



**Australian Government**

**National Health and Medical Research Council**

# **2019 Survey of research culture in Australian NHMRC-funded institutions**

## **Survey findings report**

February 2020

## I. Executive summary

The National Health and Medical Research Council (NHMRC) is committed to ensuring that NHMRC-funded research is of the highest quality. In May 2019, the NHMRC commissioned ORIMA Research to conduct a survey on its behalf in relation to the research culture in Australian NHMRC-funded institutions.

The survey aimed to better understand:

- ◆ the **relevance** of globally identified drivers, enablers and barriers to excellence in research quality in NHMRC-funded institutions;
- ◆ the **views and experiences** of individuals who are responsible for research conduct and quality in NHMRC-funded institutions;
- ◆ major **pressures and environmental issues** around research quality in NHMRC-funded institutions; and
- ◆ opportunities for **change and innovation** in the industry.

The target groups for the survey were research students; senior, mid-career and junior researchers; institutional representatives; and ethics committee members (Human Research Ethics Committees and Animal Ethics Committees).

### What are the experiences to date of individuals involved with the conduct of research in Australian NHMRC-funded institutions?

#### Understanding of research quality

The NHMRC expects NHMRC-funded research to be conducted responsibly, ethically and with integrity, and regards high-quality research to be rigorous, transparent and reproducible.<sup>1</sup> In order to understand the current perceptions that exist within the Australian NHMRC-funded community, all participants were asked which elements they believe are the most important for high-quality research.

**73%** of all participants believed that **rigour** was the most important aspect of high-quality research. This was followed by reports that high-quality research reflects research that is **ethical** (69%), **beneficial to society** (57%), and **accurate** (53%).

Furthermore, 41% nominated **transparency**, which is regarded by the NHMRC as a key aspect of high-quality research (along with rigour and reproducibility).

<sup>1</sup> <https://www.nhmrc.gov.au/about-us/publications/nhmrcs-research-quality-strategy>

## Use of research resources

58%

of research students / researchers reported that the conduct of unnecessary research that might have been avoided if all **negative or neutral studies were routinely published** was the main factor that substantially contributed to inefficient use of research resources.

Research students were *more likely* than other participant groups to feel that a range of factors greatly contributed to inefficient use of research resources.

## Environmental features encouraging the production of high-quality research

76%

of research students / researchers felt that **codes of conduct** had the greatest **positive effect** on the production of high-quality research. Ethical review processes and data sharing policies were also seen as highly positive influences (73% each).

In contrast, the features which participants felt had the most **negative effect**, and hence discouraged the production of high-quality research were: how funding for specific projects and programmes is awarded (52%); emphasis on publishing in top-tier journals (44%); and how researchers are assessed for promotion during their careers (44%).

Researchers (particularly senior researchers) were generally more critical of the effect that environmental features have in terms of encouraging researchers to produce high-quality research, while research students and ethics committee members (particularly AEC members) were generally more optimistic in their ratings.

## Reproducibility of results

93%

of all participants believed that **reproducibility was important** to research, and 73% had heard of the term '**crisis of reproducibility**'.

Senior researchers and AEC members were *most likely* to indicate that they felt that reproducibility was important to research (96% each), while research students and HREC members were *least likely* to view reproducibility as important to research (though were still high at 89% and 86% respectively).

56%

of all participants felt that there is currently a **significant** 'crisis of reproducibility', while 40% believed that there is a **slight** 'crisis of reproducibility'.

AEC members and junior researchers were *most likely* to indicate that there is a significant crisis of reproducibility (66% and 60% respectively), while HREC members were *least likely* to share this sentiment (41%).

Research students / researchers and institutional representatives were asked to indicate the extent to which a variety of factors were felt to contribute to a failure to reproduce results. Overall, the top three factors which they believed contributed '**considerably**' or '**to a great extent**' were: selective reporting of results (71%); pressure to publish for career advancement (62%); and original findings obtained with low statistical power / poor statistical analysis (52%).

In contrast, the three factors which participants felt contributed only '**slightly**' or '**not at all**' were: bad luck (75%); fraud (62%); and insufficient peer review of grant applications (60%).

## What environmental factors are identified and / or experienced as barriers and enablers to high-quality research?

### General perceptions – immediate environment

**90%** of research students / researchers agreed that research practices in their department / research group **follow established institutional policies** regarding research; whilst

**55%** of research students / researchers agreed that researchers in their immediate research environment are **committed to open access publishing** when publishing research results (17% disagreed).

Furthermore, 16% of all participants *disagreed* that junior researchers are effectively mentored about responsible research practices.<sup>2</sup>

### Barriers to implementing procedures to improve reproducibility of results

**19%** of research students / researchers reported that they / their research group had **experienced barriers** when trying to implement procedures to improve reproducibility, primarily cost and time-related barriers.

Barriers were reportedly more common amongst senior researchers; however junior researchers and research students were also more likely to report that they have never tried to implement procedures to improve reproducibility of results.

### Attempts to reproduce results

**50%** of research students / researchers reported that they were able to **fully reproduce a finding from their own published paper**, whilst 30% were able to fully reproduce a finding from another researcher's published paper.

Furthermore, participants were considerably more likely to have been *unable* to fully reproduce a finding from another researcher's published paper, compared to their own published paper (44% versus 8%).

### Pressures

Results suggested that pressures were more often observed in other researchers than personally experienced by researchers.

**54%** of all participants were **aware of researchers** feeling tempted or under pressure to compromise on research quality.

Junior researchers were *most likely* to be aware of such instances, while ethics committee members (particularly AEC members) were *least likely*.

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<sup>2</sup> Responsible research practices are defined as those that ensure research is rigorous, transparent and reproducible.

27%

of research students / researchers indicated that they had **personally** felt tempted or under pressure to compromise on research quality.

Research students and junior researchers were *most likely* to have felt such pressure, while senior researchers were *least likely*.

### Funding, publishing and competition

Research students / researchers demonstrated some concerns regarding funding and publishing pressures.

46%

of research students / researchers agreed that their department's / research group's expectations of researchers for obtaining external **funding** were reasonable (versus 66% agreeing that expectations with respect to **publishing** were reasonable).

53%

of research students / researchers agreed that pressure to obtain external **funding** has a negative effect on the quality of research in their department / research group (versus 33% who felt this way in relation to **publishing**).

Junior researchers were *most likely* to be impacted by these pressures, compared to mid-career and senior researchers.

70%

of all participants felt that **competition** was having a **negative effect** on the production of high-quality research, while 25% believed that competition was having a positive effect.

Research students and junior researchers were *least likely* to indicate that competition had a *positive* effect on the production of high-quality research, while senior researchers and ethics committee members were *most likely*.

## What behaviours that may affect research quality are occurring in Australian NHMRC-funded institutions?

### Overall behaviours

Research students / researchers were generally more likely to report that they had **witnessed others** undertaking undesirable behaviours throughout the research process, than they were to report that they had **personally undertaken** such behaviours themselves.

43%

of research students / researchers reported that they had **witnessed others propose a research question which was easy to answer rather than needed**.

Other commonly witnessed behaviours included choosing an inadequate research design because it minimised costs (40%); and using an unsuitable measurement method because it was readily available (35%).

25%

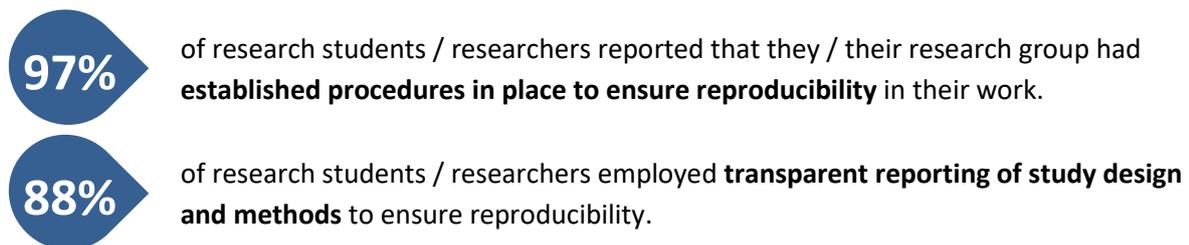
of research students / researchers admitted to **personally not attempting to publish a valid 'negative' or 'neutral' study**.

Other common behaviours personally undertaken included choosing an inadequate research design as it minimised costs (16%), and proposing a research question that was easy to answer rather than needed (15%).

Research students were generally *less likely* to report having witnessed or undertaken the listed behaviours, compared to their senior colleagues. This was likely driven by the fact that they would have had less opportunity to do or see such behaviours due to a relatively shorter length of engagement in their role.

## What are the opportunities for change and innovation to improve research quality in Australian NHMRC-funded institutions?

### Current practices: Researchers



The establishment of procedures to ensure reproducibility generally increased with seniority.

Overall, 61% of research students / researchers felt that the quality of their research had *improved* as a result of the introduction of such procedures. Compared to their junior colleagues, senior researchers were *more likely* to indicate that the quality of their research remained unchanged after these procedures were introduced. Given that 96% of research students / researchers overall felt that there was currently a ‘crisis of reproducibility’, there may be scope to improve the effectiveness of such procedures.

### Education and training

Overall, the majority of participants had offered or received education and training about responsible research practices, primarily through mandatory institutional training (62%) and training by supervisors / mentors (55%). Just 1% reported that their institution does not offer such training, and 5% indicated that they had never received such training – ethics committee members were most likely to report that they had never received training (11%-15%, compared to 2%-6% of research students / researchers).<sup>3</sup>

All participants were also asked about their *perceptions* of training on responsible research practices. Overall, most agreed that appropriately educating and training researchers about responsible research practices will improve research quality (87%), and that education and training about responsible research practices is beneficial for their work / role (85%). However, despite this positive sentiment toward training, participants were *less likely* to agree that the education and training opportunities available at their institution were effective (53%). This suggests that there is opportunity to improve the training offered through institutions to meet the needs of the research community.

<sup>3</sup> Institutional representatives were not shown this response option.

## Suggested actions and opportunities for improvement



Overall, the results suggested that researchers themselves were perceived to have the greatest potential to enact change. By participant group, however, both ethics committee members and institutional representatives strongly acknowledged that they too could have a strong impact on research quality.

When asked about the actions that participants felt researchers, academic / research institutions, and funders could take in order to improve research quality, a key take-out was that 84% of all participants felt that **academic / research institutions** could make an impact by shifting industry norms within the research community, by **promoting an environment where high-quality research and reproducible research is considered the required norm.**

In addition to this, it was felt that:

- ◆ **researchers** could have the most impact by specifying critical research design elements (71%) and obtaining statistical advice and developing a plan early (69%); and
- ◆ provision or ensuring of (by institutions / funders) or attendance at (by researchers) appropriate training or mentoring programs was an action that **all** could take (60-72%).

Other key areas of opportunity identified through the research are as follows (but are not limited to the following):

- ◆ Focusing on training / mentorship (especially of junior researchers) about responsible research practice, and the effectiveness of such education and training;
- ◆ Addressing the perceived crisis of reproducibility, through factors that are seen to be contributing most to a failure to reproduce results (such as selective reporting of results or pressure to publish for career advancement);
- ◆ Promoting positive initiatives / processes rather than competition where possible;
- ◆ Encouraging open access publishing (due to perceptions that this is not happening as frequently as other measures that contribute to high-quality research), whilst considering the barrier of cost;
- ◆ Considering the impact of funding pressures / funding expectations on researchers, and the potential to explore other funding models; and
- ◆ Encouraging more rigorous reproducibility procedures (as procedures such as in-house replication before publication are not currently being undertaken frequently).