Enhancing quality of preclinical research – a mission possible?

Vootele Voikar

University of Helsinki

UNIVERSITY OF HELSINKI
LABORATORY ANIMAL CENTRE

HiLIFE
HELSINKI INSTITUTE OF LIFE SCIENCE

Norecopa's 19th Annual Meeting, 11 June 2026

Disclosure:

I am a member of the non-profit organisation Go-EQIPD, currently acting as convener

No financial interests

https://reproducibility.global/

https://reproducibilitea.org/

What is Research Quality

Write a word, phrase or short sentence

What is Research Quality?

Research Integrity & Research Culture

Integrity is the quality of being honest and having strong moral principles

Research integrity is the active adherence to ethical principles and professional standards in the conduct and reporting of scientific research. It ensures research is trustworthy, reliable, and socially responsible by preventing misconduct - such as fabrication, falsification, and plagiarism - across every phase of a study's lifecycle.

In an ideal world, integrity should be a regular element of all aspects of research. In practice, it is too often a topic that gets attention when there is a crisis and then is put on the shelf until the next crisis arises.
Thus, over the 40 or so years that research integrity has been a topic of public discussion, universities, professional societies, and governments have responded to crises, issued reports, and then, too often, moved on to other issues, hoping that no further crises would arise.

WCRI WORLD CONFERENCES ON RESEARCH INTEGRITY

https://www.wcrif.org/origin-and-ojectives
(The origin, objectives and evolution of the World Conferences on Research Integrity – 2007-2017; https://vimeo.com/712679520)

Research Integrity has a focus on the research;

Principles of research integrity include reliability, ethics, reproducibility and transparency (Uni Helsinki)

The Singapore Statement on Research Integrity (2nd WCRI, 2010 in Singapore)
https://www.wcrif.org/guidance/singapore-statement
UKRIO Concordat to Support Research Integrity 2012-2019-2025
https://ukrio.org/research-integrity/what-is-research-integrity/

Research Culture has a focus on people

The operations of our University community are defined by our values: truth, Bildung, freedom and inclusivity

> *Research culture encompasses the behaviours, values, expectations, attitudes and norms of our research communities. It influences researchers' career paths and determines the way that research is conducted and communicated.*
>
> — Research Culture | Royal Society

> *We want to help build a better research culture – one that is creative, inclusive and honest. Current practices prioritise outputs at all costs, and this is damaging people's wellbeing and undermining the quality of research. Expectations around how research is conducted need to be reimagined.*
>
> — Research Culture | Wellcome

We build and maintain our research cultures through the actions, interactions, behaviours and processes that we all encounter and perform while undertaking or supporting research. *These cultures are felt and influenced by us at individual, team, department, university and wider discipline level. Research cultures can be experienced differently at each level and within each discipline, which is why our approach acknowledges that we experience and contribute to multiple research cultures (University of Edinburgh)*
https://www.ed.ac.uk/research-innovation/research-cultures/what-is-research-culture

WORLD VIEW | 24 November 2021

Want research integrity? Stop the blame game

Helping every scientist to improve is more effective than ferreting out a few frauds.

By Malcolm Macleod

https://www.nature.com/articles/d41586-021-03493-4

Most scientists reading this probably assume that their research-integrity office has nothing to do with them. It deals with people who cheat, right? Well, it's not that simple: cheaters are relatively rare, but plenty of people produce imperfect, imprecise or uninterpretable results.

If the quality of every scientist's work could be made just a little better, then the aggregate impact on research integrity would be enormous.

The often-used Royal Society description of **research culture** defines it as the "behaviours, values, expectations, attitudes and norms of our research communities".

Where most of us really interface with **research culture is at the point we interface with another human**. It's about how one human treats another human. If you look lost, will someone offer to guide you?...

And then at the grubbier end of human interaction: **what happens when one human treats another human very badly?** What's the worst behaviour that the humans in power are prepared to tolerate?

….it's ultimately in the application of that policy – is it **applied kindly, generously, humanely, and thoroughly – that research culture happens. It's the humans that make the culture.**

However, when you look at the top three research culture issues facing most institutions, they are usually **time, time, and time**.

Time to actually do research at all, time to do research well (to supervise well; to adhere to the best open and ethical practices, and so on. And time to lead well: to give people the time of day and make people-centered decisions.

https://wonkhe.com/blogs/four-things-no-one-wants-to-admit-about-research-culture/

Sick Space

NATURE CAREERS PODCAST | 10 January 2025

Mind matters: investigating academia's 'mental health crisis'

Adam Levy discusses some of the systemic changes needed to make the academic workplace both a happier and healthier place.

https://www.nature.com/articles/d41586-024-04240-1

NEWS FEATURE | 09 July 2024 | Correction 12 July 2024 | Correction 09 August 2024

How PhD students and other academics are fighting the mental-health crisis in science

Universities and institutions across the globe are exploring unique initiatives to help their students and staff cope with the stress of research.

NEWS | 01 October 2024

The huge toll of PhDs on mental health: data reveal stark effects

PhD students in Sweden accessed mental-health services at increasing rates as their studies went on.

CAREER NEWS | 14 January 2025

Harsh criticism and unreasonable expectations worsen PhD students' mental health

Research and teaching pressures can exacerbate anxiety and depression, causing many young scientists to consider quitting, a survey finds.

CAREER FEATURE | 23 November 2020

Postdocs under pressure: 'Can I even do this any more?'

Long hours and a lack of job security, combined with workplace bullying and discrimination, are forcing many to consider leaving science, finds *Nature*'s inaugural survey of postdoctoral researchers.

CAREER NEWS | 14 December 2021

Depression and anxiety 'the norm' for UK PhD students

A new survey underscores mental-health risks for doctoral researchers.

CAREER FEATURE | 13 February 2023 | Correction 20 February 2023

Heeding the happiness call: why academia needs to take faculty mental health more seriously

Group leaders voice their struggles with mental health to remove stigma and bolster institutional support.

https://www.nature.com/articles/d41586-023-00419-0

Can’t we just be kind?

Trends in
Cell Biology

Science & Society

A kinder approach to science

Leonardo Almeida-Souza [1,2,3,*]
and Lilian O’Brien[4,5,*]

To be kind is to protect and promote the well-being of others. We borrow this definition from the philosophical literature to formulate a simple and powerful principle to make scientific communities and institutions healthier, fairer, and more inclusive.

https://doi.org/10.1016/j.tcb.2021.11.003

Immunology & Cell Biology 2023; **101**: 97–103
www.wileyonlinelibrary.com/journal/icb

COMMENTARY

OPEN

What is Kindness in Science and why does it matter?

Jessica Boulter[1,2,3,a], Mariana Lizeth Orozco Morales[2,3,4,a], Nicola Principe[2,3,4,a] &
Caitlin M Tilsed[2,3,4,5,a]

1 School of Medicine, University of Western Australia, Crawley, WA, Australia
2 National Centre for Asbestos Related Diseases, Nedlands, WA, Australia
3 Institute for Respiratory Health, Nedlands, WA, Australia
4 School of Biomedical Sciences, University of Western Australia, Crawley, WA, Australia
5 Penn Center for Pulmonary Biology, Perelman School of Medicine, University of Pennsylvania, Philadelphia, PA, USA

Immunology & Cell Biology 2023; **101**: 97–103; doi: 10.1111/imcb.12580

https://doi.org/10.1111/imcb.12580

EDITORIAL | 03 June 2019

Research integrity is much more than misconduct

All researchers should strive to improve the quality, relevance and reliability of their work.

https://www.nature.com/articles/d41586-019-01727-0

COMMENT | 12 October 2020

Research integrity: nine ways to move from talk to walk

Counselling, coaches and collegiality – how institutions can share resources to promote best practice in science.

https://www.nature.com/articles/d41586-020-02847-8

Many hundreds of articles have been written on the topic: about **threats to research quality** from **hypercompetitiveness** and poor training; the unquestioning and inept **reliance on metrics in evaluation**; and **systematic biases** in peer review and publication.

There are also multiple reports of shocking **cases of fraud**, **alarming rates of questionable research practices** and foot-dragging from practitioners, editors, authors and institutions when dealing with retractions and corrections. For all this to be avoided, **research institutions must translate integrity principles into practice**

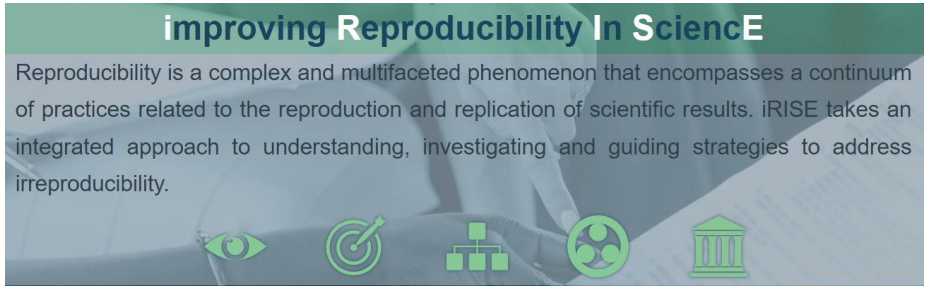
Better research: three areas, nine topics, many actions

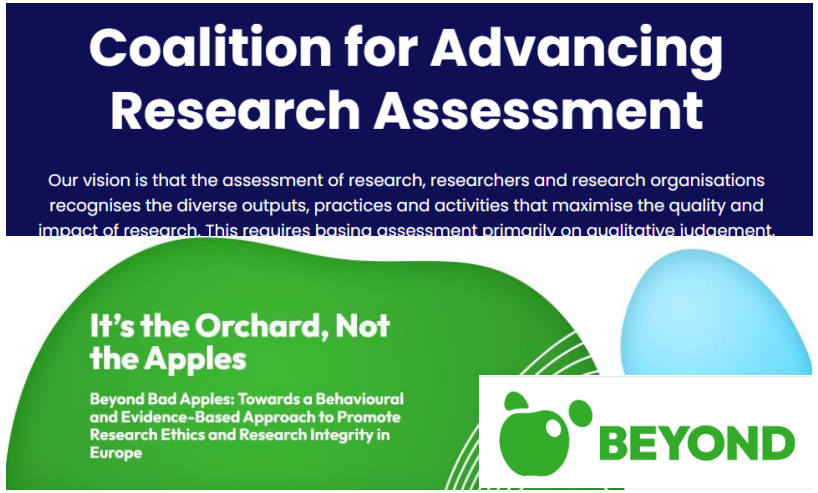
Area	Topic	Action*
Support	Research environment	Ensure fair assessment procedures and prevent hypercompetition and excessive publication pressure.
Support	Supervision and mentoring	Create clear guidelines for PhD supervision (such as on meeting frequency); set up skills training and mentoring.
Support	Integrity training	Establish training and confidential counselling for all researchers.
Organization	Ethics structures	Establish review procedures that accommodate different types of research and disciplines.
Organization	Integrity breaches	Formalize procedures that protect both whistle-blowers and those accused of misconduct.
Organization	Data practices and management	Provide training, incentives and infrastructure to curate and share data according to FAIR principles.
Communication	Research collaboration	Establish sound rules for transparent working with industry and international partners.
Communication	Declaration of interests	State conflicts (financial and personal) in research, review and other professional activities.
Communication	Publication and communication	Respect guidelines for authorship and ensure openness and clarity in public engagement.

IS THERE A CRISIS?

https://data.europa.eu/doi/10.2777/341654

The EU has also funded a raft of projects that, if well managed and coordinated, will strengthen **open research and reproducibility policies.**
Some aim to **boost** open research, others to **measure** it, build bridges between openness and **research assessment**, link openness to **reproducibility** and **research integrity**, and make research **software** more transparent.
The Commission also helped to set up both **Coalition S** and the **Coalition on Advancing Research Assessment**. The former has recently announced an **ambitious proposal to reform the publishing landscape**, while the latter aims to reform research assessment, in part to recognise open research.





Culture of Care – not only for animals

- **Appropriate behavior and attitude** towards animal research from all key personnel.
- A corporate **expectation of high standards** with respect to the legal, welfare, 3Rs, and ethical aspects of the use of animals, operated and endorsed at all levels throughout the establishment.
- **Shared responsibility** (without loss of individual responsibility) towards animal care, welfare, and use. Those with specified roles know their responsibility and tasks.
- **A proactive (rather than reactive) approach towards improving standards**.
- **Effective communication** throughout the establishment on animal welfare, care, and use issues.
- The importance of compliance is understood.
- Care staff and veterinarians are **respected** and **listened** to and their roles and work are supported throughout the establishment.
- **ALL VOICES AND CONCERNS AT ALL LEVELS THROUGHOUT THE ORGANIZATION ARE HEARD AND DEALT WITH POSIVIELY.**

- The CoC can thus be considered in terms of ***what we do and what we think***, i.e., **our behavior, our mindset**, and how these both shape the establishment's **inherent values and attitudes** towards the animals it uses and who are in its care.

- *Thomas Bertelsen and Penny Hawkins in Animal-centric Care and Management (CRC Press, 2021)*

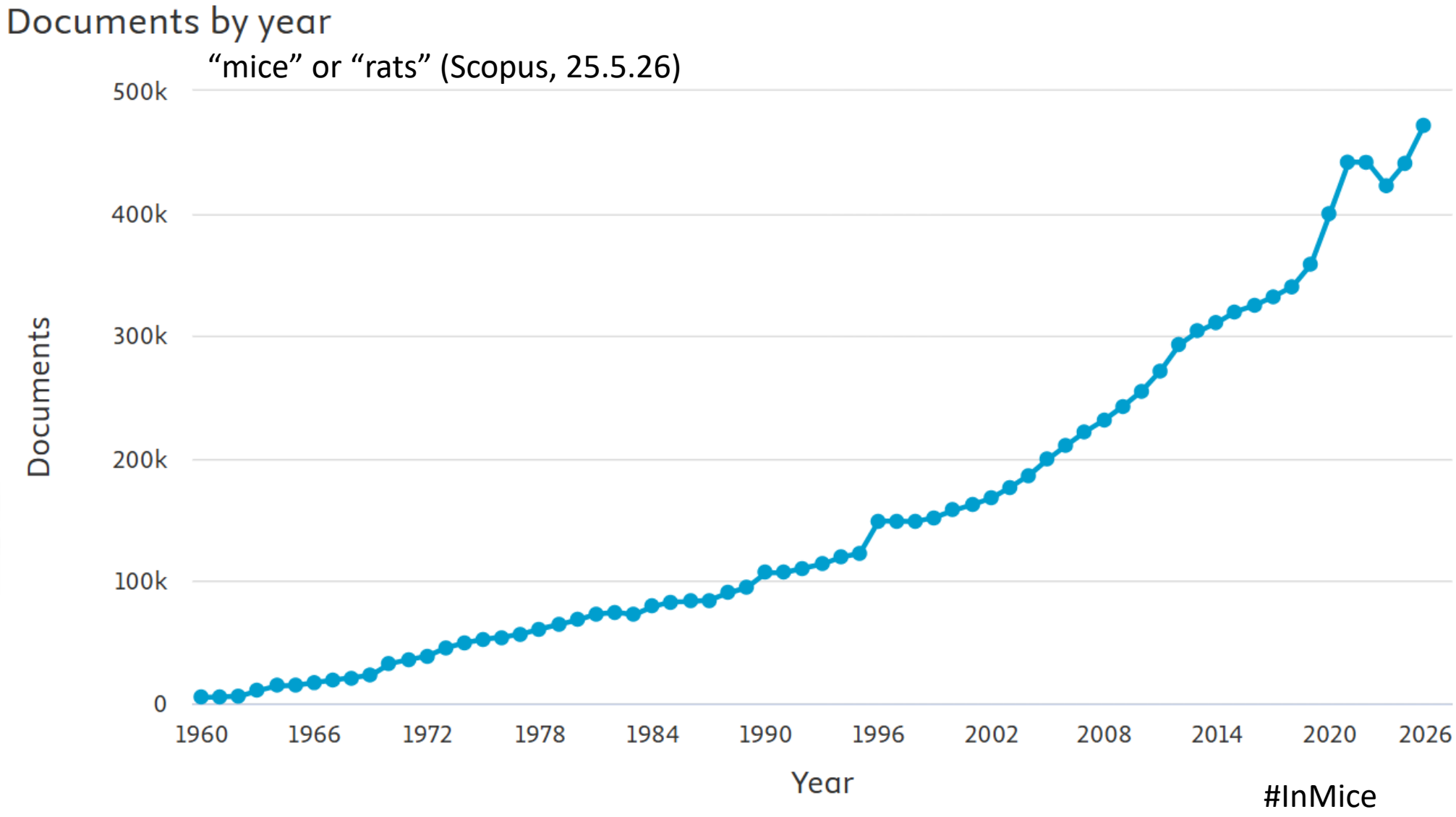
What first comes in your mind when thinking of CoC?

Webinar with Angela Kerton

Culture of Care is not a policy document.
It is what happens between people every single day.

(Marian Verhage)

Animal models nonclinical research



#InMice

Essay

Why Most Published Research Findings Are False

John P. A. Ioannidis

Research in Translation

Can Animal Models of Disease Reliably Inform Human Studies?

H. Bart van der Worp[1]*, David W. Howells[2], Emily S. Sena[2,3], Michelle J. Porritt[2], Sarah Rewell[2], Victoria O'Collins[2], Malcolm R. Macleod[3]

Troublesome variability in mouse studies

Editorial

Considerations for Experimental Design of Behavioral

What's going wrong in research using animal models?

g to
of

Believe it or not: how much can we rely on published data on potential drug targets?

EDITORIAL

Improving transparency and scientific rigor in academic publishing

Enhancing reproducibility

New reporting standards for Nature journal authors are intended to improve transparency and reproducibility.

Six red flags for suspect work

QUALITY PROBLEMS IN RESEARCH USING ANIMAL MODELS

OPEN ACCESS Freely available online

PLoS one

Survey of the Quality of Experimental Design, Statistical Analysis and Reporting of Research Using Animals

REPORTING

Carol Kilkenny[1]*, Nick Parsons[2], Ed Kadyszewski[3], Michael F. W. Festing[4], Innes C. Cuthill[5], Derek Fry[6], Jane Hutton[7], Douglas G. Altman[8]

•Published: November 30, 2009
•https://doi.org/10.1371/journal.pone.0007824

OPEN ACCESS Freely available online

PLoS MEDICINE

Research in Translation

DESIGN

Can Animal Models of Disease Reliably Inform Human Studies?

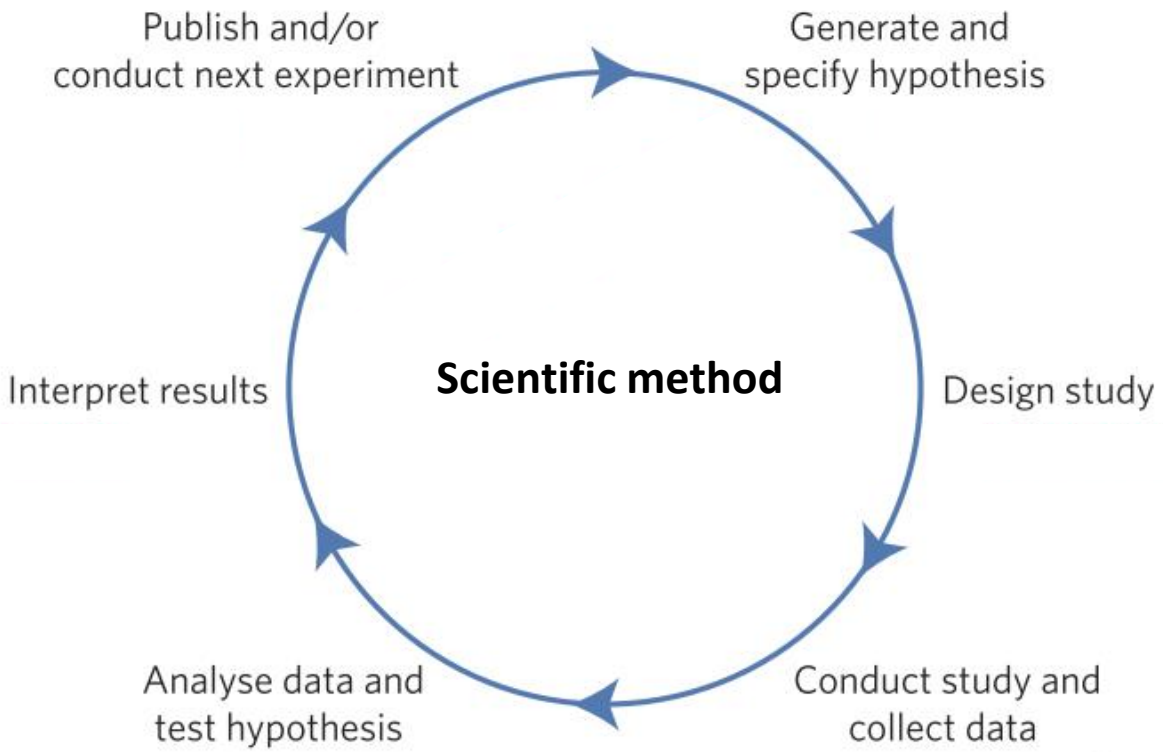
H. Bart van der Worp[1]*, David W. Howells[2], Emily S. Sena[2,3], Michelle J. Porritt[2], Sarah Rewell[2], Victoria O'Collins[2], Malcolm R. Macleod[3]

•Published: March 30, 2010
•https://doi.org/10.1371/journal.pmed.1000245

A manifesto for reproducible science

Marcus R. Munafò[1,2*], Brian A. Nosek[3,4], Dorothy V. M. Bishop[5], Katherine S. Button[6], Christopher D. Chambers[7], Nathalie Percie du Sert[8], Uri Simonsohn[9], Eric-Jan Wagenmakers[10], Jennifer J. Ware[11] and John P. A. Ioannidis[12,13,14]

Nature Human Behaviour, 2017.



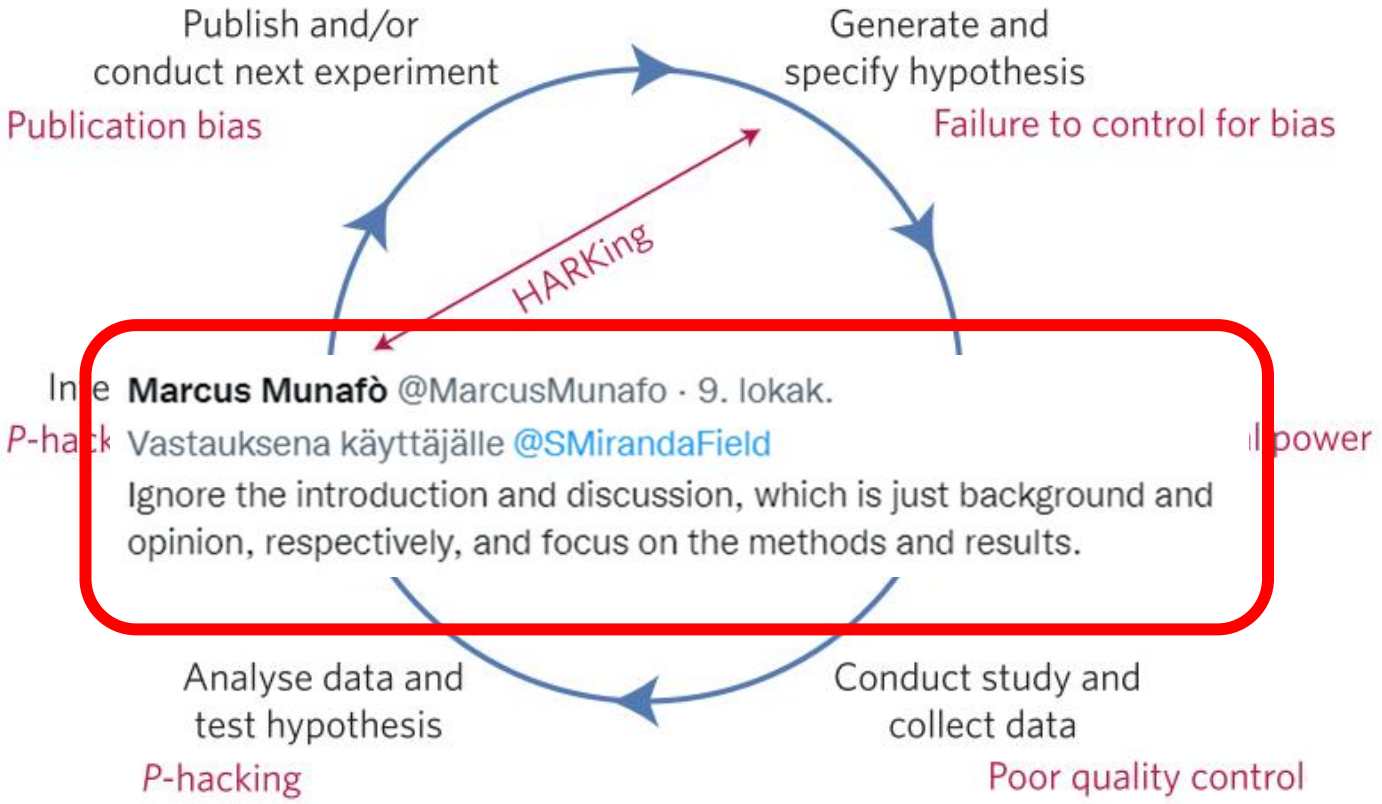
The problem comes across different fields…. ”reproducibility crisis”

A manifesto for reproducible science

Marcus R. Munafò[1,2*], Brian A. Nosek[3,4], Dorothy V. M. Bishop[5], Katherine S. Button[6], Christopher D. Chambers[7], Nathalie Percie du Sert[8], Uri Simonsohn[9], Eric-Jan Wagenmakers[10], Jennifer J. Ware[11] and John P. A. Ioannidis[12,13,14]

Nature Human Behaviour, 2017.

Threats to reproducible science, aka Questionable Research Pracice



Guidelines, Checklists….

EQIPD

Enhancing **Quality** in Pre-clinical **Data**

EQIPD 2017-2021

ARRIVE Guidelines

ARRIVE – 2010; 2020

Animal Research: **Reporting** of In Vivo Experiments

norecopa

PREPARE

PREPARE 2017

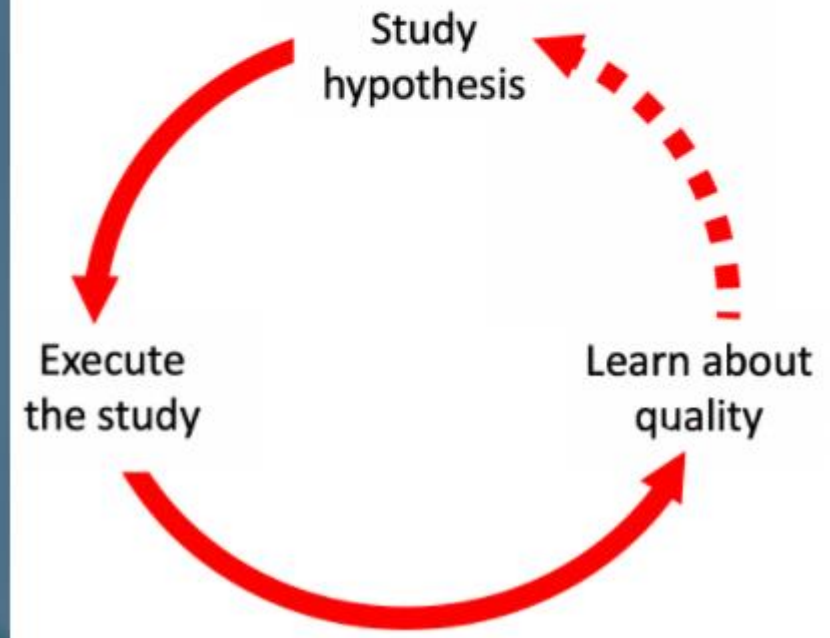
Planning Research and Experimental Procedures on Animals: Recommendations for Excellence

Enhancing Quality in Preclinical Data - Systematic assurance of quality needed!

Our Vision

Simple and sustainable solutions that facilitate improvements in data quality without impacting innovation and freedom of research.

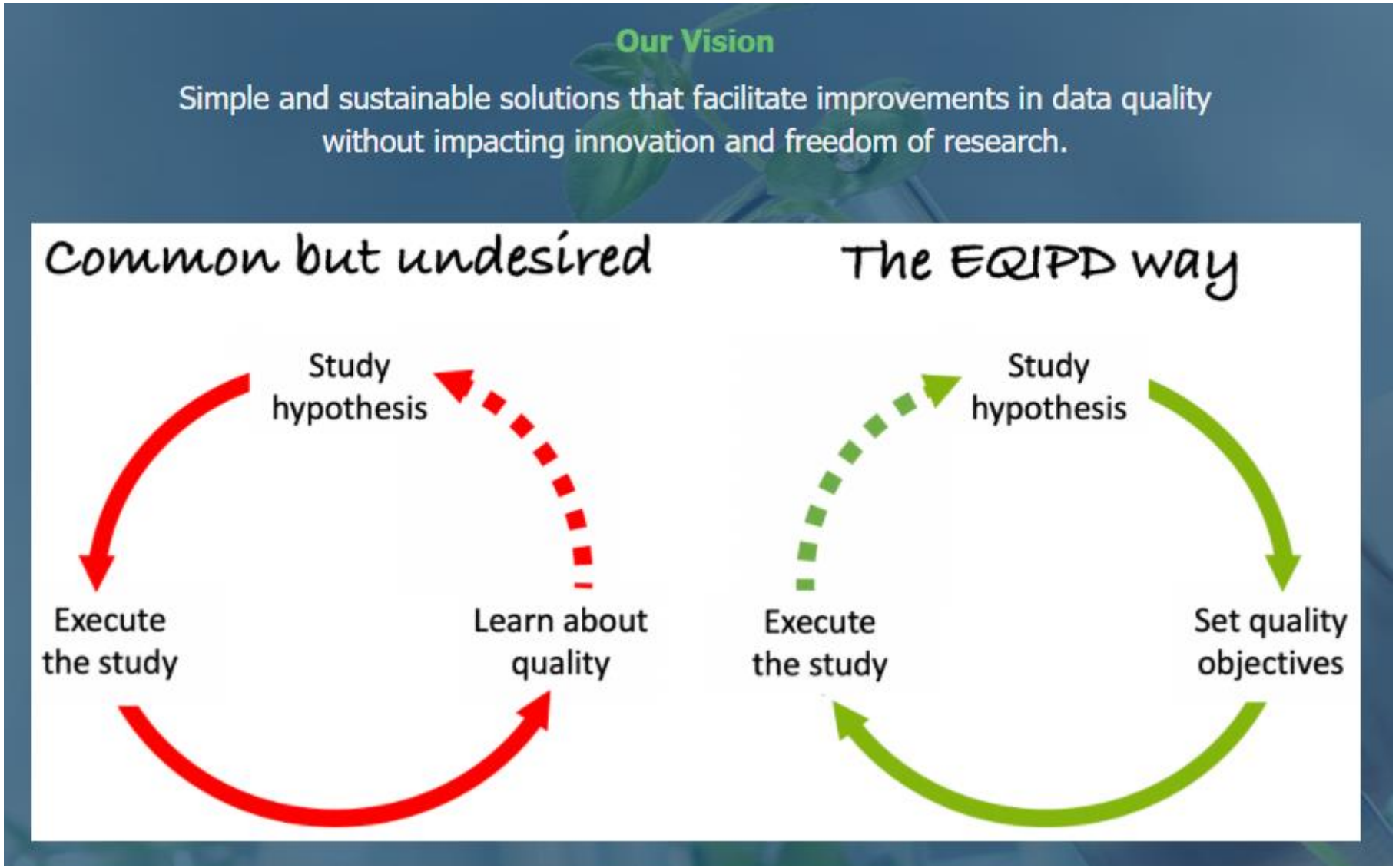
Common but undesired



Malcolm Macleod

Introduction to the EQIPD quality system (Bespalov et al., 2021 eLife)

Enhancing Quality in Preclinical Data - Systematic assurance of quality needed!



Malcolm Macleod

Introduction to the EQIPD quality system (Bespalov et al., 2021 eLife)

Enhancing Quality in Preclinical Data (EQIPD)

Bespalov, A., et al. (2021). Elife 10: e63294.
https://elifesciences.org/articles/63294

Core Requirements – Enable, Establish, Maintain GRP

(18, in 6 categories)

1. Research team → Communication process, responsibilities
2. Quality culture → Defined quality objectives, acting upon concerns of potential misconduct, compliance with legislation and policies
3. Data integrity → Generating, handling, and changes to data records must be documented, data traceability, disclosure of all repetitions – FAIR data
4. Research processes → Definition of exploratory or confirmatory, availability of protocols, competence for performing assigned tasks
5. Continuous improvement
6. Sustainability → Risk assessment of the factors possibly affecting the process of generation and storage of research data, management of errors and critical incidents

The Guarantors of EQIPD (GoEQIPD) e.V. were founded in 2021 as a non-profit organization to oversee the implementation of the EQIPD Quality System

Communication, Dissemination, Education, Training Good Research Practice

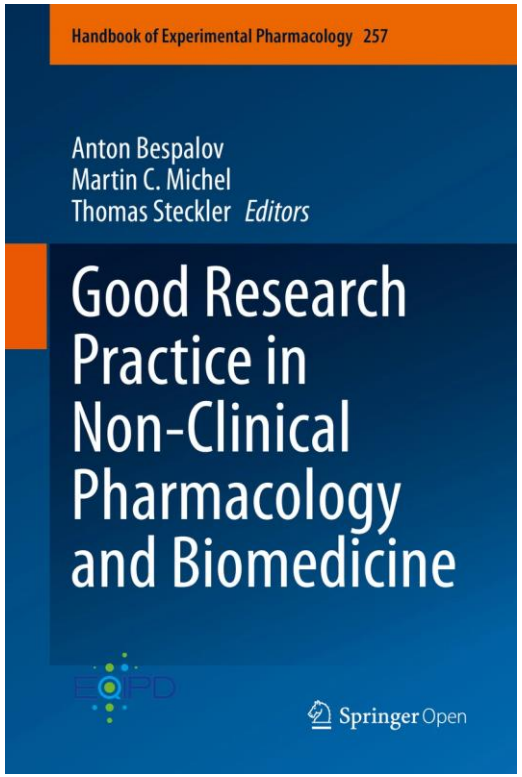
Ensuring governance and management of the EQIPD QS (incl certification)

Organising seminars, webinars, workshops and networking events

Working with stakeholder group to update and improve the QS

Resources

Toolbox is a structured collection of various quality-related items, such as guidelines, protocols, and tools that can be used to build an EQIPD Quality System, https://wiki.go-eqipd.org/wiki/Toolbox



Good Research Practice in Non-Clinical Pharmacology and Biomedicine
Book - Open Access © 2020

https://link.springer.com/book/10.1007/978-3-030-33656-1

Minimal Metadata

Repository

Book

Perspective | Open access | Published: 04 March 2024

A minimal metadata set (MNMS) to repurpose nonclinical in vivo data for biomedical research

Anastasios Moresis, Leonardo Restivo, Sophie Bromilow, Gunnar Flik, Giorgio Rosati, Fabrizio Scorrano, Michael Tsoory, Eoin C. O'Connor, Stefano Gaburro & Alexandra Bannach-Brown

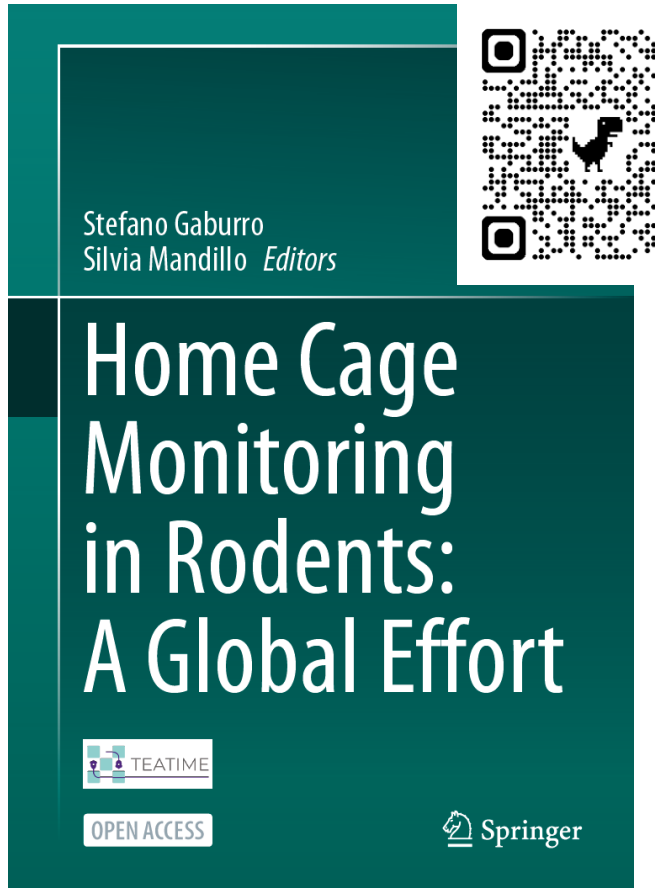
Lab Animal **53**, 67–79 (2024) | Cite this article

https://doi.org/10.1038/s41684-024-01335-0

Too big to lose - a FAIR repository for biomedical data derived from Home-Cage Monitoring

R Sonia Bains[1*], Damien Huzard[2*#], James Edgar McCutcheon[3*], Pawel M. Boguszewski[4*], Davor Virag[5*], Leonardo Restivo[6], Lars Lewejohann[7,8], Michael C. Ashby[9], Jan Rozman[10], Hamish Forrest[1], Marion Rivalan[11], Hilary Gates[1], Otto Kalliokoski[12], Benoit Girard[13*#]

https://osf.io/preprints/osf/fsg83_v1



TEATIME

https://link.springer.com/book/10.1007/978-3-032-19781-8

Short Communication

Data welfare is animal welfare: Building a WellFAIR research ecosystem

Benoit Petit-Demoulière [a,*], Damien Huzard [b,c]

https://doi.org/10.1016/j.nsa.2026.106998

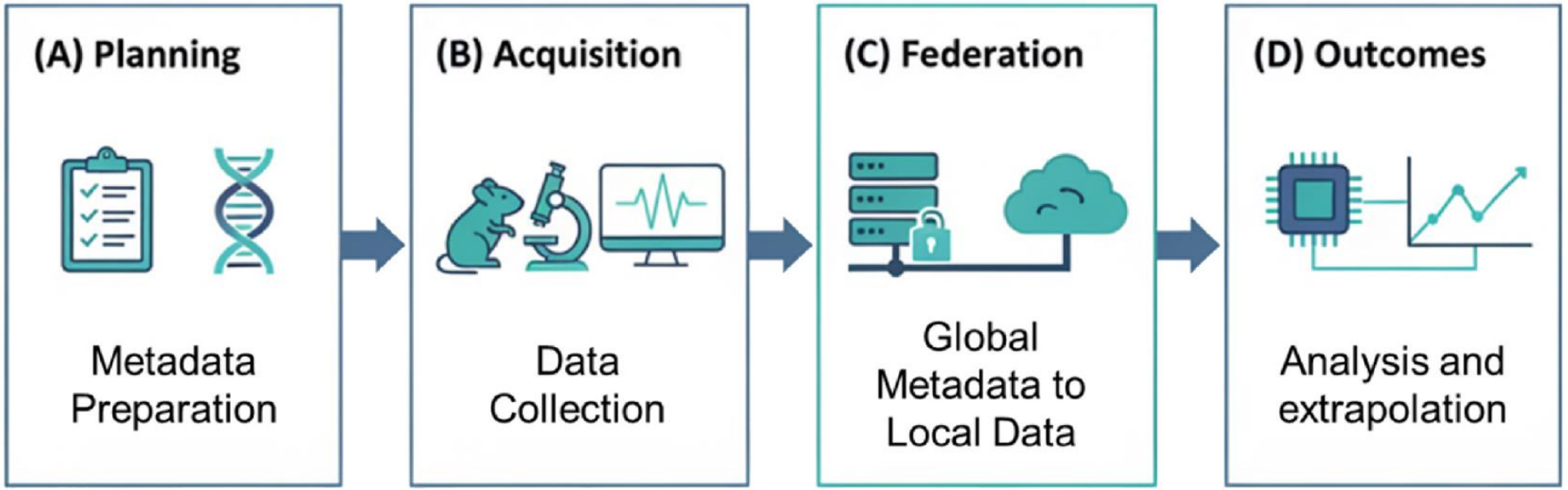


Fig. 1. The WellFAIR Ecosystem.
A schematic representation of the data lifecycle designed to support the 3Rs. (A) Planning: Researchers engage with Data Stewards to select a Minimum Metadata Set (MNMS) before the experiment begins (B) Acquisition: "Born-FAIR" middleware (e.g., Madbot, Metadatapp). acts as a bridge between instruments and Electronic Lab Notebooks (ELNs), capturing metadata in real-time. (C) Federation: The FAIR3R model resolves sovereignty concerns by keeping data on local institutional servers while publishing searchable metadata globally. (D) Outcomes: This structured pipeline enables the aggregation of "Shadow Data" to reduce AI bias and creates sufficient historical datasets to form Virtual Control Groups, directly reducing animal usage.

EVENT RECAP · FAIR METADATA · 3RS · AI/VCG

WellFAIR webinar recap — FAIR data, the 3Rs, and the path to AI/VCG

9 June 2026 · Damien Huzard, PhD

On 9 June 2026, Benoit Petit-Demoulière and I gave a COST TEATIME webinar arguing that FAIR data is the most under-used lever for respecting the 3Rs — and that the same metadata discipline that honours animal use is what makes AI agents and virtual control groups (VCGs) credible. This is a short recap of what we covered, the audience questions, and the resources shared in the chat.

TEATIME

EQIPD
Online Networking Event:

Data Sharing in Research

15 June 2026 – 15:00 CEST

The event will bring together members of the EQIPD stakeholder community and colleagues interested in research quality, transparency, and reproducibility to discuss challenges, experiences, and best practices related to data sharing and interoperability.

Register!

Better Animal Research through Open Science

Be open in several phases of your research

Universiteit Utrecht

Enhancing Quality – a Mission Possible!

On October 26th, 2021 Utrecht University (the Open Science programme) and the Animal Welfare Body Utrecht held an online symposium on the relationship between Open Science and animal experiments, called ‘Better Animal Research through Open Science’.

https://www.youtube.com/playlist?list=PLdBD13ueqSKF75MVbUEV4LIAEAZsYuzWm

Vootele Voikar

is the convener of the Guarantors of EQIPD e.V. executive board. He previously was part of the EQIPD stakeholder group.

Convener

René Bernard

is the deputy of the GoEQIPD executive board. He focused on the development of the governance structure for the EQIPD QS.

Deputy

Björn Gerlach

is the treasurer of the association. Previously, he was a member of the EQIPD consortium, involved in the development of the EQIPD QS.

Treasurer

GoEQIPD

https://go-eqipd.org/

100+ EQIPD-stakeholders

Kim Wever

was the project lead for the development of the online teaching platform and training program.

ExBoard

Malcolm Macleod

was the academic lead of the EQIPD consortium and contributed to the development the EQIPD QS.

ExBoard

Thomas Steckler

was the industry lead of the EQIPD consortium and contributed to the development of the EQIPD QS.

ExBoard

Heidrun Potschka

was member of the EQIPD consortium.

Member

Andrew Rice

was member of the EQIPD consortium.

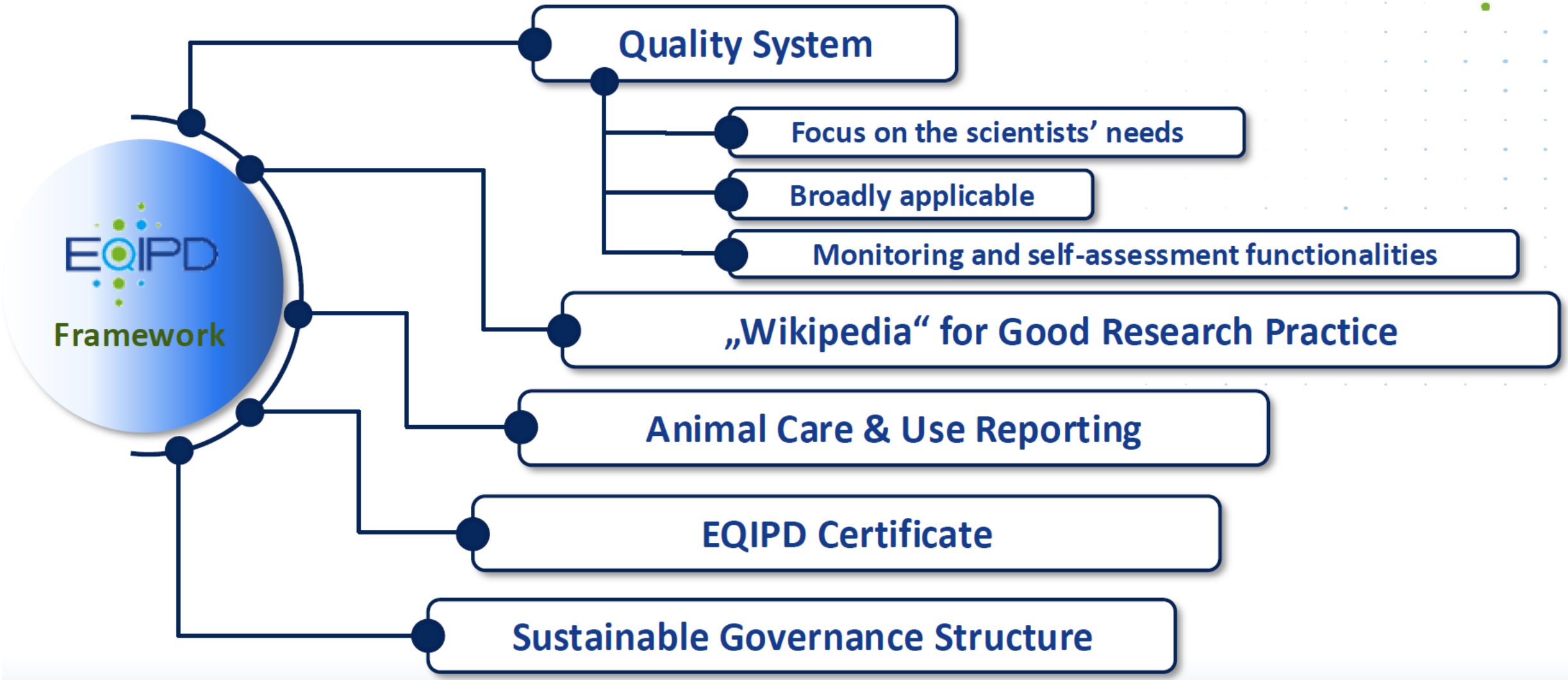
Member

Thank You!

UNIVERSITY OF HELSINKI
LABORATORY ANIMAL CENTRE

HiLIFE
HELSINKI INSTITUTE OF LIFE SCIENCE

The EQIPD Quality System



This project has received funding from the Innovative Medicines Initiative 2 Joint Undertaking under grant agreement No 777364. This Joint Undertaking receives support from the European Union's Horizon 2020 research and innovation programme and EFPIA.

The EQIPD Quality System:
18 Core requirements

Good Research Practice will be **maintained**

6 core requirements

Good Research Practice is **established**

9 core requirements

Good Research Practice is **enabled**

3 core requirements