



The objectives of the Strategy are to:

1. support a **research culture** in NHMRC-funded institutions that is conducive to the conduct of high quality research
2. support **high quality** in the development, design, methodology, conduct and analysis of NHMRC-funded research
3. support **transparency** of NHMRC-funded research
4. support **accountability** for high quality research by NHMRC-funded institutions and their institutional review committees
5. ensure the need for incremental and breakthrough **innovations** is balanced with the need for necessary **replication**, and
6. ensure NHMRC's processes are **efficient** while supporting high quality research.



# NHMRC's Research Quality Strategy

## Status update



# Outline

1. The problems
2. NHMRC & International plans
3. Today's workshop themes

## 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  
Conduct of  
Research*

*Questionable  
Research  
Practices*

*Research  
Misconduct*

Lex Bouter, VMC, Netherlands

# Begley's Bombshell


Between 2002-2012, Amgen was not able to reproduce the seminal findings from 47 of 53 “top tier” publications.

- publications that reported something completely “new”

The major finding was not reproduced!

*In the majority, data was not reproduced by the original investigators with their reagents in their lab*

Amgen's experience is not unique....



**COMMENT**

**AVIAN INFLUENZA** Shift expertise to track mutations where they emerge **p.534**

**EARTH SYSTEMS** Past climates give valuable clues to future warming **p.537**

**HISTORY OF SCIENCE** Descartes' lost letter tracked using Google **p.540**

**OBITUARY** Wylie Vale and an elusive stress hormone **p.542**

Many landmark findings in preclinical oncology research are not reproducible, in part because of inadequate cell lines and animal models.

## 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.

Efforts over the past decade to characterize the genetic alterations in human cancers have led to a better understanding of molecular drivers of this complex set of diseases. Although we in the cancer field hoped that this would lead to more effective drugs, historically, our ability to translate cancer research to clinical success has been remarkably low<sup>1</sup>. Sadly, clinical trials in oncology have the highest failure rate compared with other therapeutic areas. Given the high unmet need in oncology, it is understandable that barriers to clinical development may be lower than for other disease areas, and a larger number of drugs with suboptimal preclinical validation will enter oncology trials. However, this low success rate is not sustainable or acceptable, and investigators must reassess their approach to translating discovery research into greater clinical success and impact.

Many factors are responsible for the high failure rate, notwithstanding the inherently difficult nature of this disease. Certainly, the limitations of preclinical tools such as inadequate cancer-cell-line and mouse models<sup>2</sup> make it difficult for even ▶

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# A very brief history

1994 - “huge sums of money are spent annually on research that is seriously flawed through the use of inappropriate designs, unrepresentative samples, small samples, incorrect methods of analysis, and faulty interpretation”

Doug Altman, The Scandal of Poor Medical Research, *BMJ*.

2009 – Chalmers & Glasziou, *Lancet* calculated that ~85% research is avoidably wasted

2012 Begley & Ellis - Amgen not able to reproduce the seminal findings from 47 of 53 “top tier” publications (reproducibility crisis)

2014 *Lancet* 5-part series on *Adding Value, Avoiding Waste* published

2014 Ensuring Value in Research (EVIR) funders forum initiated

2018 NHMRC Research Quality Committee set up





**Annual avoidable waste in research estimated to be 85% from:**

2. avoidable design flaws (50%),
4. non-publication (50%) and
5. unusable reports (50%)

– for a global total of over \$140 Billion/year.

Calculation at: <http://blogs.bmj.com/bmj/2016/01/14/paul-glasziou-and-iain-chalmers-is-85-of-health-research-really-wasted/>

Adding Value, Reducing Waste

Lancet Series 2014

[www.researchwaste.net](http://www.researchwaste.net)

THE LANCET

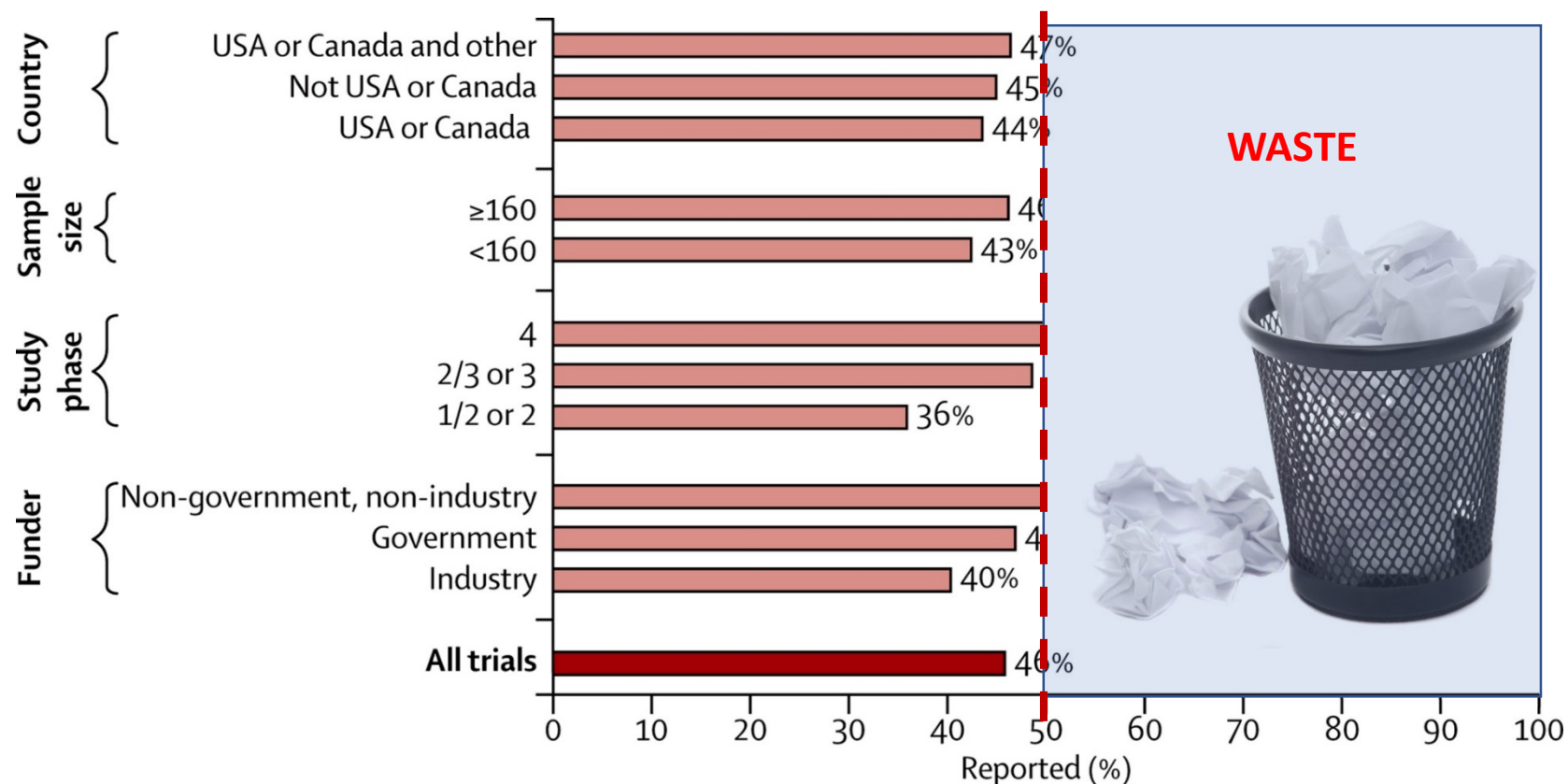
Research: increasing value, reducing waste January 2014 www.thelancet.com

“By ensuring that efforts are infused with rigour from start to finish, the research community might protect itself from the sophistry of politicians, disentangle the conflicted motivations of capital and science, and secure real value for money for charitable givers and taxpayers through increased value and reduced waste.”

Research: increasing value, reducing waste

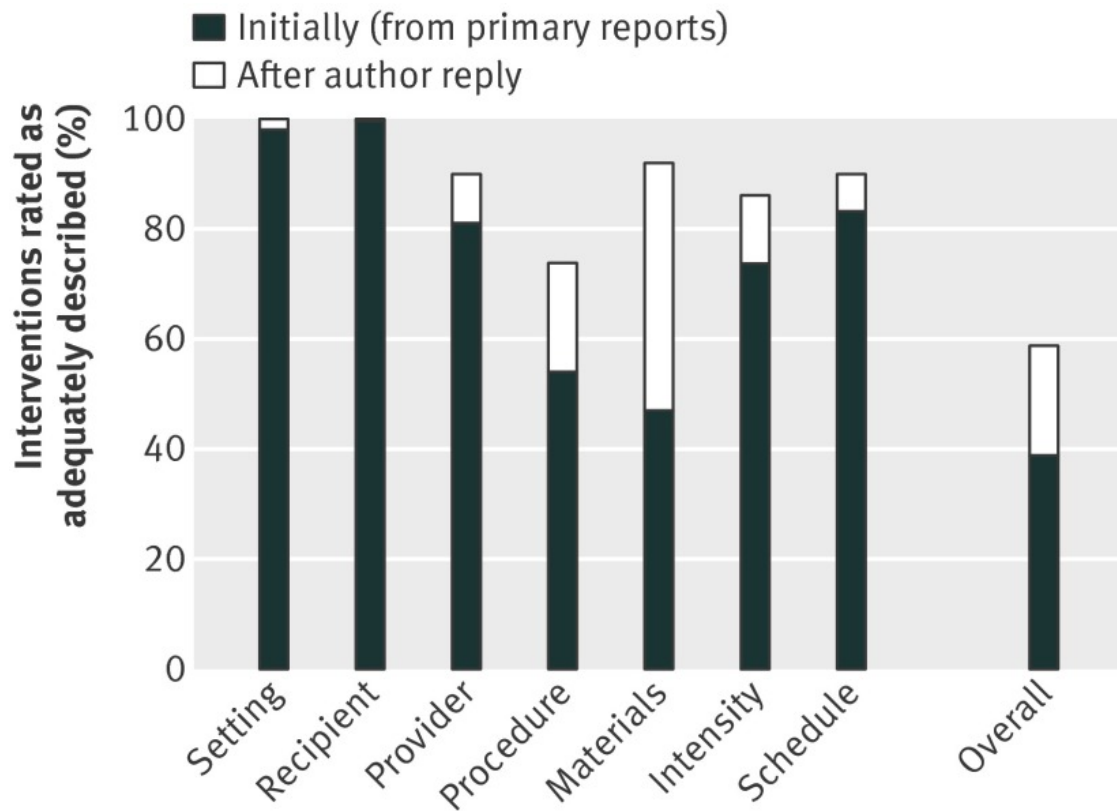


# 50% of research is not published





## Poor reporting of non-pharmacological interventions in 6 major medical journals



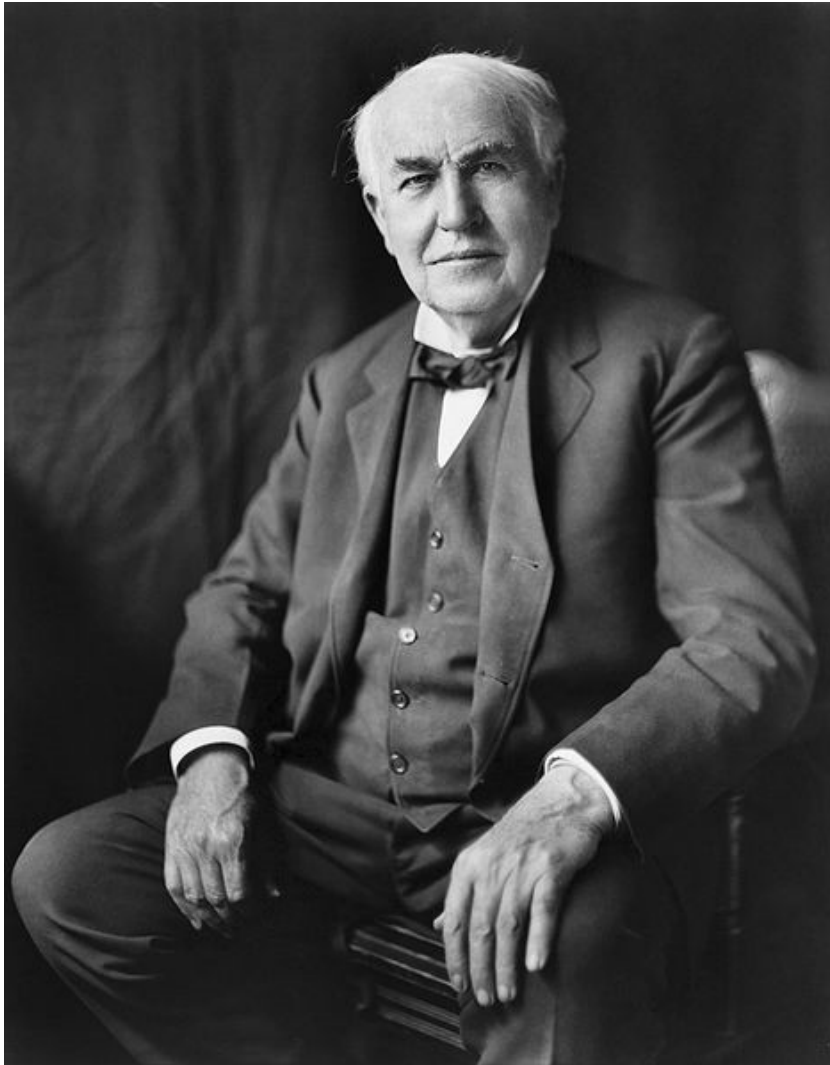
Of 133 trials in 2010

59% adequate after contacting author

**39% adequate in primary sources**



# Unavoidable “waste” in research



"Young man, why would I feel like a failure? And why would I ever give up? I now know definitively over 2,000 ways that an electric light bulb will not work. Success is almost in my grasp."

Thomas Edison

1% innovation

99% perspiration

# Some international work

- **EVIR funders forum**
- EQUATOR network
- Hong Kong Principles
- Open Science Framework



The next EVIR Forum meeting will be held in Dublin (Health Research Board offices) on the 28-29 March 2019.

Details to follow on this website or contact [EVIRFundersForum@gmail.com](mailto:EVIRFundersForum@gmail.com) for more information

Organisations from around the world are coming together to advance the practices of health related research and research funding, in order to increase the value of health related research.

The Ensuring Value in Research (EVIR) Funders' Collaboration and Development Forum started in 2017, with meetings in London, Den Haag and Washington DC. In our first year the Funders' Forum developed a [Consensus Statement](#) and [Guiding Principles](#).

As organisations that fund health-related research, represent funders, or set funding policy, we have a responsibility not just to seek to advance knowledge, but also to advance the practices of health-related research and research funding. Through working together and with our respective research communities we are sharing current and developing new approaches to increase the value of health-related research.

Delegates from eight countries have attended meetings so far, with the next meeting of the EVIR Funders' Forum taking place in Cardiff, Wales, UK on 16-17 May 2018.

Members of the forum who have already endorsed the consensus statement and guiding principles include:

- [Forte \(Sweden\)](#)
- [Graham Boeckh Foundation](#)
- [Health and Care Research Wales - Welsh Government \(UK\)](#)
- [Health Research Board Ireland \(Ireland\)](#)
- [Marie Curie \(UK\)](#)
- [Ministry of Health Salute \(Italy\)](#)
- [NIHR - National Institute for Health Research \(UK\)\\*](#)
- [PCORI - Patient Centered Outcomes Research Institute \(USA\)\\*](#)

# Some international work

- EVIR funders forum
- **EQUATOR network**
- Open Science Framework
- Hong Kong Principles

The screenshot shows the EQUATOR network website. At the top, the logo for 'equator network' is displayed next to the tagline 'Enhancing the QUALity and Transparency Of health Research'. A navigation menu includes 'Home', 'Library', 'Toolkits', 'Courses & events', 'News', 'Blog', 'About us', and 'Contact'. Below the navigation is a green banner with the text 'Essential resources for writing and publishing health research'. The main content area is divided into three columns. The left column features a 'Library for health research reporting' section with a description and four interactive buttons: 'Search for reporting guidelines', 'Not sure which reporting guideline to use?', 'Reporting guidelines under development', and 'Visit the library for more resources'. The middle column is titled 'Reporting guidelines for main study types' and lists various categories with links to specific guidelines, such as 'Randomised trials' (CONSORT, Extensions, Other), 'Observational studies' (STROBE, Extensions, Other), 'Systematic reviews' (PRISMA, Extensions, Other), 'Case reports' (CARE, Other), 'Qualitative research' (SRQR, COREQ, Other), 'Diagnostic / prognostic studies' (STARD, TRIPOD, Other), 'Quality improvement studies' (SQUIRE, Other), 'Economic evaluations' (CHEERS, Other), 'Animal pre-clinical studies' (ARRIVE, Other), and 'Study protocols' (SPIRIT, PRISMA-P, Other). A link 'See all 291 reporting guidelines' is provided at the bottom of this section. The right column contains a 'Possible strategies' section with a grid of icons and labels for 'Open data', 'Pre-registration', 'Collaboration', 'Automation', 'Open methods', 'Post-publication review', and 'Reporting guidelines'. At the bottom of the page, there are three colored buttons: 'Toolkits' (red), 'EQUATOR highlights' (dark blue), and 'News' (orange).

# Some international work

- EVIR funders forum
- EQUATOR network
- **Open Science Framework**
- Hong Kong Principles



The screenshot shows the OSFHOME website with a dark header containing the logo and 'OSFHOME' text. The main content area is titled 'How OSF supports your research' and features four icons representing different research stages: a magnifying glass for 'Search and Discover', a pencil for 'Design Your Study', a bar chart for 'Collect and Analyze Data', and a document for 'Publish Your Reports'. Each icon is accompanied by a brief description of the service.

OSFHOME

## How OSF supports your research

**Search and Discover**  
Find papers, data, and materials to inspire your next research project. Search public projects to build on the work of others and find new collaborators.

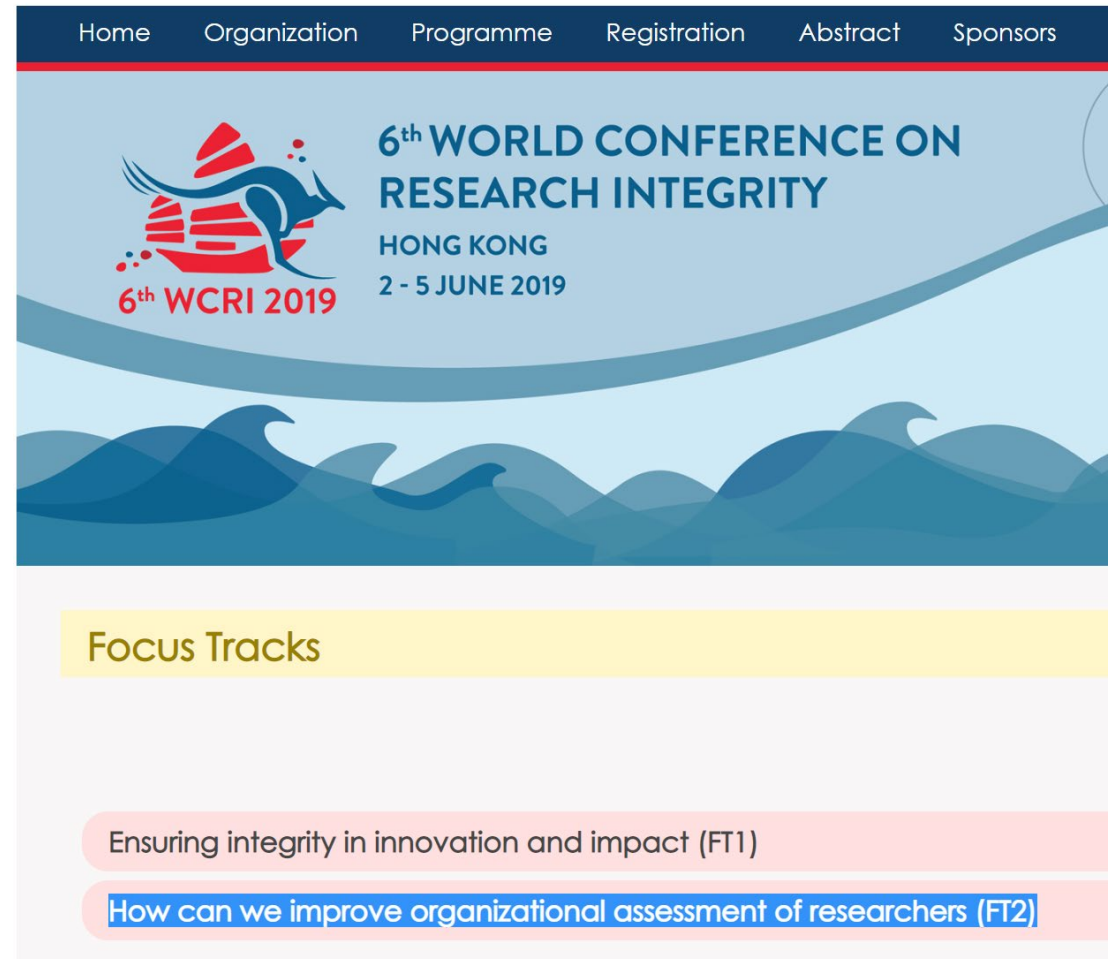
**Design Your Study**  
Start a project and add collaborators, giving them access to protocols and other research materials. Built-in version control tracks the evolution of your study.

**Collect and Analyze Data**

**Publish Your Reports**

# Some international work

- EVIR funders forum
- EQUATOR network
- Open Science Framework
- **Hong Kong Principles**



# What to change?

1. **Blinding, blinding, blinding**
2. Good reporting
3. Study registration
4. .....

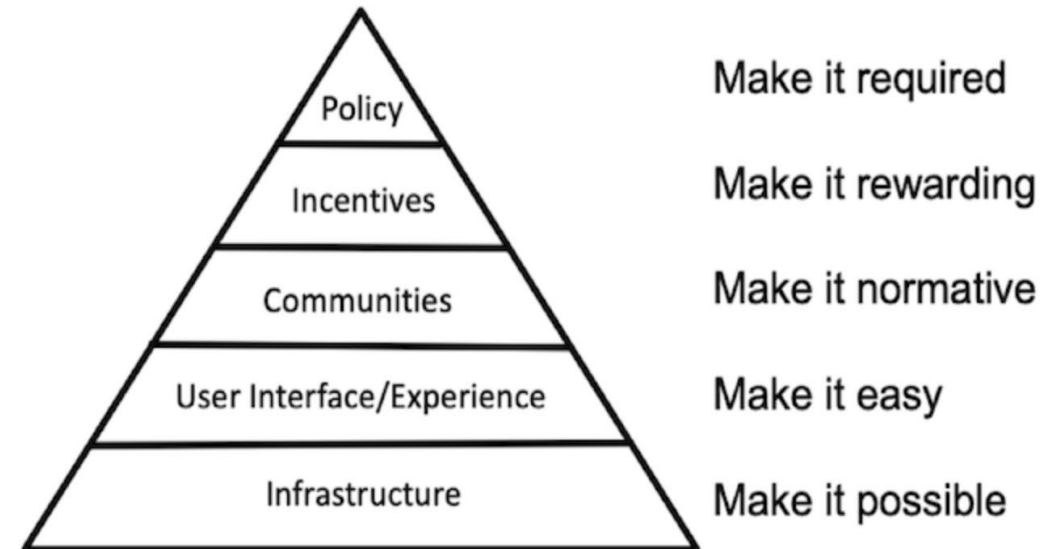
99. Lack of computing power
100. Spelling mistakes

# How to change it?

## Strategy for Culture Change

June 11th, 2019, Brian Nosek

Tags: [Behavior Change](#), [Open Science](#), [Reproducibility](#), [Culture Change](#)

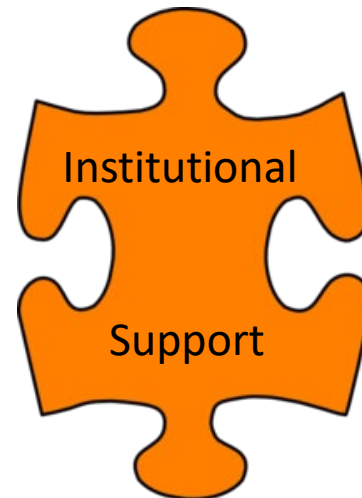


# NHMRC Research Quality Steering Committee

## Terms of Reference:

- Advise NHMRC's CEO on mechanisms for enhancing quality in NHMRC-funded research through rigour, transparency and reproducibility, including:
  - identification of factors that enable or hinder **rigour, transparency and reproducibility** in research
  - **short and long-term strategies for improving** rigour, transparency and reproducibility in NHMRC-funded research, and
  - measuring and reporting effectiveness of strategies.

# Where are we now?





# Education & Training

## Curriculae



## Training processes

COMMENTARY

Open Access



### Designing integrated research integrity training: authorship, publication, and peer review

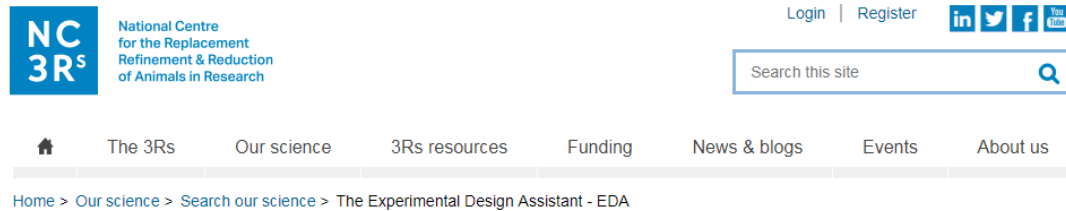
Mark Hooper<sup>\*</sup>, Virginia Barbour, Anne Walsh, Stephanie Bradbury and Jane Jacobs

**Table 1** Authorship and Publication agenda

#	Item	Method of delivery
1	Welcome, overview, etc.	Narrator introduction
2	Develop a data management plan	Lightning talk
3	Get an ORCID iD	Lightning talk
4	Agree authorship	Lightning talk
5	Academics discussing authorship	Video (short interview clips)
6	Shortlisting journals	Lightning talk
7	Open access 101	Lightning talk
8	Writing tips	Video (short interview clips)
9	Originality and plagiarism	Lightning talk
10	Report COIs and acknowledge grants	Video (animated)
11	Do you still need a cover letter?	Lightning talk
12	Respond to peer review	Video (animated)
13	Review the publishing agreement	Lightning talk
14	Deposit manuscript at QUT ePrints	Lightning talk
15	What happens after publication?	Lightning talk
16	Promote your work	Lightning talk
17	Questions	Open discussion

# Infrastructure & Tools

## Tools to aid better study design



The screenshot shows the top navigation bar of the NC3Rs website. On the left is the NC3Rs logo and the text "National Centre for the Replacement, Refinement & Reduction of Animals in Research". To the right are links for "Login" and "Register", followed by social media icons for LinkedIn, Twitter, Facebook, and YouTube. Below this is a search bar with the placeholder text "Search this site" and a magnifying glass icon. A horizontal menu contains links for "Home", "The 3Rs", "Our science", "3Rs resources", "Funding", "News & blogs", "Events", and "About us".

## The Experimental Design Assistant - EDA

Overview

Publications

The Experimental Design Assistant (EDA) is a free online tool from the NC3Rs, designed to guide researchers through the design of their experiments, helping to ensure that they use the minimum number of animals consistent with their scientific objectives, methods to reduce subjective bias, and appropriate statistical analysis.

Click here to access the EDA



Office-led project

Status:  
Active

NC3Rs Scientist  
Dr Nathalie Percie du Sert

Primary 'R'  
Reduction

Technologies/approach  
Improved study design

Keywords  
Experimental design  
Reduction

## Trial registration



FAQs | HOW TO GET INVOLVED | NEWS | ABOUT US

CREATE ACCOUNT LOGIN

The ANZCTR is an online registry of clinical trials being undertaken in Australia, New Zealand and elsewhere.

### Search for a trial

Search all registered trials



The safety and scientific validity of each study registered on the ANZCTR is the responsibility of the study sponsor and investigators. Listing a study on the ANZCTR does not mean it has been endorsed by the ANZCTR. Before participating in a study, talk to your health care provider and refer to [information for consumers](#)

### Advanced search

[Click here](#) to use our advanced search feature.

For instructions on how to search and alternative search options, please visit the 'How to search' page [here](#).

# Institutional Support

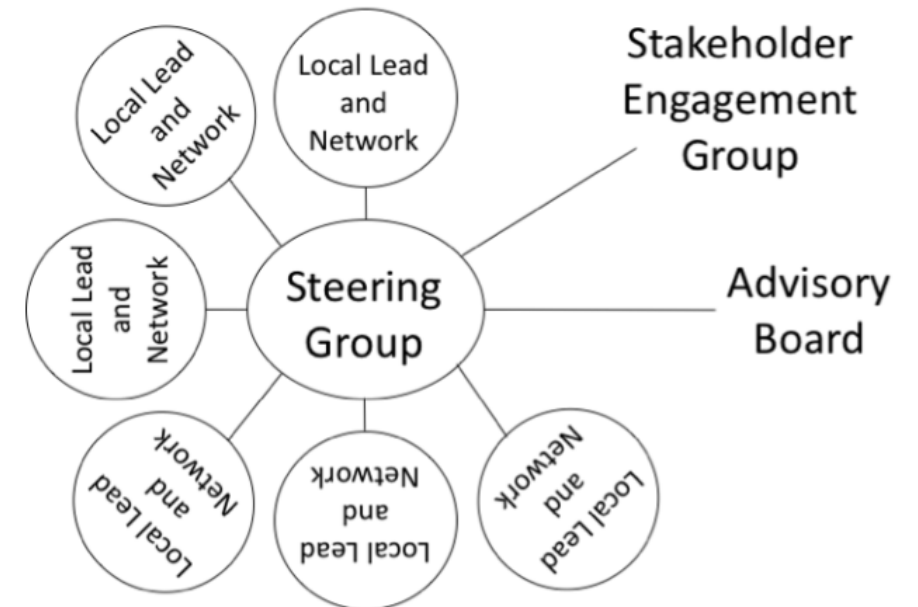


UK Reproducibility Network

UK Reproducibility Network	
About	
↳ Terms of Reference	
↳ Code of Conduct	
↳ <b>Activities</b>	
Local Networks	
Steering Group	
Advisory Board	
Stakeholders	
Contacts	
PhD Students	

## UKRN Activities

- [Registered Reports](#)
- [Registered Reports Funding](#)
- [Editors4BetterResearch](#)
- [Accountable Replication Policies](#)
- [Octopus](#)
- [Open Research Working Groups](#)
- [ReproducibiliTea](#)
- [Hiring Policies Certification Scheme](#)
- [Laboratory Efficiency Assessment Framework \(LEAF\)](#)



# Research on Research

## Research on Research Problems



## Research on Research Efficiency

[Home](#) / [Resources](#) / [Studies Within a Trial](#)

### Studies Within a Trial (SWAT)

Our colleagues at Queen's University Belfast host the Studies Within a Trial (SWAT) and Studies Within a Review (SWAR) initiative ([site](#)).

It is being developed by the Northern Ireland Network for Trials Methodology Research in collaboration with the Medical Research Council's Network of Hubs for Trials Methodology Research in the UK (HTMR Network), the Health Research Board's Trials Methodology Research Network in Ireland (HRB-TMRN), and others.

More information, and a repository of existing SWATs can be found at the [site](#). If you are interested in embedding methodology research into an ongoing trial and other prospective study, have a look at the SWAT (Studies Within A Trial) collection online to see examples, or to register a new SWAT.

[www.qub.ac.uk/sites/TheNorthernIrelandNetworkforTrialsMethodologyResearch/SWATSWARInformation/](http://www.qub.ac.uk/sites/TheNorthernIrelandNetworkforTrialsMethodologyResearch/SWATSWARInformation/)

