

How can research institutes empower researchers to foster research integrity?



Lex Bouter



my personal page

2024-12-10 How can universities empower researchers to foster research integrity - University of Sao Paulo - LM Bouter – 120 minutes, including interactive Q&A

Bouter LM. What research institutions can do to foster research integrity. *Journal of Science and Engineering Ethics* 2020; 26: 2363-69. <https://bit.ly/4fXXIfm>

Bouter L, Kleinert S, Horn L. Research integrity and societal trust in research. *South African Heart Journal* 2021; 18: 80-1.

<https://www.journals.ac.za/index.php/SAHJ/article/view/4879>

Bouter LM. Research misconduct and questionable research practices form a continuum. *Accountability in Research* 2024; 31; 1255–1259. <https://bit.ly/3YYaluu>

Bouter L. Why research integrity matters and how it can be improved. *Accountability in Research*. 2024; 31: 1277-1286.

<https://research.vu.nl/files/219241433/5.248.pdf>

Bouter L. Tackling research misconduct. *British Medical Journal* 2024; 386: q1595. <https://bit.ly/3OkCOLO>

Content

- Research Waste and Replication crisis
- Prevalence of problems
- Research Integrity and Open Science
- Open Methods and Open Data
- What research institutes can do

Essay

Why Most Published Research Findings Are False

John P. A. Ioannidis

2005

Simulations show that for most study designs and settings, it is more likely for a research claim to be false than true.

Moreover, for many current scientific fields, claimed research findings may often be simply accurate measures of the prevailing bias. In this essay, I discuss the



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Ioannidis JPA. Why most published research findings are false – PLoS Medicine 2005; 2 e124. <https://doi.org/10.1371/journal.pmed.0020124>



Avoidable waste in the production and reporting of research evidence

Iain Chalmers, Paul Glasziou

2009



REWARD
REduce research Waste
And Reward Diligence

2014



Webpage of Lancet REWARD campaign: <https://www.thelancet.com/campaigns/efficiency>

Chalmers I, Glasziou P. Avoidable waste in the production and reporting of research evidence. *Lancet* 2009; 374: 86-9

Chalmers I et al. How to increase value and reduce waste when research priorities are set. *Lancet* 2014; 383; 156-65

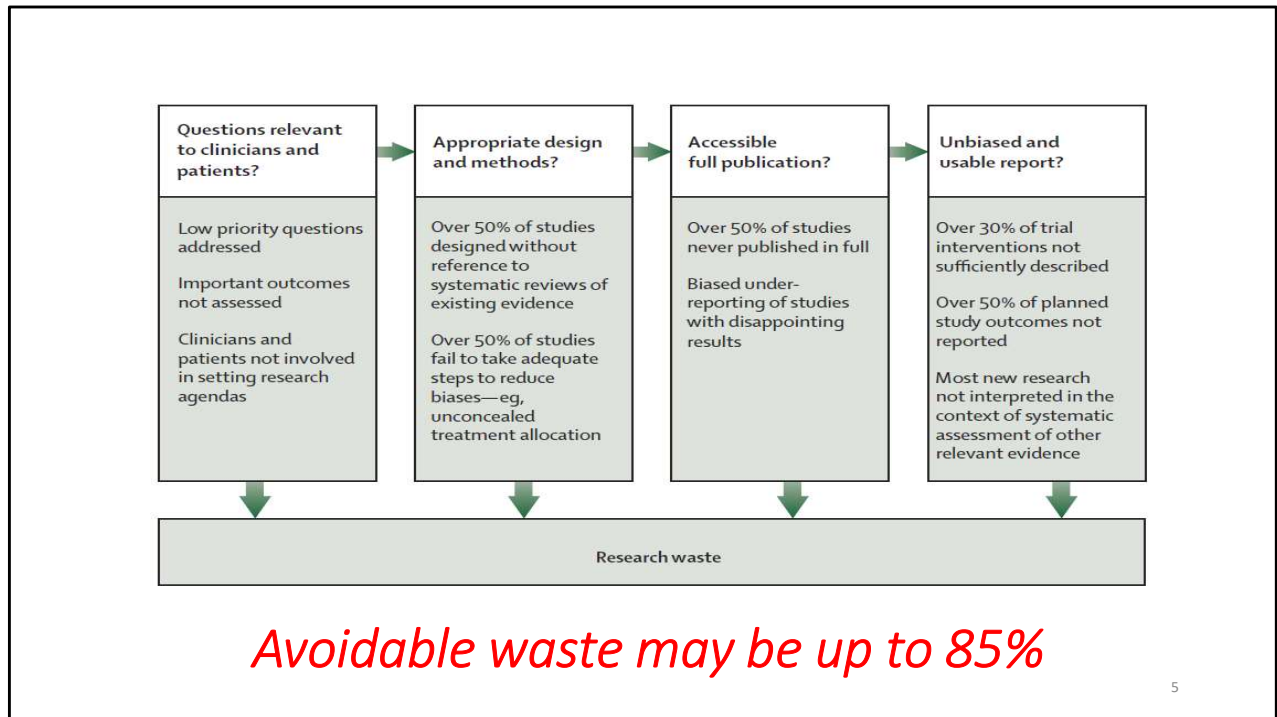
Ioannidis IPA et al. Increasing value and reducing waste in research design, conduct and analysis. *Lancet* 2014; 383; 166-75

Salman RA et al. Increasing value and reducing waste in biomedical research regulation and management. *Lancet* 2014; 383; 176-85

Chan A et al. Increasing value and reducing waste: addressing inaccessible research. *Lancet* 2014; 383: 257-66

Glasziou P et al. Reducing waste from incomplete or unusable reports of biomedical research. *Lancet* 2014; 383: 267-76

Moher et al. - Increasing value and reducing waste in biomedical research - who's listening - *Lancet* 2016; 387: 1573-1586



85% may be an overestimation, but when it would be half of that it would still be a shocking estimate.

Raise standards for preclinical cancer research

C. Glenn Begley and Lee M. Ellis propose how methods, publications and incentives must change if patients are to benefit.

2012

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This is the title of a alarming article in Nature in 2012.

The authors tried to replicate 53 widely cited high impact preclinical studies on potential new cancer treatments – surprise, surprise, they were all positive

If needed they even went into the original labs and tried to replicate the study there together with the original PIs

Begley CG, Ellis LM. Raise standards for preclinical cancer research. Nature 2012; 483: 531-3

Only **6 of 53** preclinical landmark cancer studies
could be **confirmed by replication**

When negative studies are rarely published, the published
record gets very biased and full of chance findings

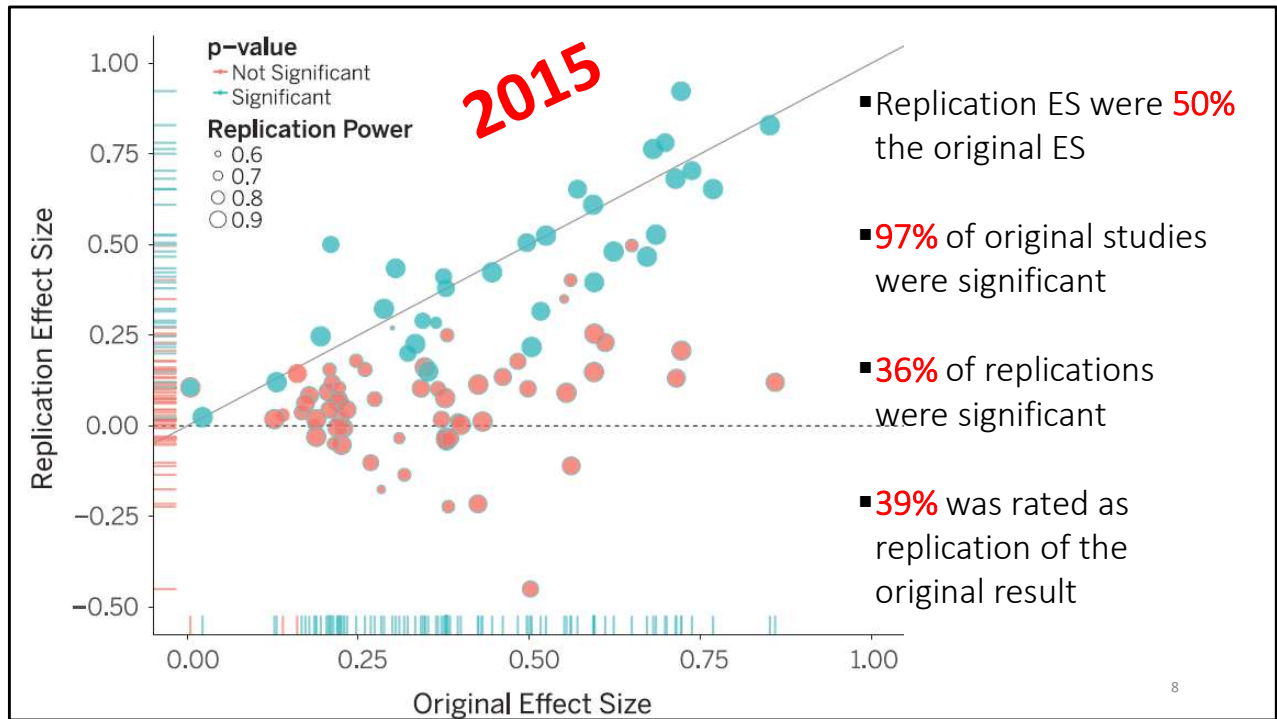
- These false leads inspire new studies → **research waste!**
- Including phase 1 clinical trials → **unethical situation!**

7

Selective reporting of animal studies is a huge problem, leading to a embarrassing low level of successful replication studies.

Furthermore, re-doing the studies is difficult because the methods used are often poorly documented.

Begley CG, Ioannidis JPA. Reproducibility in science. Circulation Research 2015; 116 116-26



Replications of 100 experimental and correlational studies published in three psychology journals using high-powered designs

Open Science Collaboration - Estimating the reproducibility of psychological science - Science 2015; 349

Epidemiological characteristics and prevalence rates of research reproducibility across disciplines: a scoping review

- English language replication studies published between 2018-2019 in **economics, education, psychology, health sciences** and **biomedicine**.
- Less than the half of the studies referred to a **registered protocol**.
- There was **variability** in the **definitions of replication success**.
- Based on the definition of replication success used by the author of each study, 95 of 177 (**53.7%**) studies replicated.

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Kelly D Cobey, Christophe A Fehlmann, Marina Christ Franco, Ana Patricia Ayala, Lindsey Sikora, Danielle B Rice, Chenchen Xu, John PA Ioannidis, Manoj M Lalu, Alixe Ménard, Andrew Neitzel, Bea Nguyen, Nino Tsertsvadze, David Moher (2023) Epidemiological characteristics and prevalence rates of research reproducibility across disciplines: A scoping review of articles published in 2018-2019. eLife 12:e78518. <https://elifesciences.org/articles/78518>

Replication studies are often undervalued in the **sciences**

Why replication has more scientific value than original discovery

John P. A. Ioannidis ^(a1) 

COMMENTARY

Empirical research must be replicated before its findings can be trusted

Lex M. Bouter^{a,b,*}, Gerben ter Riet^{c,d}

Replication studies are probably important for the **humanities** as well

10

Ioannidis JPA. Why replication has more scientific value than original discovery. Behavioral and Brain Sciences 2018; 41: e137

Bouter LM, ter Riet G. Empirical research must be replicated before its findings can be trusted. Journal of Clinical Epidemiology 2021; 129: 188-90.
[https://www.jclinepi.com/article/S0895-4356\(20\)31118-5/fulltext](https://www.jclinepi.com/article/S0895-4356(20)31118-5/fulltext)

Peels R, Bouter LM. The possibility and desirability of replication in the humanities. Palgrave Communications 2018; 4: 95. <https://www.nature.com/articles/s41599-018-0149-x>

Peels R, Bouter L. Replication and trustworthiness. Accountability in Research 2023; 30: 77–87. <https://doi.org/10.1080/08989621.2021.1963708>

“Only when certain events recur in accordance with rules or regularities, as in the case of **repeatable** experiments, can our observations be tested—in principle—by anyone.... Only by such **repetition** can we convince ourselves **that we are not dealing with a mere isolated ‘coincidence,’** but with events which, on account of their regularity and **reproducibility**, are in principle inter-subjectively testable.”

Karl Popper. *The Logic of Scientific Discovery*. London: Hutchison. 1959, P. 45

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Level of publications

54 % of 177 replication studies were successful

> 2 % of articles meet COPE **retraction** criteria (<0.1% are retracted)

4 % of the articles with **photos** these are **manipulated**

2% of published articles are **fake publications**

Level of researchers

Fabrication: 4% at least once in the last 3 years

Falsification: 4% at least once in the last 3 years

51% engaged frequently in at least 1 out of 11 **QRPs** in last 3 years



Kelly D Cobey, Christophe A Fehlmann, Marina Christ Franco, Ana Patricia Ayala, Lindsey Sikora, Danielle B Rice, Chenchen Xu, John PA Ioannidis, Manoj M Lalu, Alixe Ménard, Andrew Neitzel, Bea Nguyen, Nino Tsertsvadze, David Moher. Epidemiological characteristics and prevalence rates of research reproducibility across disciplines: a scoping review of articles published in 2018-2019. eLife 2023; 12: e78518.

<https://doi.org/10.7554/eLife.78518>

Oransky I. Retractions are increasing but not enough. Nature 2022; 608: 9.

<https://www.nature.com/articles/d41586-022-02071-6>

Bik EM, Casadevall A, Fang FC. The Prevalence of Inappropriate Image Duplication in Biomedical Research Publications. mBio 2016; 7: 10.1128/mbio.00809-16.

<https://doi.org/10.1128/mbio.00809-16>

Van Noorden R. How big is science's fake-paper problem? Nature News: 6 November 2023.

<https://www.nature.com/articles/d41586-023-03464-x>

Gopalakrishna G, ter Riet G, Vink G, Stoop I, Wicherts J M, Bouter L. Prevalence of questionable research practices, research misconduct and their potential explanatory factors: a survey among academic researchers in The Netherlands.

PLoS One 2022; 17: e0263023.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0263023>

Fanelli D. How Many Scientists Fabricate and Falsify Research? A Systematic Review and Meta-Analysis of Survey Data. PLoS ONE 2009; 4(5): e5738.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0005738>

Y. Xie, K. Wang, Y. Kong, Prevalence of research misconduct and questionable research practices: a systematic review and meta-analysis. Science and Engineering Ethics 2021; 27: 41. <https://link.springer.com/article/10.1007/s11948-021-00314-9>

<https://publicationethics.org/>

<https://publicationethics.org/files/cope-retraction-guidelines-v2.pdf>

<https://publicationethics.org/files/redundant%20publication%20B.pdf>

Fake publications are on the rise

- Produced by **Paper Mills** (using GAI)
 - Fabrication from scratch or by paraphrasing (plagiarism)
 - Authorship brokering
 - Citation boosting (citation cartels)
- **Fake reviewers** submitting **fabricated review reports**
- **Bribed** (guest) **editors** (of special issues)
- **Predatory** and **highjacked journals**

14

We have no solid data on the frequency of these phenomena, but they definitely seem to be on the rise.

Byrne JA, Abalkina A, Akinduro-Aje O, Christopher J, Eaton SE, Joshi N, et al. (2024) A call for research to address the threat of paper mills. PLoS Biol 22(11): e3002931.

<https://doi.org/10.1371/journal.pbio.3002931>.

<https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.3002931>

COPE & STM report on paper mills: <https://publicationethics.org/sites/default/files/paper-mills-cope-stm-research-report.pdf>

MA Oviedo-Garcia. Review Mill at MDPI. <https://predatoryreports.org/news/f/review-mill-at-mdpi>

Lonni Besançon I, Cabanac G, Labbé C, Magazinov A. Sneaked references: Fabricated reference metadata distort citation counts. J Assoc Inf Sci Technol 2024; 1–12.

<https://asistdl.onlinelibrary.wiley.com/doi/10.1002/asi.24896>

Strinzel M, Severin A, Milzow K, Egger M. Blacklists and Whitelists To Tackle Predatory Publishing: a Cross-Sectional Comparison and Thematic Analysis. mBio 2019; 10: e00411-19

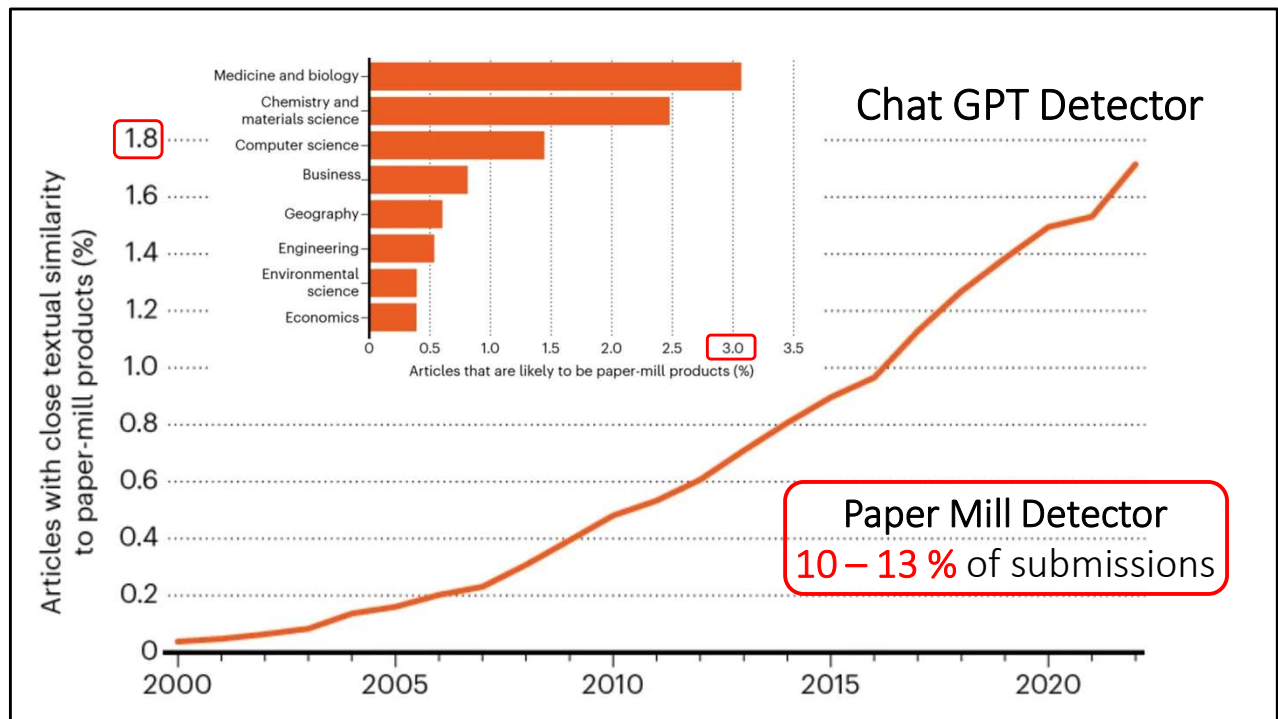
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Cobey CD, Grudniewicz A, Lalu MM, Rice DB, Raffoul H, Moher D. Knowledge and motivations of researchers publishing in presumed predatory journals: a survey. BMJ Open 2019; 9: e026516. <https://bmjopen.bmj.com/content/9/3/e026516>

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Retraction Watch. Exclusive: New hijacking scam targets Elsevier, Springer Nature, and other major publishers. <https://retractionwatch.com/2024/11/25/exclusive-new-hijacking-scam-targets-elsevier-springer-nature-and-other-major-publishers/>



Van Noorden R. How big is science’s fake-paper problem? Nature News: 6 November 2023. <https://www.nature.com/articles/d41586-023-03464-x>

Prillaman M. ‘ChatGPT detector’ catches AI-generated papers with unprecedented accuracy: tool based on machine learning uses features of writing style to distinguish between human and AI authors. Nature News: 6 November 2023. <https://www.nature.com/articles/d41586-023-03479-4>

Katharine Sanderson. Science’s fake-paper problem: high-profile effort will tackle paper mills. Nature News 19 January 2024. https://www.nature.com/articles/d41586-024-00159-9?utm_medium=Social&utm_campaign=nature&utm_source=Twitter#Echobox=1705659987

Wittau J, Seifert R. How to fight fake papers: a review on important information sources and steps towards solution of the problem. Naunyn-Schmiedeberg's Archives of Pharmacology, published online: 6 July 2024. <https://link.springer.com/article/10.1007/s00210-024-03272-8>

Wiley Paper Mill Detection service: <https://johnwiley2020news.q4web.com/press-releases/press-release-details/2024/Wiley->

[announces-pilot-of-new-AI-powered-Papermill-Detection-service/default.aspx](#)

Up to one in seven submissions to hundreds of Wiley journals flagged by new paper mill tool
<https://retractionwatch.com/2024/03/14/up-to-one-in-seven-of-submissions-to-hundreds-of-wiley-journals-show-signs-of-paper-mill-activity/>

The Journal of Clinical Investigation

AAP PRESIDENTIAL ADDRESS

2024 Association of American Physicians Presidential Address

Transparency, bias, and reproducibility across science: a meta-research view

John P.A. Ioannidis

Departments of Medicine, of Epidemiology and Population Health, of Biomedical Data Science, and of Statistics and Meta-Research Innovation Center at Stanford (METRICS), Stanford University, Stanford, California, USA.



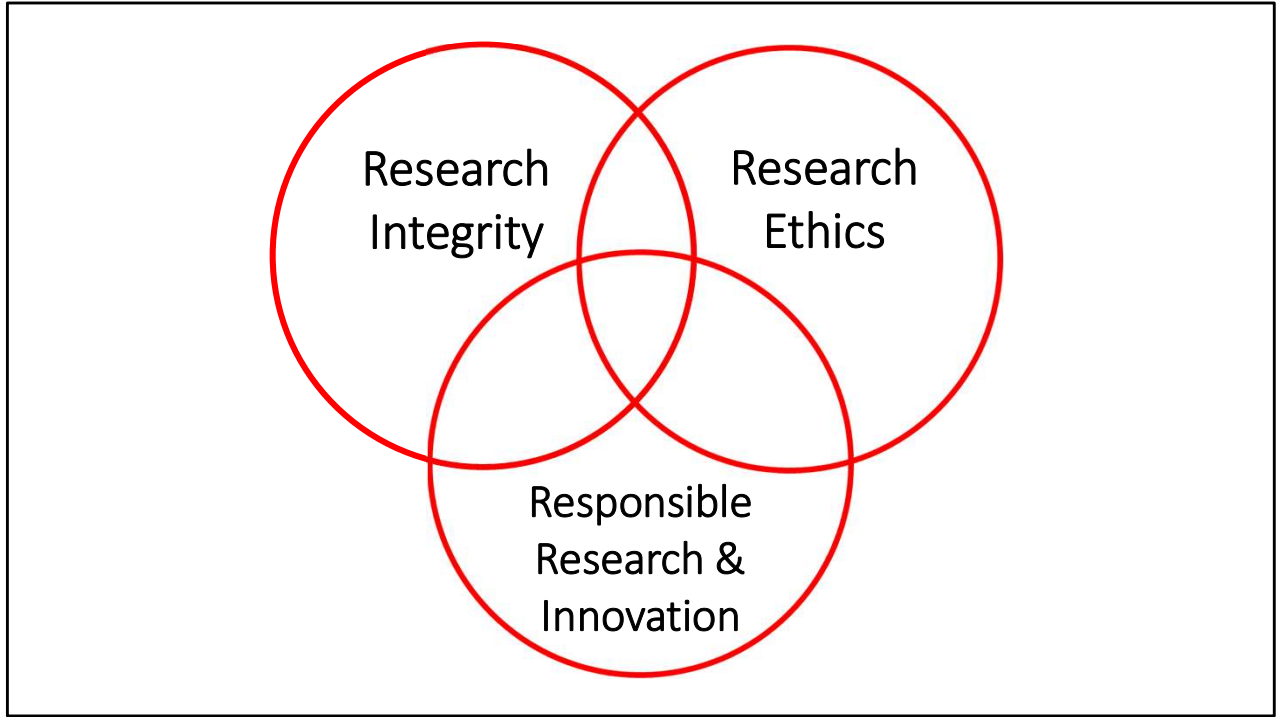
John P.A. Ioannidis. Transparency, bias, and reproducibility across science: a meta-research view. *J Clin Invest*. 2024;134(22):e181923. <https://doi.org/10.1172/JCI181923>

Hoekstra R, Vazire S. Aspiring to greater intellectual humility in science. *Nature Human Behavior* 2021; 5: 1602–1607. <https://doi.org/10.1038/s41562-021-01203-8>

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- Research Waste and Replication crisis
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- Research Integrity and Open Science
- Open methods and open data
- What research institutes can do
- What funding agencies can do

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Research Integrity (RI) concerns behaviors of researchers that hamper validity (**truth**) of research or **trust** in science and between scientists.

Research Ethics (RE) concerns the ethical considerations of research with **humans** and **animals**.

Responsible Research & Innovation (RRI) concerns the benefits and harms of research for **society** and the **environment**.

Minimize overlap and avoid 'mission creep' (e.g. by lumping EDI, epistemic justice and sustainability with Research Integrity)

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RI and RE norms can be ethical, methodological or both.

RI is usually codified and has a legal basis in some countries.

RE usually has a legal basis.

RRI is a matter of personal convictions and political debate and to some extent 'in the eye of the beholder' – difficult to codify or legalize.

Spectrum of research practices

How it should be done

Relevant, Valid, Reproducible, Efficient

Sloppy science

Ignorance, honest error or dubious integrity

Scientific fraud

Fabrication, Falsification, Plagiarism

*Responsible
Research Practices*

*Questionable
Research
Practices*

*Research
Misconduct*

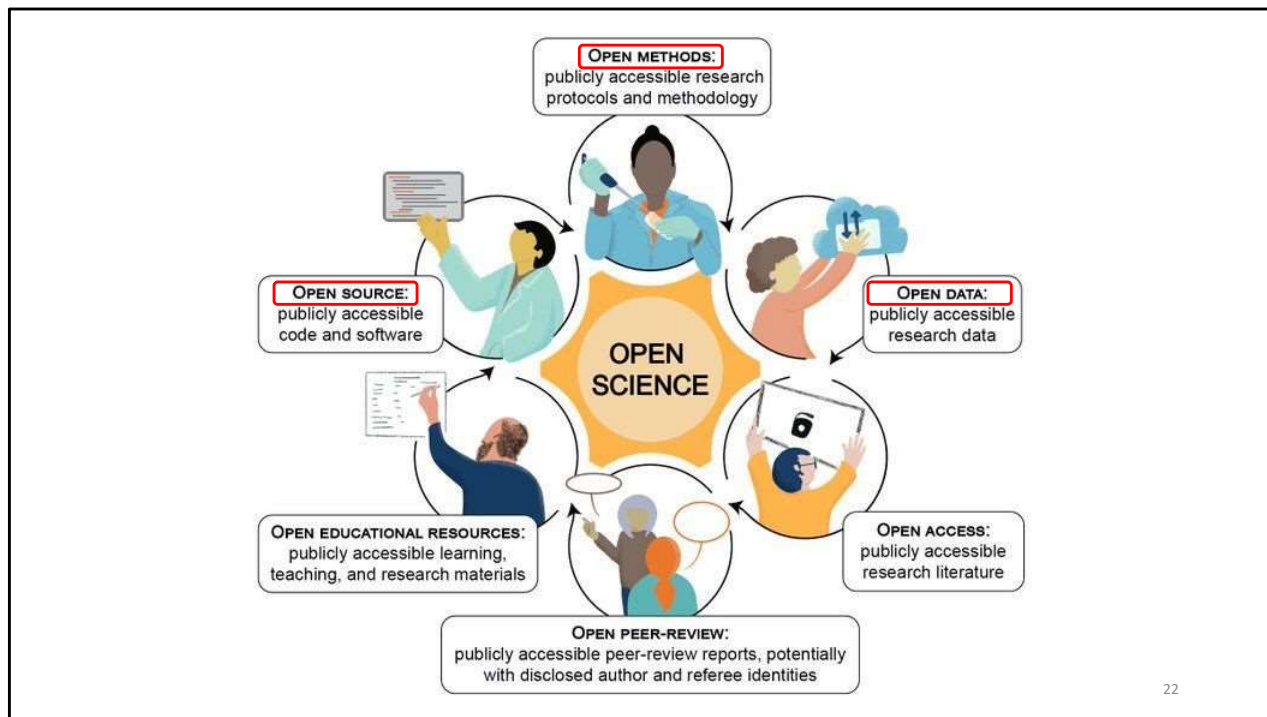
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Research Integrity concerns individual or collective behavior of researchers that promotes or hampers the validity (**truth**) of or the **trust** in research findings and in researchers

- **Trust** needs to be deserved by being **trustworthy**
- **Transparency** strengthens **trustworthiness**
- **Open Science** practices enable **accountability**

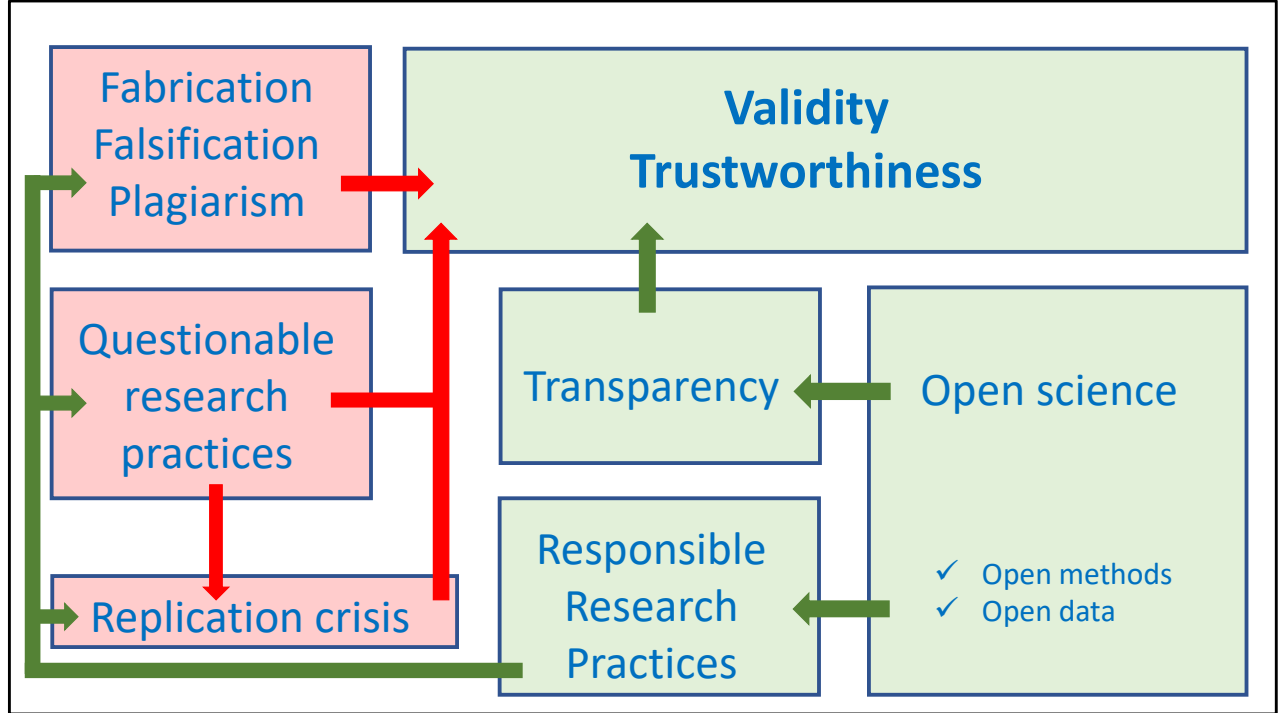
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Bertram B, Thoré E, Brodin T. Moving towards an open science community. LSE Impact Blog; 20 October 2023.

<https://royalsociety.org/blog/2023/10/moving-towards-an-open-science-community/>



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Bouter LM. Research misconduct and questionable research practices form a continuum. Accountability in Research 2024; 31; 1255–1259. <https://bit.ly/3YYaluu>

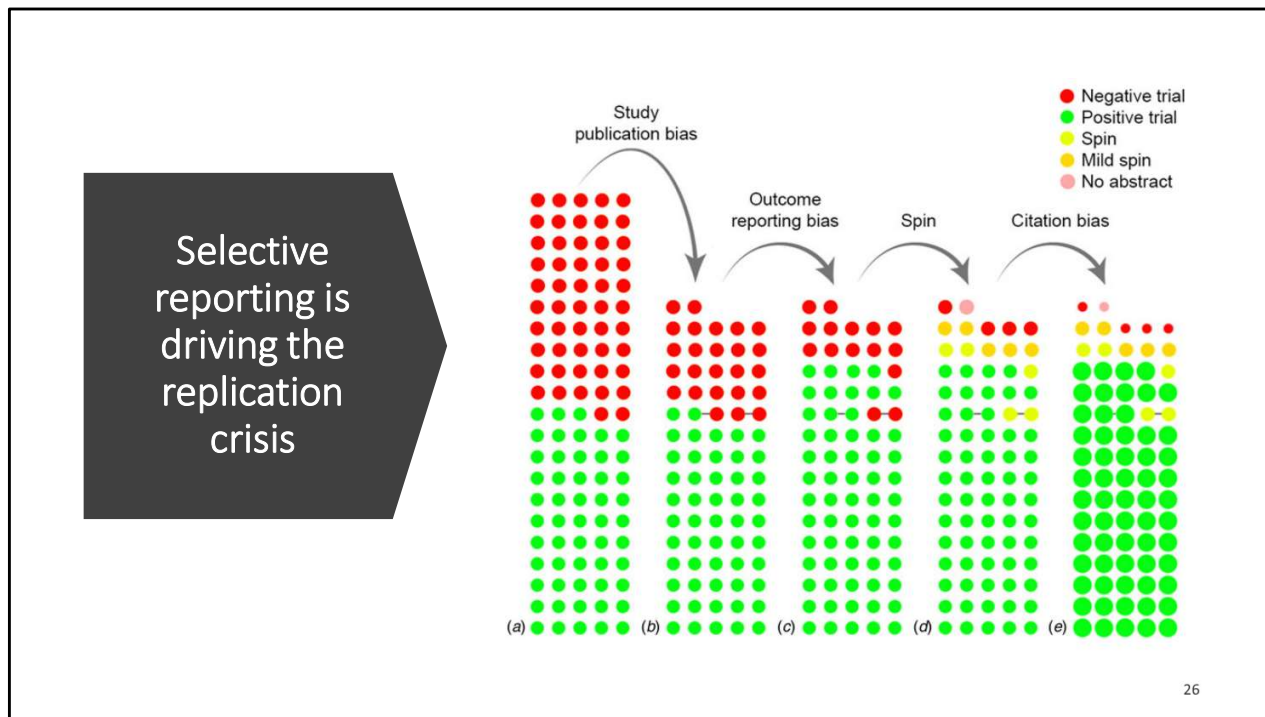
Bouter L. Why research integrity matters and how it can be improved. Accountability in Research. 2024; 31: 1277-1286. <https://research.vu.nl/files/219241433/5.248.pdf>

How these things hang together

- **Open methods** fosters **replicability** and also helps to detect **QRPs** e.g. selective reporting, p-hacking and hypothesizing after results are known (HARKing)
- **Unsuccessful replication** implies that findings of initial study, its replication, or both are untrue (not **valid**) due to:
 - random error
 - deviation from the study protocol
 - differences between the initial and replication study protocols
- **Successful replication** doesn't imply that the findings are true (**valid**) as also **bias** due to **methodological flaws** will be replicated consistently
- Both **replicability** and **successful replication** increase the **trustworthiness** of findings

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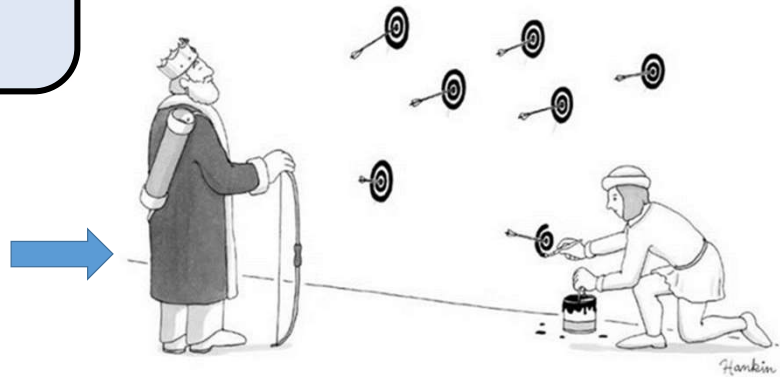
This example concerns the fate of an inception cohort of 105 RCTs of the efficacy of anti-depression drugs from the FDA database. The cohort is complete in the sense that pharmaceutical companies must register all trials they intend to use to obtain FDA market approval before embarking on data collection. The FDA considered 50% of the trials to be positive after carefully looking at the results.

de Vries YA, Roest AM, de Jonge P, Cuijpers P, Munafò MR, Bastiaansen JA (2018). The cumulative effect of reporting and citation biases on the apparent efficacy of treatments: the case of depression. *Psychological Medicine* 1–3.
<https://doi.org/10.1017/S0033291718001873>

Drivers of the Replication Crisis

- Selective reporting
- Low power
- P-hacking
- HARKing

Hypothesizing After
Results are Known



Wicherts et al - Degrees of freedom - checklist to avoid p-hacking - Front Psych 2016; 7: 1832. <https://www.frontiersin.org/articles/10.3389/fpsyg.2016.01832/full>

Open Methods

- (pre)registration of essential features of study design
- publication or preprint of full study protocol (incl. data-analysis plans)
- Registered Report

Essential traits

- prospective (before start of data collection)
- public (embargo possible)
- amendments with time stamp (data-driven?)



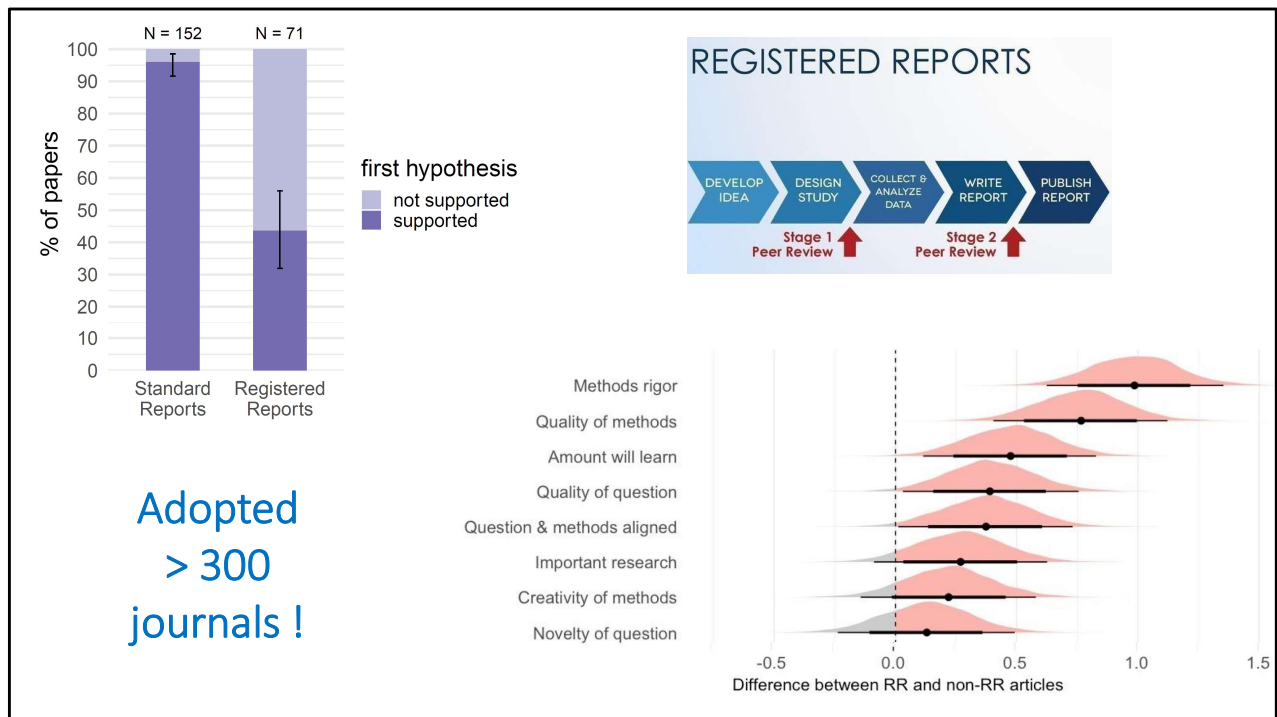
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Allen C, Mehler DMA. Open science challenges, benefits and tips in early career and beyond. PLoS Biol 2019; 17(5): e3000246. <https://doi.org/10.1371/journal.pbio.3000246>

Daniël Lakens, Cristian Mesquida, Sajedah Rasti & Massimiliano Ditroilo (2024) The benefits of preregistration and Registered Reports, Evidence-Based Toxicology, 2:1, 2376046, <https://doi.org/10.1080/2833373X.2024.2376046>

<https://www.cos.io/initiatives/prereg>



Chambers C. What's next for registered reports. *Nature* 2019; 573 187-189.
<https://www.nature.com/articles/d41586-019-02674-6>

Allen C, Mehler DMA. Open science challenges, benefits and tips in early career and beyond. *PLoS Biol* 2019; 17(5): e3000246. <https://doi.org/10.1371/journal.pbio.3000246>

Editorial. Nature welcomes Registered Reports. *Nature* 2023; 614: 594.
<https://www.nature.com/articles/d41586-023-00506-2>

Anne M. Scheel , Mitchell R. M. J. Schijen, and Daniël Lakens An excess of positive results: comparing the standard psychology literature with registered reports. *Advances in Methods and Practices in Psychological Science* April-June 2021, Vol. 4, No. 2, pp. 1–12.
<https://journals.sagepub.com/doi/full/10.1177/25152459211007467>

Soderberg CK, Errington TE , Schiavone SR, Bottesini J, Thorn FS, Vazire S, Esterling KM, Nosek BA. Initial evidence of research quality of Registered Reports compared to the standard publishing model. *Nature Human Behaviour* 2021; 990–997

Henderson EL, Chambers CD (2022) Ten simple rules for writing a Registered Report. *PLoS Comput Biol* 18(10): e1010571. <https://doi.org/10.1371/journal.pcbi.1010571>

<https://cos.io/rr/>

Findable, Accessible, Interoperative, Reusable data reposition



Wilkinson MD, et al. The FAIR Guiding Principles for scientific data management and stewardship. *Scientific Data* 2016; 3: 160018.

<https://www.nature.com/articles/sdata201618>

Wagenmakers, E., Sarafoglou, A., & Aczel, B. Facing the Unknown Unknowns of Data Analysis. *Current Directions in Psychological Science* 2023; 32: 362 –368.

<https://journals.sagepub.com/doi/pdf/10.1177/09637214231168565>

<https://www.go-fair.org/fair-principles/>

Make reporting guidelines mandatory

<u>Randomised trials</u>	CONSORT	Extensions	Other
<u>Observational studies</u>	STROBE	Extensions	Other
<u>Systematic reviews</u>	PRISMA	Extensions	Other
<u>Case reports</u>	CARE	Extensions	Other
<u>Qualitative research</u>	SRQR	COREQ	Other
<u>Diagnostic / prognostic studies</u>	STARD	TRIPOD	Other
<u>Quality improvement studies</u>	SQUIRE		Other
<u>Economic evaluations</u>	CHEERS		Other
<u>Animal pre-clinical studies</u>	ARRIVE		Other
<u>Study protocols</u>	SPIRIT	PRISMA-P	Other
<u>Clinical practice guidelines</u>	AGREE	RIGHT	Other



Enhancing the **QUALity** and **Transparency** Of health **Research**

N = 646

<http://www.equator-network.org/>

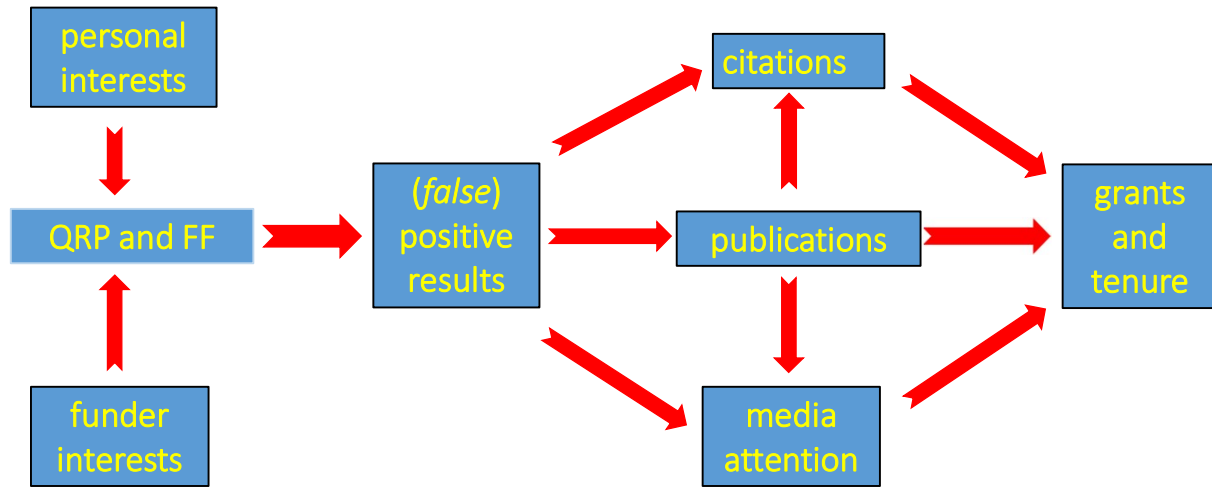
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What can research institutes do?

- Offer good training in **research integrity** and **research methodology**
- Have good **supervision** and **quality control** installed
- Mandate **open methods** and **open data**
- Reform **researcher assessment** to prevent perverse incentives
- Organize **monitoring** of the research process for quality and integrity
- Integrate the above and more in a **Research Integrity promotion Plan**

How things can go wrong



Functioning of moral compass depends on

- Individual factors:
virtuousness of the individual
- Institutional factors:
research climate in the lab
- Systemic factors:
adequate incentives



Kent BA, Holman C, Amoako E, Antonietti A, Azam JM, Ballhausen H, et al. Recommendations for empowering early career researchers to improve research culture and practice. *PLoS Biol* 2022; 20: e3001680. <https://doi.org/10.1371/journal.pbio.3001680>

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Macleod M. Improving the reproducibility and integrity of research: what can different stakeholders contribute? *BMC Research Notes* 2022; 15: 146.

<https://doi.org/10.1186/s13104-022-06030-2>

Mertonian norms



Communism (scientific knowledge is not private property. Scientists must share it with the scientific community, otherwise knowledge cannot grow.)

Universalism (whether scientific knowledge is judged as true or false is judged by universal, objective criteria)

Disinterestedness (being committed to discovering knowledge for its own sake)

Organised scepticism (no knowledge claim is regarded as 'sacred'. Every idea open to questioning, criticism and objective investigation.)

https://en.wikipedia.org/wiki/Mertonian_norms

Originally published as: Merton RK. Science and technology in a democratic order. *Journal of Legal and Political Sociology*. 1942; 1: 115-26.

Reproduced as Chapter 13 (p. 267 – 78) of Merton RK. *The sociology of science: theoretical and empirical investigations*. Chicago, University of Chicago Press, 1973.

Guidelines for research institutions on the **research integrity education of bachelor, master and PhD students**



Guidelines for research institutions on the **research integrity education of post-doctorate and senior researchers**

Guidelines for research institutions on the **research integrity education of institutional research integrity stakeholders**

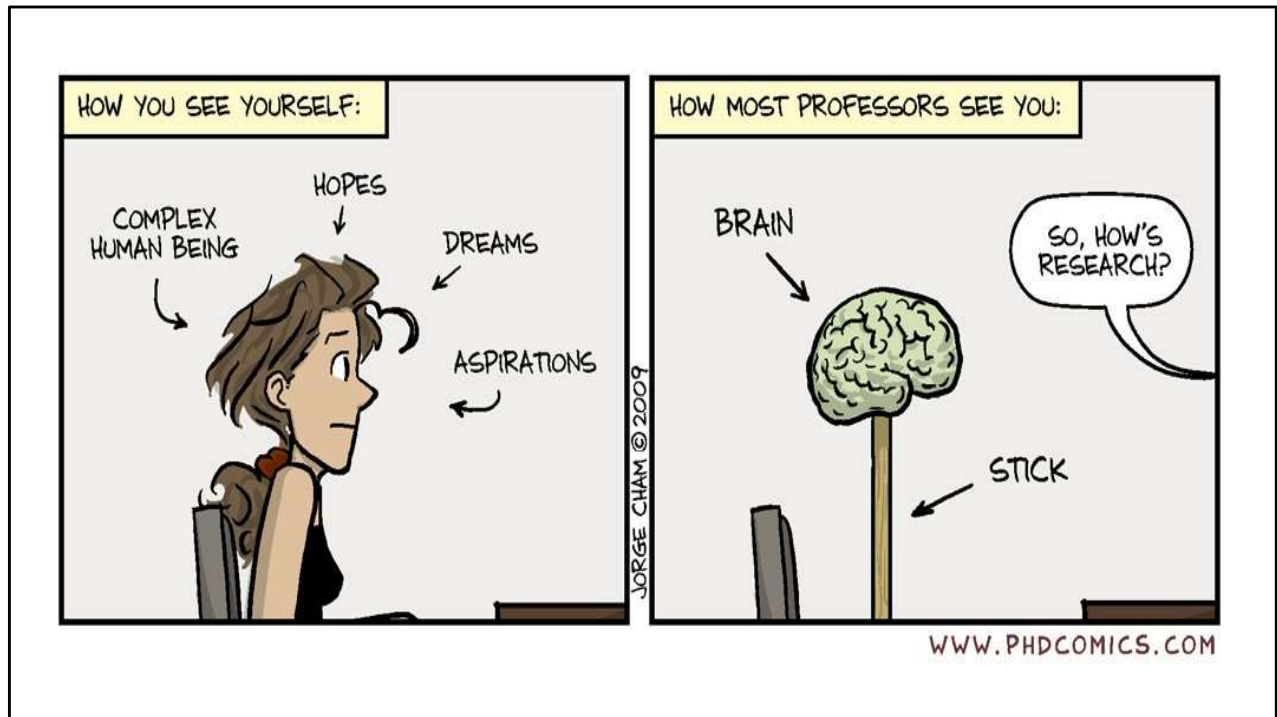
Guidelines for research institutions on **continuous research integrity education**

www.sops4ri.eu

Labib K, Evans N, Pizzolato D, Aubert Bonn N, Widdershoven G, Bouter L, Konach T, Langendam M, Kris Dierickx K, Tjldink JK. Co-creating research integrity education guidelines for research institutions. *Journal of Science and Engineering Ethics* 2023; 29: 28. <https://doi.org/10.1007/s11948-023-00444-2>

Labib K, Pizzolato D, Stappers PJ, Evans N, Lechner I, Widdershoven G, Bouter L, Dierickx K, Bergema K, Tjldink J. Using co-creation methods for research integrity guideline development: how, what, why and when? *Accountability in Research* 2024; 31: 531-556. <https://doi.org/10.1080/08989621.2022.2154154>



Bachelor, Master and PhD students: <https://osf.io/z7m3v>
Post-doctorate and senior researchers: <https://osf.io/6d9ta>
Institutional research integrity stakeholders: <https://osf.io/ya3qj>
Continuous research integrity education: <https://osf.io/ambg3>



The most important elements of research climate may be the quality of mentoring and supervision. Early Career Researchers need also inspiring role models and opportunities to improve their skills and to develop their leadership style.

Educatie Research Info corona Amsterdam UMC Over ons Mijn Dossier
Universitair Medische Centra

← Onze opleidingen



Superb supervision junior - mentoring your PhD candidate towards responsible conduct of research

Superb supervision: A pilot study on training supervisors to convey responsible research practices onto their PhD candidates

Tamarinde Haven, Lex Bouter, Louise Mennen & Joeri Tjldink

Haven T, Bouter L, Mennen L, Tjldink J. Superb Supervision: a pilot study on training supervisors to convey responsible research practices onto their PhD students. *Accountability in Research* 2022; 1-18. <https://doi.org/10.1080/08989621.2022.2071153>

Haven T. It takes two flints to start a fire: A focus group study into supervision for responsible research. *MetaArXiv Preprints*: August 18, 2024. <https://osf.io/preprints/metaarxiv/m5h8a>

Bridging the gap - *how to support Early Career Researchers*

Action 1: Ombuds system and confidential advisors

Action 2: Research integrity and research ethics advisory system

Action 3: Capacity-building budget for ECRs

Action 4: ECR inclusion in decision-making and leadership roles

Action 5: Bridge careers after project completion

Action 6: ECR network and community platform

Pizzolato D, Reyes Elizondo A, Aubert Bonn N et al. Bridging the gap – how to walk the talk on supporting early career researchers [version 1; peer review: 3 approved]. *Open Res Europe* 2023, 3: 75 <https://doi.org/10.12688/openreseurope.15872.1>



Assessment of researchers

- Grant applications
- Vacancies
- Promotion
- Tenure
- Awards

Incentives works well

For *intended* effects:

- More publications and citations

But also for *unintended* effects:

- Focus on quantity, not quality
- More plagiarism and duplicate publication
- More 'salami slicing', gift authorship and use of predatory OA journals
- Citation cartels and fake (Paper Mill) papers and fake peer reviewers
- Less time-consuming responsible research practices

When a measure becomes a target, it ceases to be a good measure

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Goodhardt's Law: https://en.wikipedia.org/wiki/Goodhart%27s_law



DORA



CoARA

Reform of Researcher Assessment

- Make **citation counts** and **publication counts** less important
- Give also 'career points' for **responsible research practices**, like
 - Making methods and data open
 - Being a good peer reviewer, supervisor, teacher and team member

Aubert Bonn N, Bouter L. Research assessments should recognize responsible research practices: narrative review of a lively debate and promising developments. In: Valdés E, Lecaros EA, eds. Handbook of bioethical decisions. Volume II: scientific integrity and institutional ethics. Cham, Springer Nature, 2023: 441-472. <https://rdcu.be/dfWki>

Raff JW. The San Francisco Declaration on Research Assessment. *Biology Open* 2013; 2: 533–534. <https://journals.biologists.com/bio/article/2/6/533/1056/The-San-Francisco-Declaration-on-Research>

Hicks D, Wouters P, Waltman L, de Rijcke S, Rafols I. The Leiden Manifesto for research metrics. *Nature* 2015; 520: 429-31. <https://www-nature-com.vu-nl.idm.oclc.org/articles/520429a.pdf>

Moher D, Bouter L, Kleinert S, Glasziou P, Sham MH, Barbour V, Coriat AM, Foeger N, Dirnagl U. The Hong Kong principles for assessing researchers: fostering research integrity. *PLoS Biology* 2020; 18: e3000737. <https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.3000737>

Editorial. Support Europe's bold vision for reforming research assessment. *Nature* 2022; 607: 636. <https://www.nature.com/articles/d41586-022-02037-8>

Neylon C. Stop misusing data when hiring academics. *Nature* 2022; 607: 637.
<https://www.nature.com/articles/d41586-022-02038-7>

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<https://www.interacademies.org/sites/default/files/2023-05/2023-05-11%2BEvaluation%2B-%2BWEB.pdf>

Declaration on Research Assessment. <https://www.sfdora.org/>

Coalition for Advancing Research Assessment. <https://coara.eu/>

90 % reproducibility
is possible!

Quality and Reproducibility of **OUTCOME**



Quality and Reproducibility of **PROCESS**

- Internal audits
- Buddy system
- Blame-free reporting
- Methodological and statistical training
- Expert guidance
- Quality Handbook
- Methodological Review Boards



Munafó M, Noble S, Brownie WJ, Brunner D, Button K, Ferreira J, Holmans P, Langbehm D, Lewis G, Lindquist M, Tilling K, Wagenmakers EJ, Blumenstein R. Scientific rigor and the art of motor cycle maintenance. *Nature Biotechnology* 2014; 32: 871-873.

<https://www.nature.com/articles/nbt.3004>

Lakens D. Is my study useless? Why researchers need methodological review boards. *Nature* 2023; 613: 9. <https://www.nature.com/articles/d41586-022-04504-8>

Lakens D. Pandemic researchers — recruit your own best critics. *Nature* 2020; 581: 121. <https://www.nature.com/articles/d41586-020-01392-8>

Junk T, Lyons L. Reproducibility and replication of experimental particle physics results. *Harvard Data Science Review* 2020; 2.4: 1-63. <https://hdsr.mitpress.mit.edu/pub/1lhu0zvn/release/4>

Axfors C, Malički M, Goodman SN. Research Rigor and Reproducibility in Research Education: A CTSA Institutional Survey. *Journal of Clinical and Translational Science* 2024; 8: e45, 1–4.

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institutional-survey/3B8FA1E860C49DDAF7B5CD1D3E2169AF

Recently it has been demonstrated that rigour-enhancing practices can yield a replication success percentage of 86%.

Protzko J, Krosnick J, Nelson L, Nosek BA, Axt J, Berent M, Buttrick N, DeBell M, Ebersole CR, Lundmark S, MacInnis B, O'Donnell M, Perfecto H, Pustejovsky JE, Roeder SS, Walleczek J, Schooler JW. High replicability of newly discovered social-behavioural findings is achievable. *Nat Hum Behav* 8, 311–319 (2024). <https://doi.org/10.1038/s41562-023-01749-9>

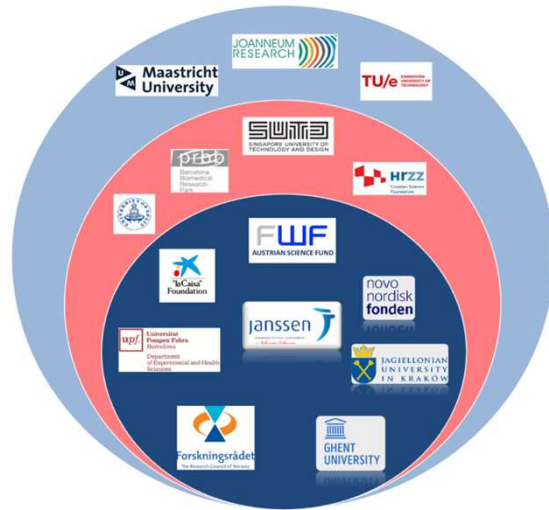
See retraction: <https://www.nature.com/articles/s41562-024-01997-3>

O'Grady C. Preregistering, transparency, and large samples boost psychology studies' replication rate to nearly 90%. *Science* 2023: 9 November.
https://www.science.org/content/article/preregistering-transparency-and-large-samples-boost-psychology-studies-replication-rate?utm_source=sfmc&utm_medium=email&utm_content=alert&utm_campaign=DailyLateStNews&et rid=34982860&et cid=4978675

Research Institutes should have a **Research Integrity Promotion Plan** and can find 121 guidelines in the SOPs4RI toolbox



Research integrity: nine ways to move from talk to walk



Mejlgaard N, Bouter LM, Gaskell G, Kavouras P, Allum N, Bendtsen AK, Charitidis CA, Claesen N, Dierickx K, Domaradzka A, Reyes Elizondo A, Foeger N, Hiney M, Kaltenbrunner W, Labib K, Marušić A, Sørensen MP, Ravn T, Ščepanović R, Tijdink JK, Veltri GA. Research integrity: nine ways to move from talk to walk. Nature 2020; 586: 358-60.
<https://www.nature.com/articles/d41586-020-02847-8>

www.sops4ri.eu features 130 guidelines to promote aspects of research integrity

SPJM Horbach, Sørensen MP, on behalf of SOPs4RI. How to create and implement a Research Integrity Promotion Plan (RIPP).
https://sops4ri.eu/wp-content/uploads/Implementation-Guideline_FINAL.pdf

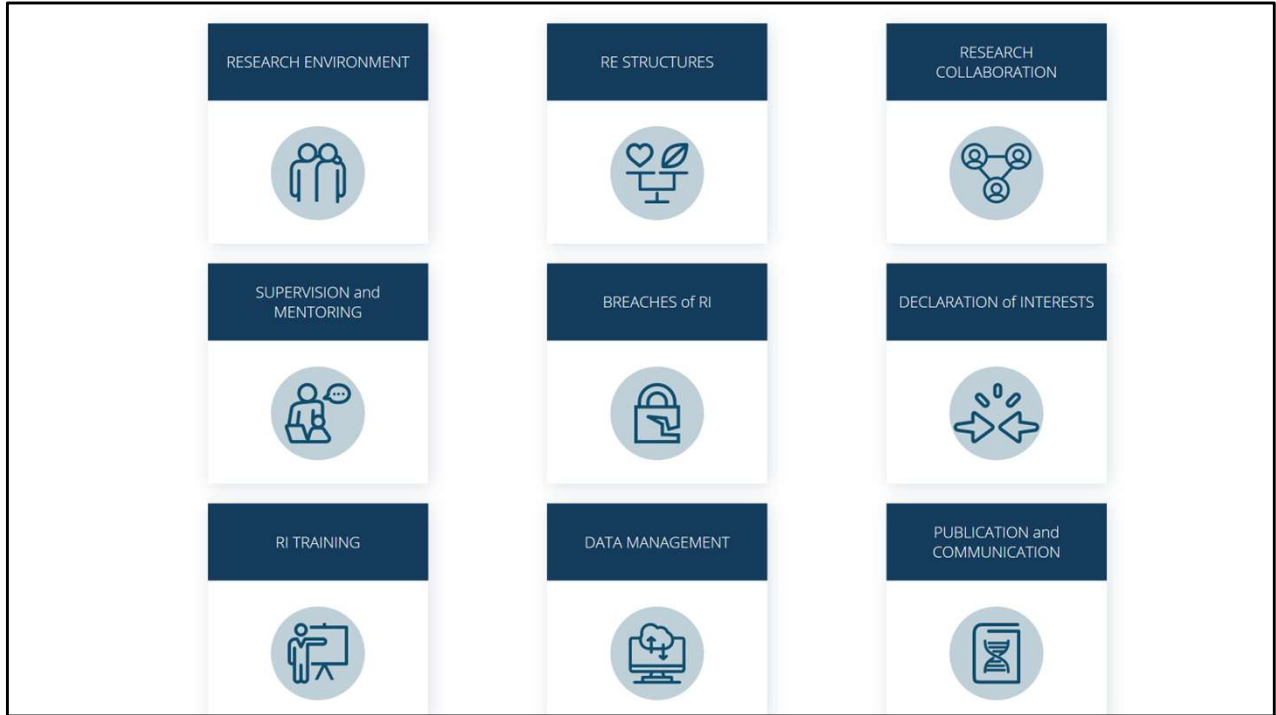
Template for writing a Research Integrity Promotion Plan for Research Performing Organisations.
https://sops4ri.eu/wp-content/uploads/Template-Research-Integrity-Promotion-Plan-RPOs_FINAL.pdf

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<https://sops4ri.eu/deliverables/>

The European Code of Conduct for Research Integrity (<https://allea.org/wp-content/uploads/2023/06/European-Code-of-Conduct-Revised-Edition-2023.pdf>) is mandatory for research sponsored by the EU (Horizon 2020 and Horizon Europe). See page 6 of Horizon Europe Programme Standard Application Form (https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/temp-form/af/af_he-ria-ia_en.pdf) states:

We declare that the proposal complies with ethical principles (including the highest standards of research integrity as set out in the ALLEA European Code of Conduct for Research Integrity, as well as applicable international and national law, including the Charter of Fundamental Rights of the European Union and the European Convention on Human Rights and its Supplementary Protocols. Appropriate procedures, policies and structures are in place to foster responsible research practices, to prevent questionable research practices and research misconduct, and to handle allegations of breaches of the principles and standards in the Code of Conduct.

In addition, the Horizon Europe hyperlink for the *Appropriate procedures, policies and structures opens the Guideline for Promoting Research Integrity in Research Performing Organisations is: https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/guideline-for-promoting-research-integrity-in-research-performing-organisations_horizon_en.pdf* by the SOPs4RI (<https://sops4ri.eu/>





<https://allea.org/wp-content/uploads/2023/06/European-Code-of-Conduct-Revised-Edition-2023.pdf>

<https://www.universiteitenvannederland.nl/files/publications/Netherlands%20Code%20of%20Conduct%20for%20Research%20Integrity%202018.pdf>

This code has recently been evaluated and will be updated in 2025.

<https://storage.knaw.nl/2024-07/Adviesrapport-Evaluatie-Nederlandse-gedragcode-wetenschappelijke-integriteit-2024.pdf>



[www.enrio.eu/wp-content/uploads/2019/03/INV-Handbook ENRIO web final.pdf](http://www.enrio.eu/wp-content/uploads/2019/03/INV-Handbook_ENRIO_web_final.pdf)

ENRIO Handbook on Whistleblower Protection in research.
<https://zenodo.org/record/8192478>

Bouter LM, Hendrix S. Both whistle blowers and the scientists they accuse are vulnerable and deserve protection. *Accountability in Research* 2017; 24: 359-66.
<https://research.vu.nl/files/58817835/2.477.pdf>

Menu | Research

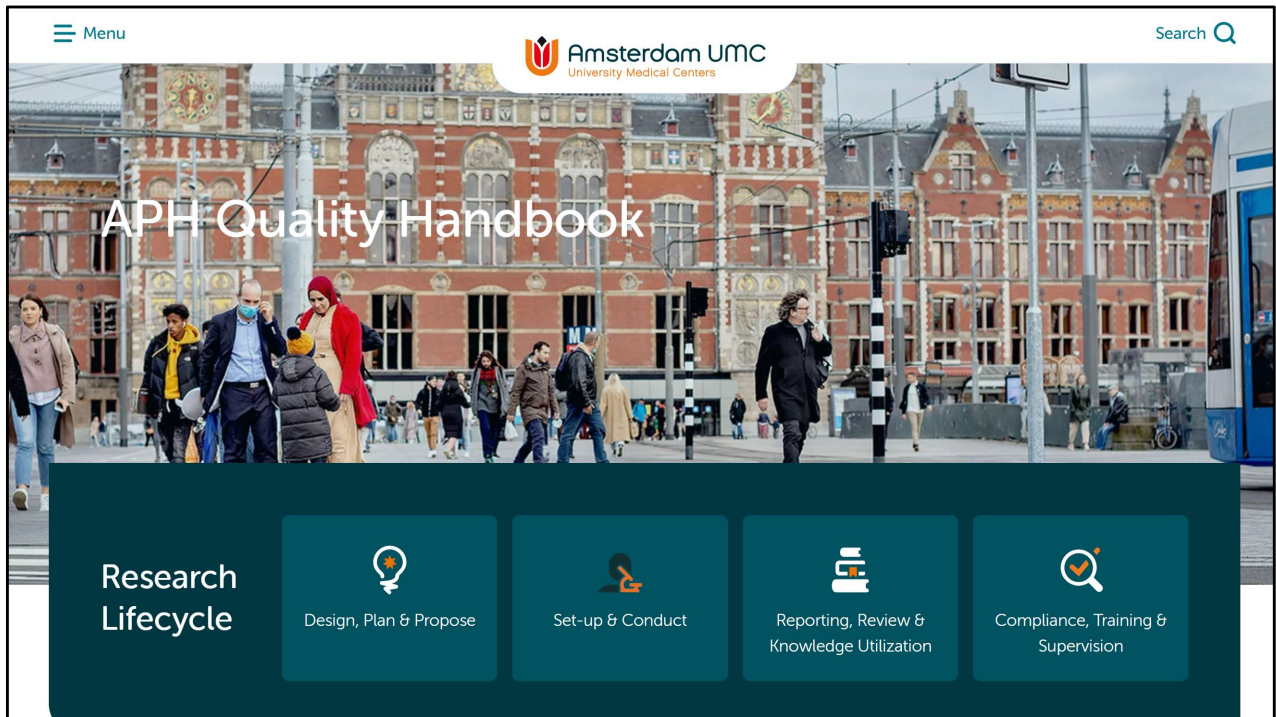
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University Medical Centers

Search

Research Roadmap

Segment	Sub-steps
Design & Preparation	Feasibility, Preparation Study documentation, Submitting & review procedure
Conduct & Collecting data	Conducting Research, Preparing study start
Closing, Publication & Valorization	Closure, Publishing & Archiving, Reporting, Analysis

<https://www.amsterdamumc.org/en/research/research-roadmap.htm>



Menu

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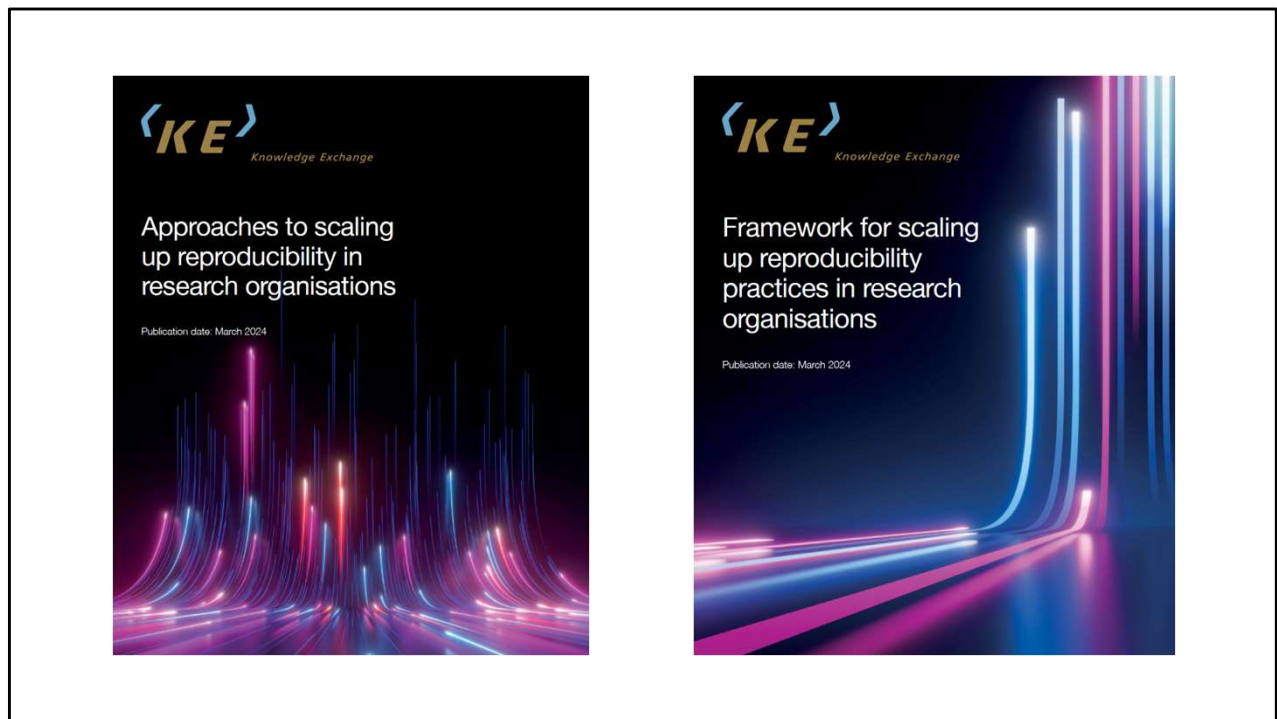
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APH Quality Handbook

Research Lifecycle

- Design, Plan & Propose
- Set-up & Conduct
- Reporting, Review & Knowledge Utilization
- Compliance, Training & Supervision

<https://aph-qualityhandbook.org/>

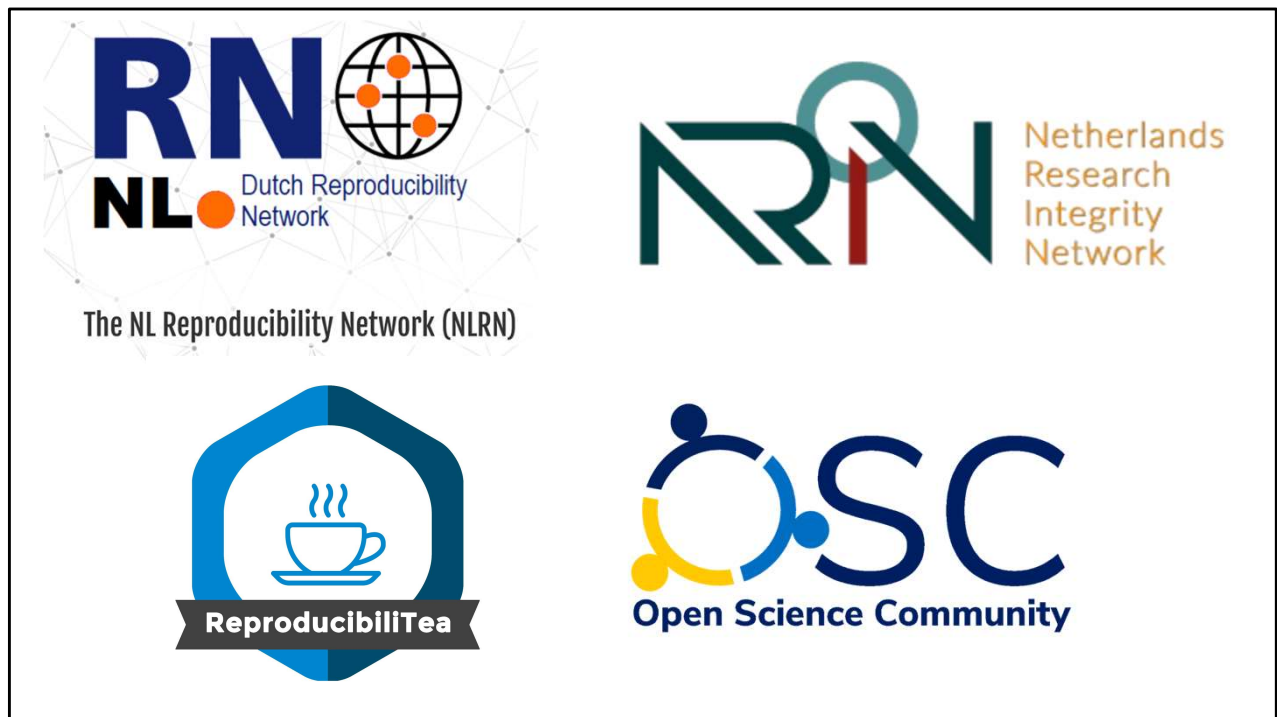


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These are great initiatives by and for Early Career Researchers.

<http://reproducibilitynetwork.nl/>

<https://www.ukrn.org/>

<https://osc-international.com/open-science-community-the-netherlands/>

<https://www.startyourosc.com/>

<https://reproducibilitea.org/>

<https://nrin.nl/>



*Enhancing Trust, Integrity and Efficiency in
Research through next-level Reproducibility*



*Open Science to Increase
Reproducibility In Science*



European Open Science Cloud

<https://tier2-project.eu/>

<https://osiris4r.eu/>

<https://irise-project.eu/>

<https://eosc.eu/>

Changing research culture is not easy



<https://www.cos.io/blog/strategy-for-culture-change>



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