonstrating whether and how implementation of the proposed guidance improves research evaluation in practice.

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Abstract

This multi-interest holder consensus effort highlights the essential influence and responsibility of Research-Performing Organizations (RPOs) in shaping the quality, transparency, and trustworthiness of scientific research. Despite the use of metrics to assess transparency and openness by academic journals and funders, most RPOs do not yet have metrics/indicators or monitoring that address deep-rooted shortcomings in research practice and assessment. These shortcomings manifest as restricted access to research outputs, poor availability of underlying data and materials, infrequent reproducibility checks and direct replications, and ongoing incidents of research misconduct all contributing to erosion of public trust in research. Such issues are exacerbated by institutional incentive structures that reward the number of publications and journal prestige, while neglecting research credibility, societal relevance, and transparent communication. To respond comprehensively to these challenges, our working group reached consensus on six core practices for RPOs to monitor: data, code, and material sharing; open access publishing; prospective study registration; reporting transparency; disclosures of interest and funding; and verification efforts. Collectively, these six practices offer a pragmatic and flexible framework that RPOs can tailor to their local context. The paper provides an implementation guide for these practices and calls for renewed leadership by RPOs in realigning research(er) assessment and incentives to reward quality, transparency, and trustworthiness in research, closing persistent gaps, and reinforcing science's credibility and utility for society.

Introduction

Transparency and openness are prominent topics on the global science policy agenda. Documents, including the UNESCO Recommendations on Open Science (1) and the OECD Principles and Guidelines for Access to Research Data from Public Funding (2), have highlighted the value of transparency and openness as critical components to trustworthy and equitable scientific systems. Actors across the research ecosystem, including journals and funders, have begun to respond to these calls. The Transparency and Openness Promotion (TOP) guidance was first published in 2015 (3), defining eight practices to help journals improve research transparency. It received broad endorsement across thousands of journals and was recently updated with the TOP 2025 guidance, which now describes seven Research practices, two Verification practices, and four Verification studies intended to increase the verifiability of empirical research claims (4). Funders have implemented more open science policies in recent years, primarily focused on open access to final

publications and open data (5,6). For example, major public funders such as the European Commission (7), UK Research and Innovation (8), and the U.S. National Institutes of Health (9,10) have introduced open access mandates alongside requirements for data management and sharing plans, with expectations that research data be deposited in trusted repositories where possible.

Similar coordinated action by research-performing organizations (RPOs) has yet to occur, despite their central role in the research ecosystem. RPOs employ a large share of researchers, train early -career researchers, host research infrastructure, and control key incentive structures, but outputs too often lack transparency, accessibility, and verifiability, undermining trust and contributing to research waste (11–13). Common manifestations include limited public accessibility to outputs, inadequate availability of underlying data and materials, rare reproducibility checks or direct replications, and persistent research misconduct reported in surveys and case investigations, all of which diminish public confidence and the practical utility of research (14–16).

A striking gap persists between recognition of problems and systematic institutional action to address them, as noted by patient and public interest holders, emphasizing the lived consequences of inaccessible and irreproducible research for those affected by health conditions and policy decisions (17,18). While causes are multifactorial, a major driver is the "publish or perish" culture that rewards quantity over quality through counts of grants, publications, and citations, often at the expense of rigorous methods, meaningful societal impact, and compliance with transparency mandates. Evidence is limited that higher publication counts correlate with stronger rigor or transparency, and engagement with patients and the public in planning, conducting, and disseminating research remains undervalued in assessment systems dominated by journal-based metrics.

Recent reforms have targeted publishers and funders, but progress on RPO policies lags (19,20) despite calls from initiatives, such as the San Francisco Declaration of Research Assessment (DORA) (21) and the Coalition for Advancing Research Assessment (CoARA) (22) to move away from journal-level metrics and toward responsible research assessment, acknowledging broader impact and aligned with open science practices, including the Findable, Accessible, Interoperable, and Reusable (FAIR) principles (23). Because RPOs fully control hiring, promotion, and tenure, practical, evidence-informed standards are needed to help them reward behaviors that enhance trust, transparency, and reproducibility in faculty assessment. This paper reports an effort to reach consensus on a concise set of practices to guide RPOs in evaluating researchers in ways that foster trustworthy and impactful science.

Methods

The study protocol was approved by the Ottawa Health Science Network Research Ethics Board (Protocol 20210670-01H) and registered at the Open Science Framework (*https://osf.io/dx7f3/overview*). The complete detailed methods and supporting data can be found at: (*https://osf.io/a87ek/overview*).

A 3-round Delphi process was conducted to develop consensus-based criteria for research-performing organizations (RPOs) to assess the quality, transparency, and trustworthiness of scientific research (29,30) with a diverse group, including researchers, funders, journal editors, institutional leaders, and patient partners. As input to the Delphi process, a preliminary set of practices was first developed by members of the Center for Open Science (24), Centre for Journalology (25), DORA (26), TOP Guidelines (27), and Hong Kong Principles (28). These practices were informed by expert opinion (researchers who had written on topics related to responsible research assessment at RPOs, journal editors, funders, patient partners, and professional societies) and previous research.

In Round 1, approximately 358 participants were invited (snowball sampling across organizations), and 98 responded (27%). The survey questions included demographic questions and 7-point Likert -scale ratings of the proposed criteria for RPOs to use to assess transparency and openness. For each item, participants were provided with a text box to justify their response

and had the opportunity to suggest new criteria for consideration in the second round. For a practice to be included (or excluded), we used a threshold value of 80%. This threshold was selected based on findings from a systematic review of Delphi studies (31).

All Round 1 invitees were re-engaged for Round 2; 76 responded (78%). All items that did not reach the 80% consensus in the initial phase were re-presented in round 2, alongside mean ratings and participant-level voting rationalization.

For Round 3, 19 participants attended an in-person consensus meeting in Toronto (6th December 2024) with electronic polling on the remaining items. Participants provided both quantitative ratings and qualitative justification for each criterion. Survey questions distinguished standards at Basic, Intermediate, and Advanced levels, mirroring the structure of the TOP Guidelines.

Results

For Rounds 1, 2, and 3, more than half of the respondents were men (55%, 57%, and 72%, respectively). Most respondents were white (86%, 84%, and 89%) and at an advanced career stage (63%, 63%, and 68%). More than half of the respondents were researchers (62%, 57%, and 61%), and nearly a quarter were in academic leadership positions (25%, 19%, and 22%).

In the final round of voting (Round 3), participants arrived at clear distinctions regarding which responsible research assessment criteria should be prioritized for inclusion in institutional policies (Table 1). Standards related to the sharing of data, materials, and code received overwhelming support, with nearly all participants voting in favor of their inclusion. Similarly, open-access publishing, prospective study registration, transparency through reporting guidelines, verification efforts, and the disclosure of interests and funding each achieved strong consensus; most respondents agreed that these practices are foundational for trustworthy academic assessment.

Table 1. Voting results after 3 Rounds

Practice	Definition	Consensus reached during Round	Include n (%)	Exclude n (%)	Abstain n (%)
Data, Materials, Code Sharing	Share data with necessary metadata, research materials, and analysis code to enable verification, reuse, and extension, subject to ethical and legal constraints	1	84 (88.4)	11 (11.6)	0
Open Access Publishing	Ensure public accessibility of research outputs via publisher open access or public repositories/preprints, using models that do not disadvantage underresourced authors or institutions	1	78 (85.7)	1 (1.1)	12 (13.2)
Prospective Study Registration	Register study hypotheses, methods, and analysis plans in a public registry before the study is conducted to reduce HARKing, publication bias, and selective reporting while enabling accountability to mandates	3	17 (85.0)	1 (5.0)	2 (10.0)
Study Transparency through Reporting Guidelines	Adhere to designappropriate reporting guidelines (e.g., CONSORT, STROBE, ARRIVE, PRISMA) to improve completeness, clarity, and reproducibility of reported research	3	16 (80.0)	2 (10.0)	2 (10.0)
Disclosure of Interests & Funding	Publicly disclose financial, institutional, and personal relationships along with all funding sources so users can appraise potential influences and protective measures taken	3	15 (83.3)	2 (H.l)	1 (5.6)
Verification efforts	Conduct and value replication and independent verification (including computational reproducibility), recognizing their rarity and importance for credible discovery	3	18 (94.7)	1 (5.3)	0

In contrast, other proposed criteria were far more divisive. While societal engagement was appreciated by the majority—as about seventy percent favored its inclusion—it did not meet the consensus threshold set for recommendations. Preprints were particularly polarizing, with respondents evenly split between support and opposition and a very small minority abstaining. The idea of integrating generative AI reporting into assessment policies, meanwhile, was met with pronounced resistance, as over two-thirds of participants recommended excluding it, while only a quarter supported its inclusion. Criteria such as dataset citation, alternative metrics for research impact, and explicit emphasis on conducting replicable or reproducible research similarly failed to achieve consensus. In these categories, a sizeable portion of the panel remained either unconvinced of their value or concerned about feasibility, implementation barriers, or broader disciplinary relevance.

Discussion

Rationale and elaborations

The six standards that reached consensus align with several of the updated TOP 2025 practices and other global open science mandates, such as funders, while providing levers specific to RPO assessment policies that shape research culture and daily practice (32). Prospective registration addresses HARKing (Hypothesizing After the Results are Known), publication bias, and selective reporting, and helps verify compliance with funder expectations, with evidence from national audits indicating persistent gaps that RPOs can help close through assessment incentives (33,34).

Reporting guidelines improve manuscript quality and transparency when embedded in workflows, enhancing the usability and integrity of research outputs across designs and disciplines (35).

Disclosure of interests and funding is essential for credibility, as undisclosed conflicts damage trust in researchers and institutions and impede objective interpretation of findings by users and the public. Open data, materials, and code provide the substrate for verification and reuse, creating a virtuous cycle that discourages questionable research practices and encourages careful methodological planning. Open access routes—including green (authors make a version of their work freely available in a repository), gold (the final published article is freely available on the publisher's site immediately), and diamond (journals make all content free for readers and do not charge author fees) models as locally feasible—serve the public interest and reduce inequities in access without forcing unaffordable fees on authors, particularly when preprint deposition is available.

Verification efforts, including replication and computational reproducibility checks, are esteemed but uncommon; valuing them in assessment corrects a long-standing imbalance favoring novelty over credibility and provides direct signals that trustworthy research is rewarded. Together, these standards offer a coherent, minimal set that RPOs can tailor and scale while preserving core commitments to transparency and rigor across research domains (36).

Implementation considerations

No single pathway for implementation will fit all RPOs; modular adoption allows disciplines and institutions to prioritize practices with the strongest evidence, clearest funder alignment, or highest local feasibility given infrastructure and ethical-legal constraints. A staged approach can progress from recognition (e.g., awards, profiles, and training) to rewards (e.g., tangible assessment credit, seed funds, and protected time) and ultimately to requirements (e.g., policy conditions for employment, promotion, or tenure) with clear timelines and support. We have developed an implementation guide (See Appendix 1) that provides structure to think about each of the 6 practices and what good implementation might look like.

Policy design should anticipate and mitigate unintended consequences, such as burdening researchers in fields where the risk of re-identification is high or where data justice and provenance issues require community agreements, with particular care for Indigenous data

governance (37) and sensitive ecological data, such as threatened species' locations. Multiple compliant routes should be enabled where sensible—for example, allowing green open access or preprints to satisfy open access expectations and permitting controlled-access repositories or synthetic data where direct sharing is inappropriate—paired with guidance, training, and infrastructure support.

Implementation should occur through dialogue with affected parties and could likely occur at different levels within the university context. For example, while general support for the process can begin at the highest levels of leadership or even in inter-school organizations, the details about which practices are relevant to scholars are likely best determined within departments or schools. The authors and collaborators who participated in the process described in this paper intend to begin this process through outreach and collaboration with potentially relevant universities, consortia, members of the TOP Guidelines advisory board, and various other research-performing organizations.

Equity and global context

Implementation should account for resource variability across RPOs and regions, including parts of the Global South where infrastructure, legal frameworks, and funding may limit the rapid adoption of all standards without tailored support and phased timelines. RPOs can collaborate with consortia, libraries, and national platforms to pool infrastructure for repositories, registries, and training while aligning with UNESCO recommendations on open science to ensure global relevance and equity (1). Engaging patients, communities, and public stakeholders in policy design will help ensure that openness and verification efforts address real-world needs and reduce inequities in access and impact.

Strengths and limitations

The process followed established Delphi methods, combining broad online participation with a representative in-person round to resolve outstanding issues, and sought to anchor inclusions in available evidence and community standards to enhance face validity and adoption prospects. However, the final consensus reflects the in-person group and should be interpreted as the product of an iterative but bounded consensus rather than a population-wide referendum, even though participants were representative of earlier rounds. A key limitation is the current lack of direct empirical studies testing the institutional impact of adopting these specific assessment standards at RPOs, underscoring the need for implementation research and evaluation across diverse organizational settings.

Conclusion

These open science practices provide a concise, consensus-based set of assessment standards for RPOs that target behaviors known to increase quality, transparency, and trustworthiness, complementing publisher and funder reforms by acting on the incentives they directly control. Adoption with phased, modular implementation—paired with training, infrastructure, and equitysensitive options for compliance—can reduce research waste, strengthen credibility, and better align academic rewards with practices the research community and public value (36).

Data availability

The study protocol was approved by the Ottawa Health Science Network Research Ethics Board (Protocol 20210670-01H) and registered at the Open Science Framework (*https://osf.io/dx7f3/overview*). The complete detailed methods and supporting data can be found at: (*https://osf.io/a87ek/overview*).

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Appendix 1

A practical guide for RPOs to maximize quality, transparency, and trustworthiness of scientific research

Introduction

This guide is designed to be used in academic promotion processes at Research Performing Organizations (RPOs) to support both:

- Candidates: to demonstrate their commitment to and use of open research practices as part of

their promotion application, and
- Assessors (i.e. panel members): to understand what good looks like in open research practice as part of their assessment of that application.

We have designed the guide to be concise and practical: rather than duplicating existing resources, it links to further information and resources on the **UK Reproducibility Network (UKRN)** website and to other external sources, including the **Open Science Framework (OSF)** website (see also Glossary and abbreviations). The six main practices included in this document are those that achieved consensus in our Delphi study and the sub-section of these main practices are adapted from *Farran et al. (2025)* which includes a collation of examples of good open research practices across various disciplines. There is an additional topic, citizen engagement, that was discussed in the Delphi but did not quite reach consensus. We nonetheless include guidance on this item as it may be of interest to some RPOs. this document provides a framework for evaluating exactly what , though, where their work collated examples of good open research practices in various disciplines, this document provides a framework for evaluating what exactly is meant by 'good' in this context.

1. **Verification efforts**
   - Replication studies
2. **Prospective study registration**
   - Registration, preregistration, or registered reports
3. **Data, code, and materials sharing**
   - FAIR data
   - Code sharing
   - Materials sharing
4. **Reporting transparency**
   - Reporting guideline checklists
   - Author contributions
5. **Open access publishing**
   - Preprints
   - Open access publication
   - Open peer review
   - Open materials
   - Open code and/or software
6. **Disclosures of interest and funding**
7. **Societal engagement**
   - Citizen Science
   - Research co-production

Using the guide

For each of the items, the guide sets out the minimum standards for open research practices and reasonable expectations across institutions, while allowing for appropriate variation between disciplines. Whilst some of the practices outlined below are perhaps more easily achieved than others, we present them here equally and recommend that candidates and assessors consider what is both reasonable and relevant within the context of their discipline and institution. We also encourage those using the guide to look at their candidates' history of consistent engagement with open research practices rather than isolated examples.

Disciplinary context

Although many open research practices have commonly been discussed under the term "open science", open research applies to all disciplines. If the concept of open research is new to you, it might be challenging to determine how you can apply open research practices to your research. UKRN has developed *discipline-specific resources* that include case studies, examples of open research practices, and links to general resources for 31 different disciplines. For candidates, as part of making the case for promotion, a key question might be 'what does good open research

practice look like within my discipline' or 'what open research practices are relevant to me'.For assessors, the UKRN disciplinary resources may be particularly useful in agreeing on what might be expected in a promotion application.

Institutional context

The expectations around open research practice are partly defined by the strategic aims and/or the research culture of the institution. The aim of UKRN is to change culture across the sector to make it more open and transparent, but the grassroots reality is that culture change takes time, and every institution is on a different journey. That is why UKRN has produced the *Recognising and rewarding open research toolkit*, which provides institutions with a self-assessment tool to determine the maturity of their relevant policies and practices in rewarding open research, as well as an implementation guide and case studies to facilitate positive change. As a candidate making the case for promotion, you might want to consider 'what does good open research practice look like within my institution' or 'what open research practices are reasonable'. It might be valuable to talk to your *UKRN Local Network Lead* to help shape realistic expectations; institutions have very different levels of maturity in implementing open research practices, and promotion procedures reflect this. The candidate's career stage should also be considered, as this can affect the resources available to support open research. For assessors and panels, we hope this guide helps you see more clearly which candidates are pushing the boundaries of open research practices within your institution, in line with your institution's strategic aims and research culture.

National context

The importance and viability of open research practices will vary between nations and over time. Therefore, candidates and assessors should consider the national context when evaluating their/their candidates' engagement with open research practices, to reflect differences in policy, reward, and resourcing for open research between countries and regions.

Resources and limitations

At this point, we have not tried to list all potentially relevant resources, but we aim to develop the guide in this direction to make it as useful as possible for candidates and assessment panel members. This current iteration of the guide is therefore not meant to be a checklist or an exhaustive list of what 'good' looks like, but to provide a starting framework that will inevitably evolve over time.

Recognised, relevant, and reasonable

In the guidance below we have used 'recognised', 'relevant', and 'reasonable' to infer certain standards or expectations, as it is not possible to provide specific examples of what may be recognised, relevant, or reasonable in a particular discipline, at a particular career stage, in a particular country or region. As such, please assume that we mean recognised, relevant, or reasonable as defined by your own disciplinary, national, and institutional context.

Verification efforts

Aim: Conduct and value replication and independent verification (including computational reproducibility), recognizing their rarity and importance for credible discovery.

What does good look like?

- Studies are preregistered, and outputs are made openly available, e.g., data and code/software are made **FAIR**/open, papers are published as preprints, and peer-reviewed articles are published **OA**
- Studies clearly state their aims, e.g., either reproduction or replication, and either testing reliability or validity/generalisability of the findings
- Studies use adequate statistical power to support the inferences made, and are transparent about the limits of those inferences
- Studies are transparent about any divergences in method from the studies under scrutiny
- Studies focus on important research findings, meaningful to the research community

Resources

Replication Research: A Guide for New Researchers:

https://medium.com/@riazleghari/replication-research-a-guide-for-new-researchers-81d4c091217f

Seven principles of effective replication studies: *https://doi.org/10.1007/s10301-018-0149-3*

2. Prospective study registration

Aim: Register study hypotheses, methods, and analysis plans in a public registry before the study is conducted to reduce HARKing, publication bias, and selective reporting while enabling accountability to mandates. In some disciplines, this is called "preregistration".

What does good look like?

- The study registration covers study aims, hypotheses, methods, ethics, analysis, and data/code sharing plans applicable to the research
- The study registration was made with recognised third-party open platforms or published in recognised journals (as per disciplinary context) with trustworthy curation and preservation arrangements
- The study registration is demonstrably timestamped prior to data collection
- The study registration is open, perhaps after an embargo
- The study registration is **FAIR**
- The study registration is assigned persistent identifiers (e.g. **DOIs**) and **canonical open licences**
- In the case of registered reports, namely study protocols that are approved by journals prior to study conduct, these are peer-reviewed, published **OA**, and assigned **DOIs** and **canonical open licences**
- The final publication contains a section illustrating and justifying any changes between the registered analysis plan and the final publication

Resources

UKRN Primer Preregistration & Registered Reports: *https://osf.io/8v2n7_v1*

UKRN Animated Primer Preregistration & Registered Reports: *https://www.youtube.com/watch?v=h0Pin-OUlS4&feature=youtu.be*

Training resources: *https://www.ukrn.org/pre-registration/?et_fb=1&PageSpeed=off*

3. Data, code, and materials sharing

Aim: Share data with necessary metadata, research materials, and analysis code to enable verification, reuse, and extension, subject to ethical and legal constraints

FAIR data

FAIR data is Findable, Accessible, Interoperable, and Reusable (FAIR). 'Findable' and 'Accessible' are concerned with where materials are stored (e.g. in data repositories), while 'Interoperable' and 'Reusable' focus on the importance of data formats and how such formats might change in the future.

Adapted from *Parsons et al. (2022)*.

What does good look like?

- Data are Findable:
  Data is deposited in a **recognised repository** with sufficient human and machine-readable standardised metadata (including persistent identifiers such as **DOIs**) to facilitate discovery
- Data are Accessible:
  Barriers to access, such as manual intervention to submit and/or approve a request to access, or a requirement to log in to a platform or system, are removed
- Data are Interoperable:
  Data are made available in **non-proprietary formats**
- Data are Reusable:
  Data are accompanied by adequate documentation (such as **ReadMe files**) to allow others to

easily interpret the data, and use **canonical open licences** (with licence details embedded within the metadata)

- Data deposited in a **recognised repository** with trustworthy curation and preservation arrangements
- There is evidence that the data have been found, accessed, scrutinised, combined with other materials, and/or reused. Whilst this *indicates* rather than *equates to* quality, it demonstrate that the data are **FAIR** and that the adoption of this open research practice has increased the impact of the research. Disciplinary, institutional, and temporal context (e.g. how recently data were made available) also need to be considered here to ensure accurate and equitable assessment
- Appropriate assessment frameworks/rubrics may be used to determine the extent to which data are **FAIR**

Resources

UKRN Primer Data Sharing: *https://osf.io/preprints/osf/wp4zu_v1*

UKRN Animated Primer Data Sharing: *https://www.youtube.com/watch?v=-s47Wb4WvDA*

Training resources: *https://www.ukrn.org/data-sharing/?et_fb=1&PageSpeed=off*

Open materials

The author's public sharing of materials that were used in a study, "such as survey items, stimulus materials, and experiment programs" (Kidwell et al., 2016, p. 3).

Adapted from *Parsons et al. (2022)*.

What does good look like?

1. Materials deposited in **recognised repositories** or platforms with trustworthy curation and preservation arrangements
2. Materials are **FAIR**
3. Materials are assigned persistent identifiers (e.g. **DOIs**) and **canonical open licences**
4. Where materials are not openly/digitally available, detailed metadata records have been created to notify others of their existence, with records also containing clear information as to how they can be accessed, with accompanying documentation,on such as **ReadMe files** made available to provide guidance on effective reuse
5. There is evidence that the materials have been found, accessed, scrutinised, combined with other materials, and/or reused. Whilst this *indicates* rather than *equates to* quality, it demonstrate that the materials are **FAIR** and that the adoption of this open research practice has increased the impact of the research. Disciplinary, institutional, and temporal context (e.g. how recently materials were made available) also need to be considered here to ensure accurate and equitable assessment

Open code

Making computer code (e.g., programming, analysis code, stimuli generation) and/or software freely and publicly available in order to make research methodologies and analyses transparent and reproducible.

Adapted from *Parsons et al. (2022)*.

What does good look like?

- Code/software deposited in **recognised repositories** or platforms with trustworthy curation and preservation arrangements
- There is evidence of version control with each iteration/change/fork clearly identified with distinguishing metadata
- Code/software is **FAIR**
- Code/software is assigned persistent identifiers (e.g. **DOIs**) and **canonical open licences**
- There is evidence that the code/software has been found, accessed, scrutinised, combined with other materials, and/or reused. Whilst this *indicates* rather than *equates to* quality, it does

demonstrate that the code/software is indeed **FAIR** and that the adoption of this open research practice has increased the impact of the research. Disciplinary, institutional, and temporal context (e.g. how recently code/software was made available) also need to be considered here to ensure accurate and equitable assessment

Resources

UKRN Primer Open Code: *https://osf.io/qw9ck_v1*

UKRN Animated Primer Open Code and Software: *https://www.youtube.com/watch?v=o_9ctpM61sM*

Training resources: *https://www.ukrn.org/open-software-and-code/?et_fb=1&PageSpeed=off*

Licensing code/software: *https://opensource.org/licenses*

4. Reporting transparency

Adherence to design-appropriate reporting guidelines (e.g., CONSORT, STROBE, ARRIVE, PRISMA) to improve completeness, clarity, and reproducibility of reported research.

What does good look like?

- The research team identifies and uses appropriate reporting guidelines from the **EQUATOR Network** (e.g., CONSORT, PRISMA, STROBE, ARRIVE) aligned to the study design and methodology.
- Authors complete the reporting checklist in full and submit it with the manuscript to support transparent, reproducible reporting.
- The manuscript text clearly addresses all checklist items or explains when items are not applicable.
- Reporting guideline use is stated explicitly in the methods section (e.g., "We followed the CONSORT 2010 guidelines").
- The completed checklist is made openly available as a supplementary file or deposited in a recognised open repository with a persistent identifiers
- Where specialised methods are used, additional or extensions of guidelines from EQUATOR are consulted and applied.
- Updated versions of reporting guidelines are used as they become available to ensure current best practice.

Resources

EQUATOR Network Library of Reporting Guidelines: *https://www.equator-network.org/library/*

EQUATOR Online Learning: *https://www.equator-network.org/e-learning/*

EQUATOR General Toolkit for Researchers: *https://www.equator-network.org/toolkits/*

UKRN reporting resources (general): *https://www.ukrn.org*

5. Open access publishing

Preprints

Publishing a preprint means making a version of a scientific manuscript/research output publicly available before peer review and formal publication, considered a form of Green Open Access. Preprints are usually hosted on a dedicated preprint repository that facilitates dissemination by sharing research results more quickly than through traditional publication, and to a wider audience.

Adapted from *Parsons et al. (2022)*.

What does good look like?

- Preprints deposited in a **recognised repository** with trustworthy curation and preservation arrangements
- Preprints are immediately and openly available
- Preprints are **FAIR**
- Preprints are assigned persistent identifiers (e.g. **DOIs**) and **canonical open licences**

- There is evidence that the preprints have been found, accessed, scrutinised, combined with other materials, and/or reused. Whilst this *indicates* rather than *equates to* quality, it does demonstrate that the preprints are indeed **FAIR** and that the adoption of this open research practice has increased the impact of the research. Disciplinary, institutional, and temporal context (e.g. how recently preprints were made available) also need to be considered here to ensure accurate and equitable assessment
- Preprints have been updated with links - including persistent identifier (PID) - to **AAM** and/or **VoR** and/or other outputs (e.g. data) in due course
- Use of **DAS** to connect data and preprints

Resources

UKRN Primer Preprints: *https://osf.io/m4zyh_v1*

UKRN Animated Primer Preprints: *https://www.youtube.com/watch?v=syef3PPltG0*

Training resources: *https://www.ukrn.org/pre-prints/?et_fb=1&PageSpeed=off*

Open access publications

***Open Access (OA)** refers to making peer-reviewed articles and other research outputs publicly available online. Different methods of achieving open access are often referred to by colour, including Green Open Access (when a version of the work [often the **AAM**] is deposited to a repository) and Gold Open Access (when the **VoR** is openly available on a journal's website/publishing platform).*

Adapted from *Parsons et al. (2022)*.

We refer below to good practice in making research articles **OA**, as other output types (e.g. data, materials, methods, code etc.) are covered separately.

What does good look like?

- Publications deposited in **recognised repositories** with trustworthy curation and preservation arrangements or published in journals with trustworthy curation and preservation arrangements
- Publications are immediately and openly available
- Publications are **FAIR**
- Publications are assigned persistent identifiers (e.g. **DOIs**) and **canonical open licences**
- The author has retained sufficient rights to share their publications, such as through the use of a **Rights Retention Statement (RRS)**
- The author has engaged with multiple approaches to **OA** and not relied on paid-for **OA** (thereby reducing financial cost to the research system), such as through Green **OA** and publishing in Diamond **OA** journals
- There is evidence that the publications have been found, accessed, scrutinised, combined with other materials, and/or reused. Whilst this *indicates* rather than *equates to* quality, it does demonstrate that the publications are indeed **FAIR** and that the adoption of this open research practice has increased the impact of the research. Disciplinary, institutional, and temporal context (e.g. how recently publications were made available) also need to be considered here to ensure accurate and equitable assessment
- Evidence of the use of **DASs** in **OA** articles to connect data and other outputs
- Evidence of **OA** publication of a range of output types beyond articles, subject to disciplinary norms, e.g., monographs, chapters, conference papers, policy documents/grey literature, etc.

Resources

UKRN Primer - Open Access *https://osf.io/94rsp_v1/*

UKRN Primer - Rights Retention *https://osf.io/2ajsg_v1*

UKRN Animated Primer Open Access: *https://www.youtube.com/watch?v=RncrQXbnL3c*

Training resources: (forthcoming)

6. Disclosures of interest and funding

Researcher publicly discloses financial, institutional, and personal relationships along with all funding sources so users can appraise potential influences and protective measures taken.

What does good look like?

- Researchers provide a complete statement of all financial, institutional, professional, and personal interests relevant to the work.
- All research funding sources are named clearly, including grant numbers and funder roles (e.g., whether funders influenced study design, analysis, or publication).
- Authors disclose non-financial interests where relevant (e.g., advocacy positions, unpaid advisory roles, intellectual positions, close collaborations).
- The disclosure statement adheres to recognised standards (e.g., ICMJE Disclosure Form or discipline-specific equivalents).
- Disclosures are included in all research outputs (e.g., protocols, preprints, publications)
- Institutions and research teams have clear, consistently applied policies for managing and mitigating conflicts of interest, and these measures are described in the publication when relevant.

Resources

ICMJE Conflict of Interest Guidance: *https://www.icmje.org/disclosure-of-interest/*

COPE Discussion Document on Competing Interests: *https://publicationethics.org*

NIH Guidance on Financial Conflicts of Interest: *https://grants.nih.gov/grants/policy/coi/* UKRIO Good Research Practice guidance: *https://ukrio.org*

7. Community engagement

Citizen Science

Citizen science refers to projects that actively involve the general public in the scientific endeavour, with the goal of democratizing science. Citizen scientists can be involved in all stages of research, but usually participate as data collectors or analysts, with more in-depth public involvement in a project possibly constituting Research Co-production, though there are no fixed distinctions.

Adapted from *Parsons et al. (2022)*.

What does good look like?

- Citizen Science projects demonstrate alignment with the European Citizen Science Association's *Ten Principles of Citizen Science*
- All research outputs from Citizen Science projects are made publicly available and **FAIR**
- All research outputs from Citizen Science projects are assigned persistent identifiers (e.g. **DOIs**) and **canonical open licences**
- Research outputs acknowledge the participation of citizens at specific stages of the project

Resources

European Citizen Science Association, Ten Principles of Citizen Science: *https://www.ecsa.ngo/10-principles/*

8. Research Co-production

An approach to research where stakeholders who are not traditionally involved in the research process are empowered to collaborate throughout the research lifecycle. For example, coproduced health research may involve health professionals and patients in study design, while coproduced education research may involve teaching staff and pupils/students in data collection.

This is motivated by principles such as respecting and valuing the experiences of non-researchers, addressing power dynamics, and building mutually beneficial relationships.

Adapted from *Parsons et al. (2022)*.

What does good look like?

- Studies are clear about the type of co-production or community engagement being undertaken
- Other aspects of good practice will depend on the type of co-production being undertaken
- All research outputs from Research Co-production projects are made publicly available and **FAIR**
- All research outputs from Research Co-production projects are assigned persistent identifiers (e.g. **DOIs**) and **canonical open licences**

Resources

UKRN Primer Community Engagement in Research: *https://osf.io/preprints/osf/8jgxt_v1*

Training resources (forthcoming)

Other

Open peer review

Peer review of research outputs, grants, etc., with public disclosure of the review reports and editorial decisions, often coinciding with author and reviewer identities being known to one another or publicly.

Adapted from *Parsons et al. (2022)*.

What does good look like?

- Identities of the authors and reviewers are disclosed to both each other and readers
- Review reports are openly available to readers, and are **FAIR**
- Review reports are assigned persistent identifiers (e.g. **DOIs**) and **canonical open licences**
- Open reviews have been conducted as part of wider and open participation in the review process
- Participation in journals that practice Open Peer Review, e.g. positions on Editorial Boards, as well as actual reviewing
- Evidence of engagement with open peer review in relation to a wide range of research outputs, for example datasets and protocols, not just journal articles (depending on the disciplinary context)

Resources

University of Surrey guide: *https://www.surrey.ac.uk/library/open-research/open-peer-review*

Recognising contributions

Understanding that contributions to the process and outputs of research are more complex than the traditional 'authorship' model, and ensuring in practice that all 'contributors', rather than authors, are acknowledged in outputs, thereby bringing greater transparency, accountability, and equity to research.

What does good look like?

- The use of **CRediT** or authorship statements on publications/outputs, detailing the explicit contributions of each person involved
- Contribution statements are fully populated, including all contributions by research and other staff and students to project administration, methodology, and supervision
- Contribution statements use an established standard, such as **CRediT**, and include links to **ORCiD** profiles
- The output includes a conflict of interest statement from all contributors

Resources

Montreal Statement on Research Integrity in Cross-Boundary Research Collaborations: *https://www.wcrif.org/guidance/montreal-statement*

CRediT: *https://credit.niso.org/*

Glossary and abbreviations

Canonical open licences: Open licences clearly state how open the resource is and how other users may interact with it, and there are many different licences applicable to different resource types. Preprints and articles are most often licensed using one of the Creative Commons (CC) licences. Data, code, and software may also be assigned CC licences, though code/software-specific licences may be more relevant, such as the MIT licence or others approved by the Open Source Initiative.
Non-proprietary formats: File formats that are able to be used by a broad range of software and operating systems so that users can access and use the contents without needing access to specific proprietary software/systems; data can also be transferred between software/systems, ensuring interoperability and preservation of the files' contents.
ReadMe file: A file, usually plain text, that accompanies data, code, software or other outputs, providing any context and clarifications needed for somebody to understand the contents of the other files. ReadMe files can contain configuration or installation instructions, a key explaining values and measurements contained in datasets, licensing information, contact details, etc., though this will vary depending on the discipline and material type.
Recognised repositories: There is significant variation across disciplines and output types regarding what might constitute a recognised repository, so we have not listed specific requirements or examples. Generally, though, what is meant by a 'recognised' repository is one which is widely used and respected within your community, indexed *in* a service such as OpenDOAR or Re3Data, and indexed *by* scholarly databases such as OpenAlex or Google Scholar, and ideally accredited or certified in some way, such as ISO16363 certification or the CoreTrustSeal.
Rights Retention Statement (RRS): A statement used by authors in submitted journal articles that asserts their rights to reuse the work (including later versions, specifically the accepted manuscript), such as by depositing a copy to a repository, which overrides any restrictions that a publisher subsequently tries to implement via its Licence to Publish, Copyright Transfer Agreement, or equivalent. An example of an RRS taken from the UKRI OA Policy:*"For the purpose of open access, the author(s) have applied a Creative Commons attribution (CC BY) licence to any Author Accepted Manuscript version arising."*Many institutions now have institutional rights retention policies that apply to all researchers at the institution, and at the time of writing, eight EU countries have 'secondary usage rights' enshrined in law that apply at a national level.

AAM:: Author accepted manuscript
CRediT:: Contributor role taxonomy (see: *https://credit.niso.org/*)
DOI:: Digital object identifier
DAS:: Data Access Statement
FAIR:: Findable, Accessible, Interoperable and Reusable (see: FAIR Data section for details)
PI or PID:: Persistent identifier
OA:: Open Access
ORCiD:: Open Researcher and Contributor ID (see: *https://orcid.org/*)
OSF:: Open Science Framework (*https://osf.io/*)
OR4:: Open and Responsible Reseacher Reward and Recognition (see: *https://www.ukrn.org/open-and-responsible-researcher-reward-and-recognition-or4/*)
RRS:: Rights Retention Statement (see:Glossary above)
UKRN:: UK Reproducibility Network (see: *https://www.ukrn.org/*)
VoR:: Version of Record

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Appendices

Table of practices and definitions included in main text for institutional policy translation and rubric development; extended voting results and protocol materials are archived in the project record cited in Methods.

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Peer reviews

Reviewer #1 (Public review):

Summary:

This study addresses the gap between calls to incentivize Open Science practices through research assessment reform and its implementation by Research Performing Organizations (RPOs). To help RPOs get started and prioritize their assessment reforms, it makes a series of recommendations for action. It does so via an expert Delphi process, where consensus around six standards was reached. The purpose is to provide a resource for would-be reformers in Research Performing Organizations around the world, in the hope of advancing the Responsible Research Assessment and Open Science reform movements across global academia. The standards are not meant to be one-size-fits-all, but customizable to local needs and implemented selectively at the discretion of a given RPO.

Strengths:

Overall I was impressed with the contribution. Generally speaking, it clearly sets out its methods and arguments. I recognize there is indeed a growing need to support RPOs at varying levels of maturity, to get started and orient themselves around research assessment reform, so this seems to me like it will be a useful offering. The Delphi approach is well explained, and further information is provided in supplementary files.

Weaknesses:

Some further reflection on the disciplinary make-up of the Delphi participants would be helpful. Somewhat more hedging on the limitations of the manuscript would help improve the contribution, as would further details on how this contribution sits in relation to existing resources and studies on implementing open science-aware research assessment reforms.

https://doi.org/10.7554/eLife.112683.1.sa2

Reviewer #2 (Public review):

Summary:

This paper describes the employment of a Delphi process, a common consensus-reaching practice based on consecutive rounds of discussion and voting. In this study, the authors engaged in the Delphi process with stakeholders to reach consensus on recommended guidelines for use in tenure and promotion, specific to reproducible and transparent research practices.

Strengths:

The paper provides very practical guidelines for research institutions willing to push for reform regarding reproducible and transparent practices. Guidelines like these are important for institutional leadership that wishes to drive change at their institutions but does not necessarily hold topic expertise on research and reproducibility. The study's authors represent longstanding expertise on the topic, and the use of the Delphi process ensures that stakeholders were engaged in the recommendations, something that helps ensure uptake and buy-in.

Weaknesses:

The biggest weakness of the paper is a lack of engagement with the literature of tenure and promotion reform. This is a field that has been heavily studied with regard to incorporating change in practice to promote equity and inclusion. Other specific subfields that have dealt in this space are those that have pushed for reform to increase the importance of teaching, service, and (inclusion of) mentorship in tenure and promotion packages. Because this paper deals heavily with implementing change in this specific space, and provides guidelines with very practical implications for change, some literature review in the introduction and discussion on where past efforts have succeeded or faced roadblocks would be welcome. This would add to the study's value in helping people implement these practices in a very real and tangible way. The other weakness is a lack of further expansion on the recommendations that did not reach consensus, many of which were added in Round 3. Are more rounds warranted for future studies? Changing landscapes require changing recommendations, which is probably why things like the use of LLMs emerged later and did not reach consensus. How should the readers engage with these results, and what future steps are needed to implement guidelines (if any) around these topics?

https://doi.org/10.7554/eLife.112683.1.sa1

Reviewer #3 (Public review):

Summary:

This work provides a novel guide for Research Performing Organizations (RPOs) to evaluate researchers in ways that promote responsible research practices. Such a tool could help inform the development of policies that foster these practices within RPOs and potentially influence decisions related to the hiring and promotion of scientific staff. The guide was developed through a modified three-round Delphi process based on a preliminary set of recommendations provided by members of various organizations. Each round included a survey, and items that did not reach a consensus of >80% were reconsidered in the subsequent round. Round 3 consisted of an in-person meeting, during which the final guide was developed based on criteria that reached {greater than or equal to}80% consensus among participants. The guide includes six practices for evaluation (verification efforts, prospective study registration, data/code/materials sharing, reporting transparency, open-

access publishing, and disclosure of funding interests) with an additional seventh component. Each practice includes a clearly defined aim and criteria describing what good practice looks like. The complete study methodology, statistical analyses, and supporting data are available through Open Science Framework (OSF).

Strengths:

A major strength of this work is the development of a practical tool that could help foster responsible research practices among candidates and provide promotion and hiring panel members with clearer criteria for assessing such practices. The three-round Delphi process, which included international participants, provides a structured approach to reaching consensus on practices that could contribute positively to the research ecosystem.

Weaknesses:

The recruitment strategy may have introduced selection bias and limited the representation of researchers and other interest holders from diverse geographical and institutional contexts, particularly from the Global South. Although the authors acknowledge that variability across regions and institutions should be considered when applying the guide, greater representation of these contexts would strengthen confidence in the broad applicability and generalizability of the proposed framework.

https://doi.org/10.7554/eLife.112683.1.sa0