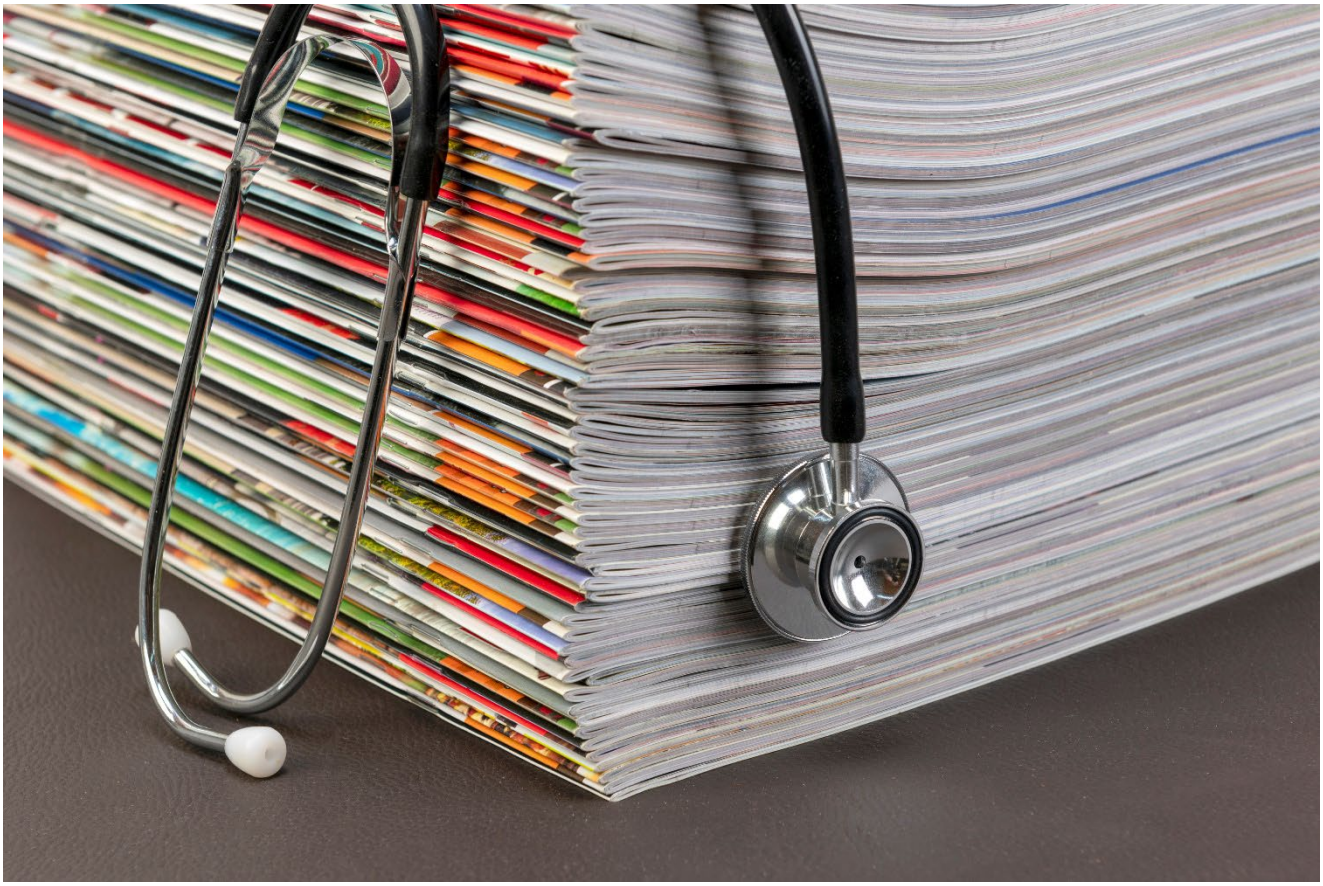
Australian Government
National Health and Medical Research Council

NHMRC

Top 10 in 10 publications policy

Phase 1 evaluation report – 24 April 2024



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Executive summary

The National Health and Medical Research Council (NHMRC) is the Australian Government's key entity for managing investment in, and the integrity of, health and medical research. NHMRC invests in the highest quality research and researchers, as determined through peer review, across the four pillars of health and medical research: basic science research, clinical medicine and science research, public health research and health services research.

NHMRC allocates funding to researchers through a grant system that relies on peer review providing rigorous assessment of applications for funding to ensure transparency, probity and fairness of process.

In 2021, with advice from its Research Committee, NHMRC undertook a targeted consultation with peak bodies in the Australian health and medical research sector on aligning NHMRC's assessment of publications with assessment processes used by other international agencies, to increase the focus on research quality and reduce peer reviewer burden.

Based on the results of this consultation, starting with the Investigator Grant scheme which opened for applications in January 2022, NHMRC began implementing a new policy relating to the assessment of publications for its track record-based schemes.

The new policy limited applicants to list no more than 10 of their top publications in the past 10 years (while also accounting for career disruptions). The full list of applicant publications from the past 10 years would no longer be provided to peer reviewers for their assessment.

It was intended that this new 'top 10 in 10' policy (henceforth 'the policy') would:

- help drive sectoral change to value research quality rather than quantity of publications
- help make assessment of publications equitable for applicants across all career stages and research fields
- reduce peer reviewer burden
- align with the publication assessment practices of many international funding agencies.

This interim report presents Phase 1 of the evaluation work undertaken to review whether the change in policy, and its implementation, has helped achieve any of the above objectives in the first year of its implementation. The initial findings highlighted in this report indicate that the policy has been successful in increasing the emphasis on quality rather than quantity of publications and has not had any unintended consequences in the funding pattern (e.g., career stages and Broad Research Areas (BRAs)) compared to the year before its implementation.

Further data analysis and the results of the 2022 Investigator Grant Peer Reviewer Survey show that the policy has also been able to reduce burden on peer reviewers.

However, the results of the survey have highlighted the need for further detailed guidance to applicants and peer reviewers on increasing their focus on the quality of the research in the publications, and consequently drawing the emphasis away from the total number of publications, journal impact factors and other quantitative metrics.

Key findings

1. Introduction of the policy did not appear to significantly change the application scoring pattern in 2022 in terms of Investigator level, gender, BRA, career disruption and career stage, compared to the year before its implementation.
2. Most peer reviewers supported the implementation of the policy and agreed that it helped emphasise the quality, instead of quantity, of publications.
3. The policy has reduced the emphasis on the total number of publications, journal impact factors and other similar quantitative metrics.
4. Most peer reviewers considered that implementation of the policy led to a reduced burden, however 23% did not and some noted that in-depth assessment required careful consideration and time.

Opportunities

1. Improve guidance to applicants on the 'quality and contribution' section of the application.
2. Improve guidance to peer reviewers on the assessment of 'quality and contribution' of the selected publications.

Recommendations

1. Continue to monitor the implementation of the policy and its impact on the Investigator Grant scheme for the next two years.
2. Improve guidance to both applicants and peer reviewers on drafting and assessing the quality and contribution of research presented in publications.
3. Conduct Phase 2 of this evaluation work once the policy has been implemented for three consecutive years.

Background

From 2022, researchers applying for NHMRC funding through its track record-based schemes were asked to list up to 10 of their top publications in the past 10 years (accounting for career disruptions). The full list of applicant publications from the past 10 years was no longer provided to peer reviewers for their assessment.

This change was intended to ensure that assessment of publication track record focused on the quality and contribution of the science rather than the quantity of publications.

Applicants were asked to explain why each publication was selected, their contribution to it, the quality of the research and its contribution to science.

The change builds on proposals by the Track Record Working Group established in 2018 at the time NHMRC's current grant program was introduced. It was also supported in a consultation with sector peak bodies.

The first grant scheme to which the new policy applied was the Investigator Grant scheme, in January 2022.

A communique explaining the rationale for the change, some frequently asked questions and social media announcements were released on 11 January 2022 to communicate this change to the sector ahead of the opening of the 2022 Investigator Grant scheme.

Objectives

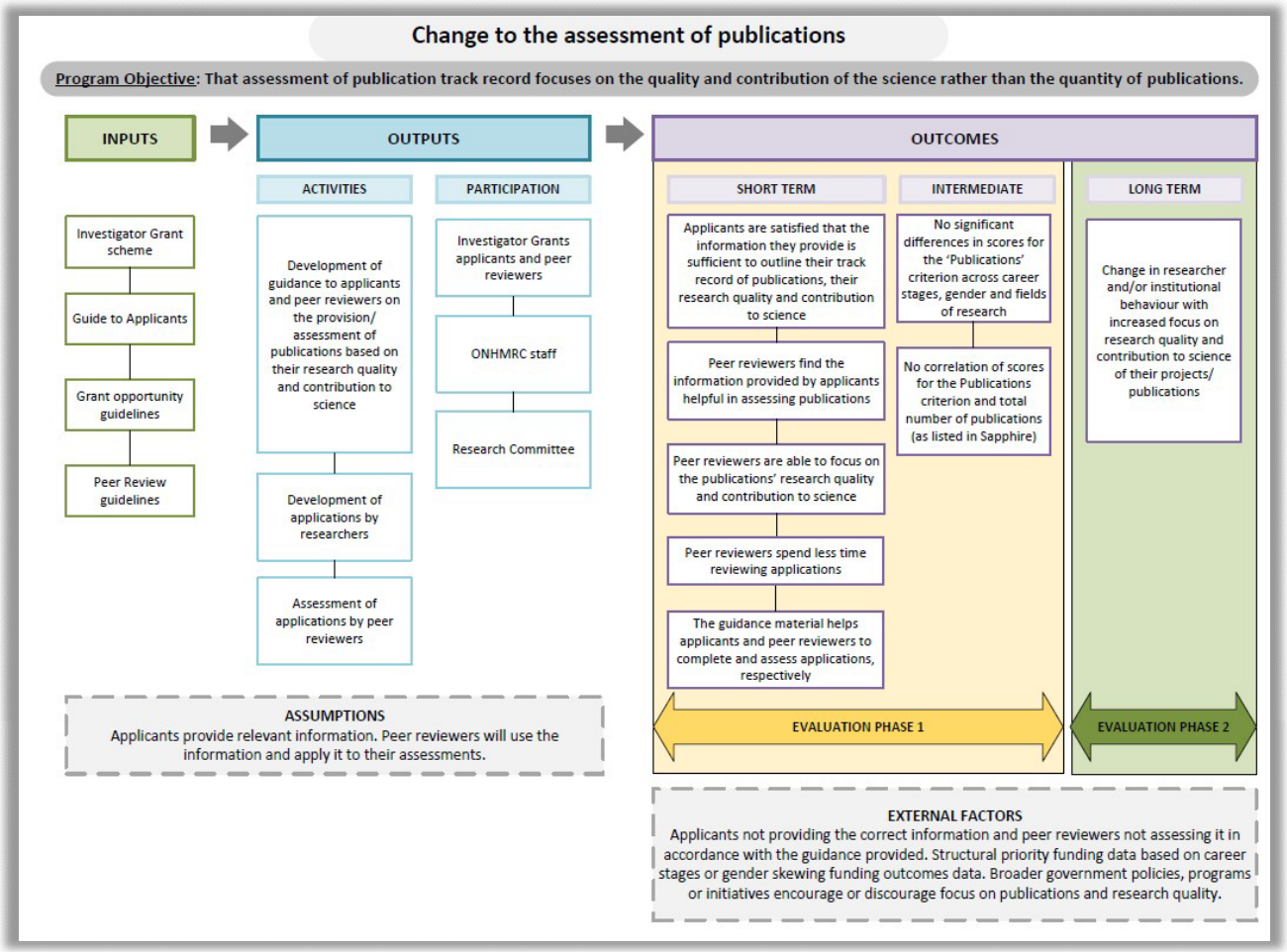
The change to the assessment of publications in track record assessment had the following objectives:

- support NHMRC's policy of emphasising the quality, not quantity, of publications and drive sectoral change to value research quality rather than quantity of publications
- help make assessment of publications equitable for applicants across all career stages and research fields
- reduce peer reviewer burden
- align with publication assessment practices of many international funding agencies.

The policy design process considered the publication assessment practices of many international funding agencies in the development, consultation and implementation phases. As such, this report details the evaluation work undertaken to assess the extent to which each of these objectives has been realised.

A logic model for the evaluation is shown at Figure 1.

Figure 1. Logic model for the policy



NHMRC has conducted surveys and data analysis on the short-term impact of the policy change, particularly on the reduction of peer review burden. NHMRC has also analysed whether this change affects applicants differentially across various career stages or BRAs, although there are likely to be many confounding factors that might make it difficult to attribute any observed trends in the data to this change alone.

Appendix A contains the details of the evaluation activities that were undertaken.

NHMRC may, in the future, undertake a Phase 2 evaluation of the long-term impact of this change on research quality and on whether the sector is moving away from a 'publish or perish' approach to research and increasing its focus on the quality of research. Some surrogates for measuring this could be a follow-up survey (similar to that conducted in 2019 on research culture[1]), and/or exploring whether research institutions are embedding guidelines and standards to promote research quality.

[1] https://www.nhmrc.gov.au/research-policy/research-quality

Key findings

Key finding 1

The introduction of this policy did not appear to significantly change the application scoring pattern in 2022 in terms of Investigator level, gender, BRA, career disruption and career stage compared to the year before its implementation.

One of the overarching aims of NHMRC's current grant program is to provide opportunities for talented researchers at all career stages to contribute to the improvement of human health.

Accordingly, one of the objectives of implementing the policy was to help make assessment of publications equitable for applicants across all career stages and research fields, i.e., to ensure that the quantitative measure of the total number of publications was not providing an advantage to applicants of a certain career stage and/or research field.

The below statistical analyses[2] were undertaken to investigate whether the implementation of the policy had changed any scoring pattern in the 2022 Investigator Grants round.

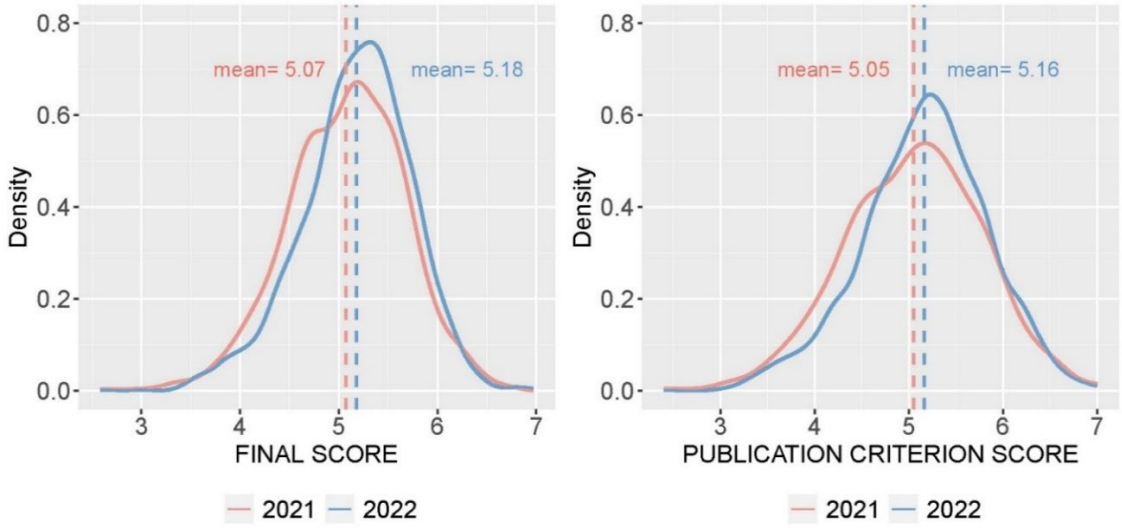
Overall score distribution

Figure 2 compares the distribution of application final scores and the Publication criterion scores between the 2021 and 2022 Investigator Grants rounds. There was an increase in the mean application final score from 5.07 in 2021 to 5.18 in 2022. The mean Publication criterion score also increased by 0.11 in the same period from 5.05 in 2021 to 5.16 in 2022.

The increase in the mean Publication criterion score could be due to the implementation of the policy, as the publication quality might have increased. However, the mean application final score also increased which implied that there might be an overall increasing trend in assessment criteria scores in the 2022 Investigator Grants.

[2] Methodological notes: (1) Where *italics* occur in the body of the text they denote exact quotes taken from survey respondents within the free-text survey questions. These quotes include any typographical or grammatical errors that respondents may have made; (2) Wherever the terms 'significance' or 'significant' are used, this refers to statistical significance at $p<0.05$.

Figure 2. **Distribution of application final score and Publication criterion score, 2021 versus 2022**

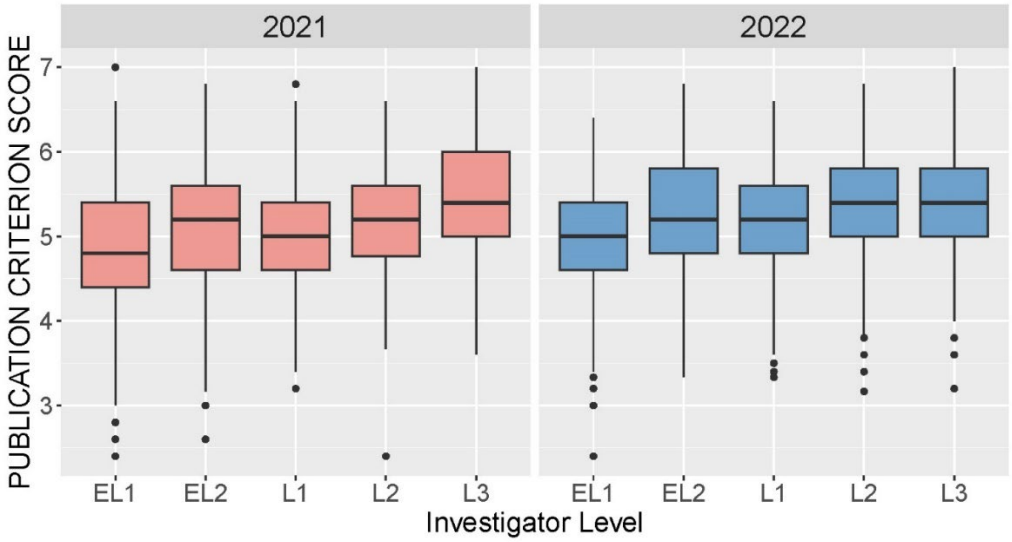


Publication score by Investigator level

The boxplots in Figure 3 compare the distribution of Publication criterion score by Investigator level in 2021 and 2022. The Investigator levels are: Emerging Leadership Level 1 (EL1), Emerging Leadership Level 2 (EL2), Leadership Level 1 (L1), Leadership Level 2 (L2) and Leadership Level 3 (L3).

Overall, the score distribution in each Investigator level showed relatively small changes from 2021 to 2022. The median score of EL1, L1 and L2 increased while that of EL2 and L3 decreased slightly during this period. The L3 Publication criterion score showed less variability in 2022 compared to that in 2021.

Figure 3. **Distribution of Publication criterion score by Investigator level in 2021 versus 2022**



Publication score by Chief Investigator A gender

Comparing 2021 and 2022 Publication criterion scores across the two gender groups showed a greater change in the mean Publication criterion score for the female applicant cohort, compared to male applicants (Figure 4). The mean Publication criterion score for female applicants increased significantly from 4.92 in 2021 to 5.08 in 2022 (Table 1) while the increase in mean Publication criterion score for male applicants (0.051) from 2021 to 2022 was not significant. Nevertheless, the mean Publication criterion scores for male applicants were higher than that for female applicants in both 2021 and 2022.

Figure 4. **Distribution of Publication criterion score by gender and year in 2021 versus 2022**

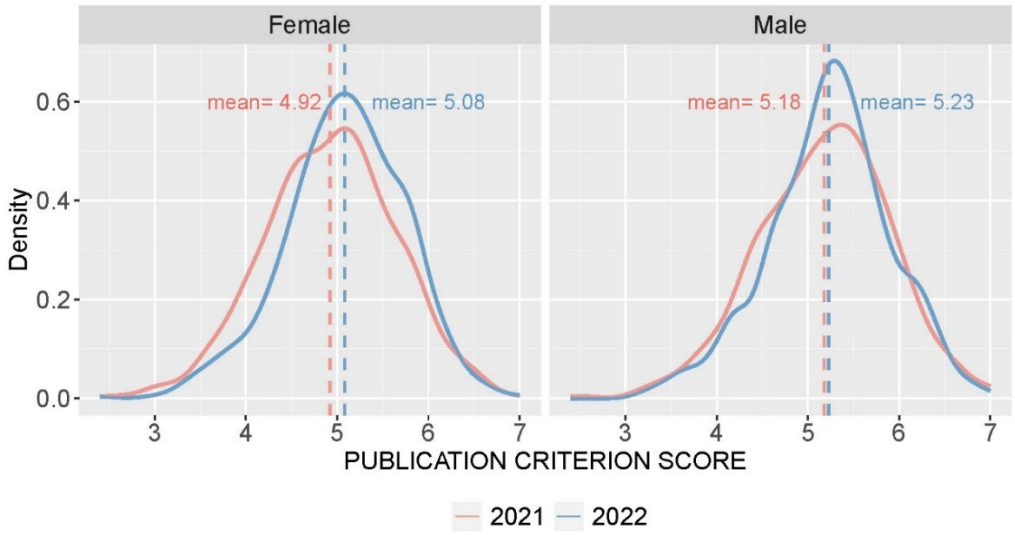


Table 1. **Summary of mean Publication criterion score by gender in 2021 versus 2022**

	2021	2022	Difference (2022-2021)	Sig. (2-tailed)
Female	4.923	5.083	0.160**	<0.001*
Male	5.178	5.229	0.051	0.144
Overall	5.050	5.162	0.112**	<0.001*

Publication score by Broad Research Areas

The distribution of the Publication criterion score for 2021 was compared to that of 2022 for each of the four individual BRAs:

- Basic Science Research
- Clinical Medicine and Science Research
- Health Services Research
- Public Health Research.

Results showed that the Publication criterion score distributions remained similar across the BRAs (Figure 5). The mean Publication score in Basic Science Research and Health Service Research increased by 0.166 and 0.211 respectively in 2022 compared to 2021. These differences were significant (Table 2).

Clinical Medicine and Science Research and Public Health Research had relatively smaller increases of 0.059 and 0.050, respectively, in 2022 compared to 2021, and the differences were not significant (Table 2).

Figure 5. **Distribution of Publication criterion score by BRA in 2021 versus 2022**

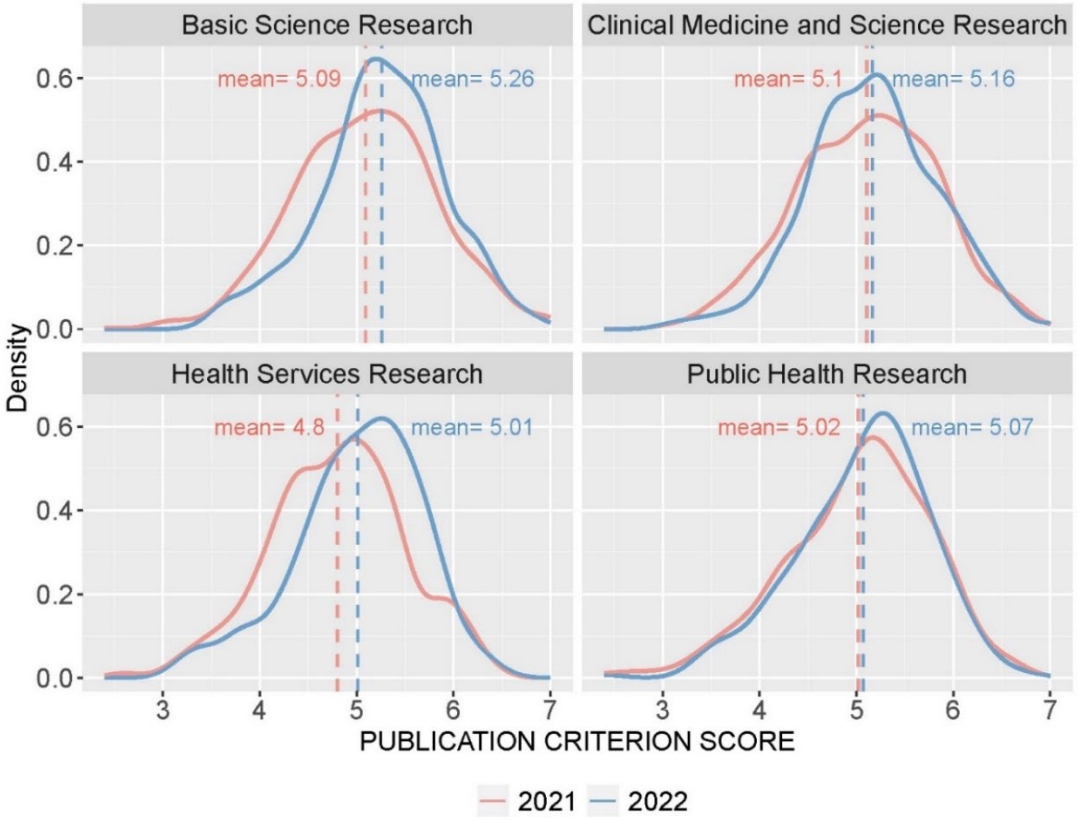


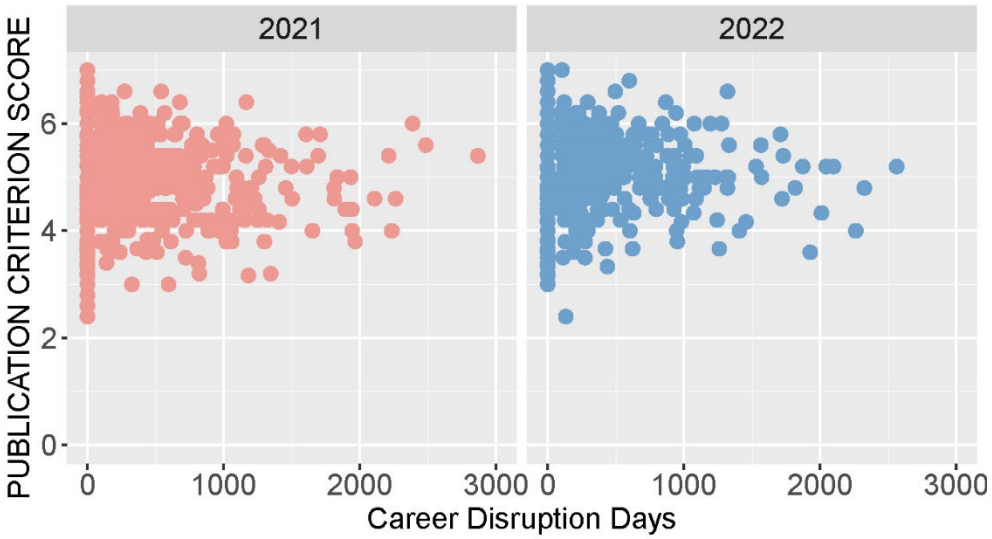
Table 2. **Summary of mean Publication criterion score by BRA in 2021 versus 2022**

BRA	2021	2022	Difference (2022-2021)	Sig. (2-tailed)
Basic Science Research	5.093	5.259	0.166	0.000*
Clinical Medicine and Science Research	5.105	5.163	0.059	0.167
Health Service Research	4.802	5.012	0.211	0.005*
Public Health Research	5.019	5.069	0.050	0.381

Publication score by career disruption

The scatter plots in Figure 6 show the correlation between Publication criterion scores and career disruption days in 2021 and 2022. In both years, most of the applicants had career disruption between 0 and 1,000 full-time equivalent (FTE) days and their Publication criterion scores were in the range between 4 and 6. There was no significant correlation between Publication criterion scores and career disruption days in either 2021 or 2022.

Figure 6. Publication score versus applicant's career disruption days[3] in 2021 versus 2022



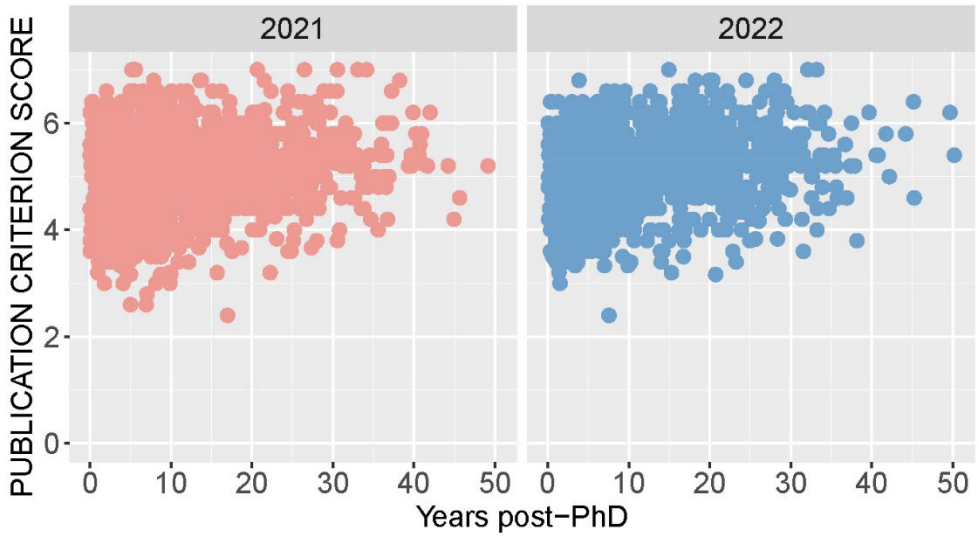
Publication score by career stage

Figure 7 shows the relationship between applicant's 'years post-PhD' and Publication criterion score. Publications criterion score displayed a small positive correlation with 'years post-PhD' in both 2021 (r=0.149) and 2022 (r=0.179).

[3] The career disruption data was sourced from the Investigator Grant application forms. Any period of career disruption claimed in the application that did not meet the criteria listed in the Investigator Grant guidelines were removed from the calculation of total career disruption days. The criteria of an eligible career disruption period were listed below:

- not be counted twice if there is overlap with another career disruption.
- only include periods since the award of the PhD even if this sits outside the last ten-year period.
- only include periods before the close date (any career disruptions after the application close date will not be applicable/considered in this funding round).
- involve a continuous absence from work of 90 calendar days or more, or continuous part- time employment (with defined % full-time equivalent, FTE) due to circumstances defined as a career disruption, with the absence amounting to a total of 90 calendar days or more.

Figure 7. **Publication score versus applicant's career stage (years post-PhD) adjusted for career disruptions, 2021-2022**



Key finding 2

Most peer reviewers supported the implementation of the policy and agreed that it helped emphasise the quality, instead of quantity, of publications.

Investigator Grants 2022 peer reviewers were surveyed about their attitudes to implementation of the policy as part of the scheme's annual Peer Reviewer Survey.

Of the 268 respondents, the majority (72%) agreed that assessing up to 10 top publications allowed them to focus more on research quality and the publications' contribution to science rather than the number of publications. Additionally:

- 75% of respondents agreed that the information provided in the application was adequate for assessing the applicant's contribution to the nominated publications.
- Approximately two-third of respondents agreed that the information provided in the application explanation field was adequate for the assessment of the publications' research quality and contribution to science.

The overall broad support for this policy amongst the cohort of peer reviewers were also reflected in their free text responses to the survey, with comments stating:

- *I thought this was an excellent innovation. It improved the quality of the applications and made it more equitable.*
- *This is such an important shift by the NHMRC. I really appreciated the opportunity to assess the quality and contribution rather than the metrics.*
- *The move toward top 10 is a great initiative, evening the playing field across applicants and focusing more on quality and contribution to science than quantity…*
- *I loved this years move away from number of papers and look forward to seeing further innovation to ensure the research and development work we do is evidenced and demonstrated through changes to practice resulting in improved health and wellbeing.*

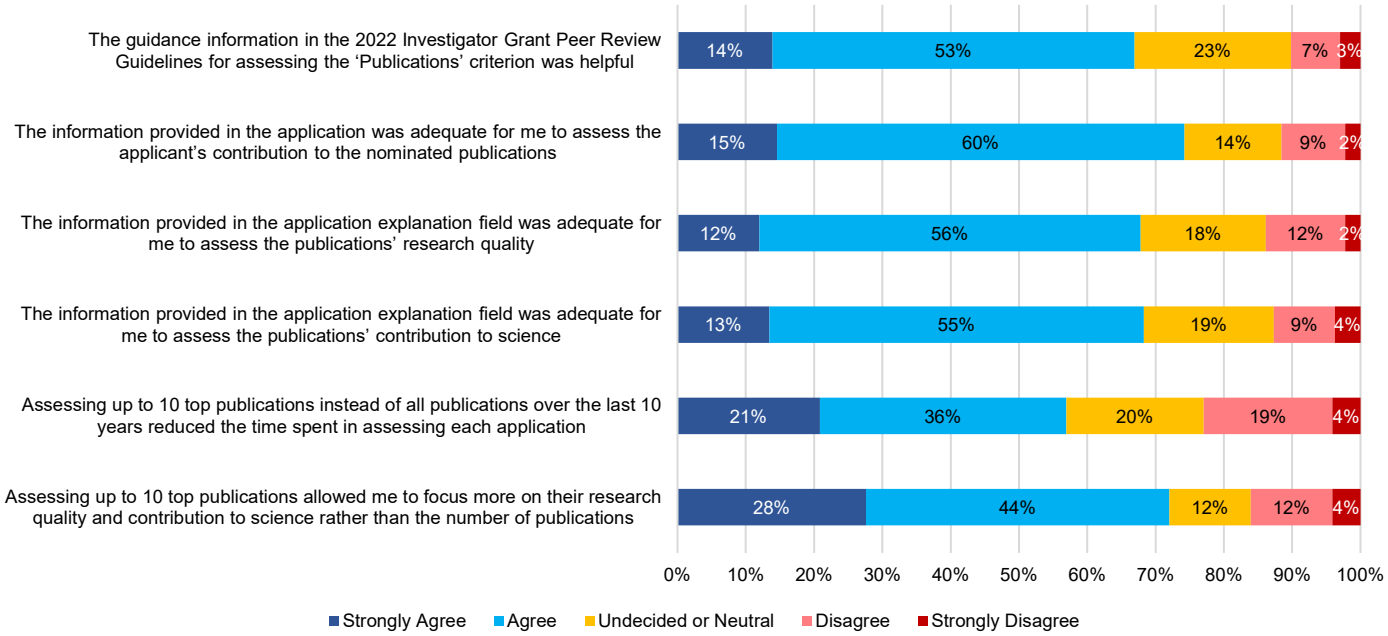
However, 28% respondents indicated that they were either undecided, neutral or disagreed that assessing up to 10 top publications allowed them to focus more on research quality and the publications' contribution to science rather than the number of publications.

Some responses noted:

- *…An investigator who hasn't done much in their career except publishing 10 high-quality publications in the last 10 years is deemed equivalent to a researcher who published 100 high-quality papers. The previous criterion was reasonable and made complete sense…*
- *Having the focus on the top 10 publications is fine, but I do not see why assessors can't also see a full list of publications in the last 10 years. I feel strongly that some very strong applicants were disadvantaged by this…*

Figure 8 presents the details of the survey responses from peer reviewers on the implementation of this policy and its impact of their assessment of the 'Publications' criterion.

Figure 8. **Investigator Grants 2022 Peer Reviewer survey responses**



Overall, there was strong support amongst peer reviewers for the policy being appropriate for the assessment of publications. Comments included:

- *Top 10 is better than full list of publications…*
- *The top 10 criterion is much better than the overall number of publications…*

However, some peer reviewers suggested that the assessment be restricted to top 5 for the EL1 category of applicants. Analysis of the number of publications showed that 17 out of 436 (~4%) EL1 applicants nominated fewer than 10 publications in 2022. Nine of the 17 applicants nominated 9 publications, with only one applicant nominating 5 publications.

Comments included:

- *I mentioned earlier but 10 papers was almost too many. Top 5 would be better.*
- *Top 10 is better than full list of publications. Although, I think this could be achieved with just the top5.*

Key finding 3

The policy has reduced emphasis on the total number of publications, journal impact factors and other similar quantitative metrics.

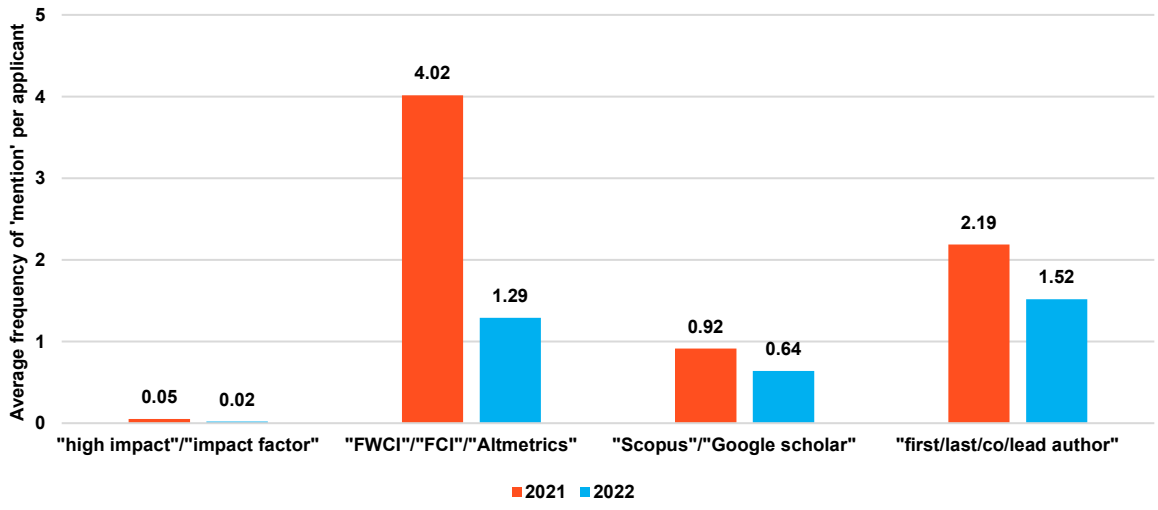
To determine whether the policy reduced the use of total number of publications, journal impact factors and other similar quantitative metrics, qualitative analysis was conducted on the free text justification applicants provided for selecting the nominated publications and their quality and contribution to science.

The resultant data showed that compared to applicants to the scheme in 2021, where the total list of publications across the past 10 years was also assessed, a reduction in the average frequency of mentions of the following terms was observed in the 2022 cohort of applicants:

- "high impact"/"impact factor": indicative of reliance on the quality of the journal, rather than the quality of the publication.
- "FWCI"/"FCI"/"Altmetrics": indicative of emphasis on citation metrics
- "Scopus"/"Google scholar": indicative of emphasis on citation metrics
- "first/last/co/lead author": indicative of reliance on author position rather than the quality of the publication.

Figure 9 highlights the average frequency of mention of the above terminology, as a surrogate for emphasis on quantitative metrics, in 2021 versus 2022.

Figure 9. Comparison of the use of quantitative metrics in the 'publication' free text field in 2021 versus 2022

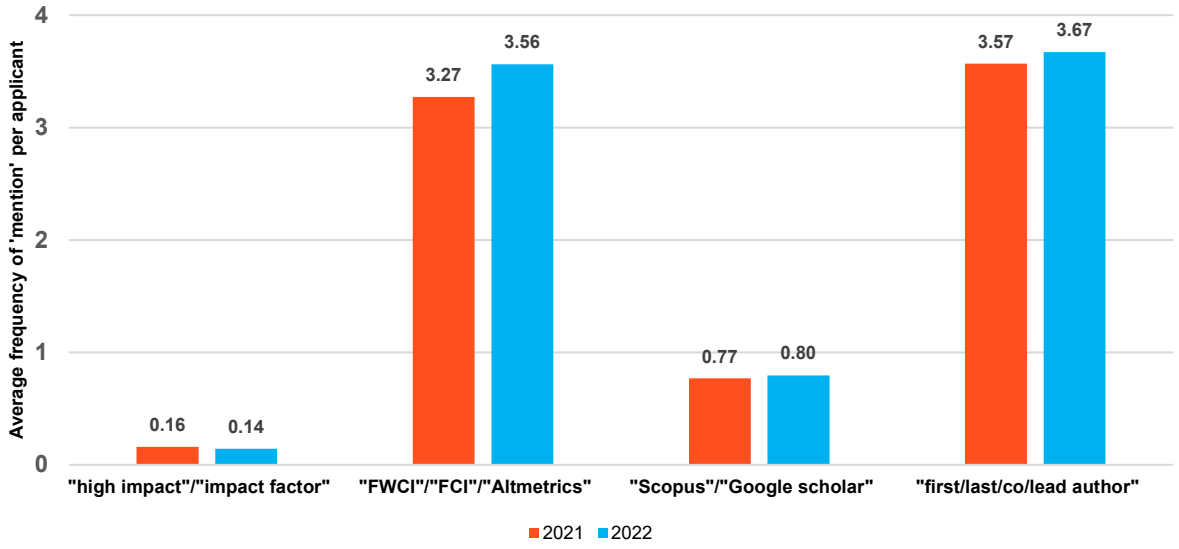


Noting that the Investigator Grants track record component comprises Research Impact as well as Leadership criteria (in addition to the Publications criterion), further analysis was undertaken to evaluate whether applicants mentioned quantitative metrics related to their publications in the free text responses for 'Research Impact' instead. This was of particular relevance as a majority of applicants select 'knowledge impact' as one of their impact types, of which publications are a significant component.

As such, the free text responses to the three Research Impact questions were combined and analysed to determine the average frequency of use of the above terminology.

The results of this analysis (Figure 10) showed that there was a minor increase in the use of quantitative metric terminology in the Research Impact free text fields.

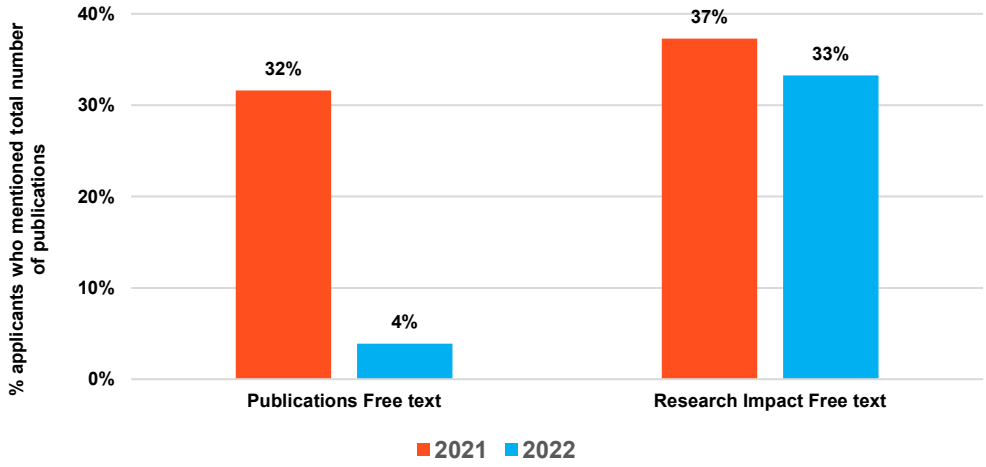
Figure 10. Comparison of the use of quantitative metrics in the 'Research Impact free text fields in 2021 versus 2022



Further analysis of the Publications and Research Impact specific free texts were undertaken to evaluate whether, contrary to advice and policy intent, applicants continued to mention their total number of publications in 2022, compared to 2021.

This analysis showed a decrease in the proportion of the applicant cohort who mentioned their total number of publications in the Publication free text field (32% in 2021 compared to 4% in 2022; refer Figure 11). There was also a decline in the proportion of applicants who mentioned their total number of publications in the Research Impact free text fields (37% in 2021 compared to 33% in 2022).

Figure 11. Comparison of the mention of total number of publications by applicants in the Publications and Research Impact free text fields in 2021 versus 2022



Fifty-five applicants (4%) did mention the total number of publications in their Publications free text in 2022 contrary to advice, indicating that further guidance to applicants might be warranted to ensure that this number continues to reduce in future years.

Overall, the results of the above analyses suggest that the policy has reduced emphasis on the total number of publications, journal impact factors and other similar quantitative metrics among applicants to the 2022 Investigator Grant scheme.

Key finding 4

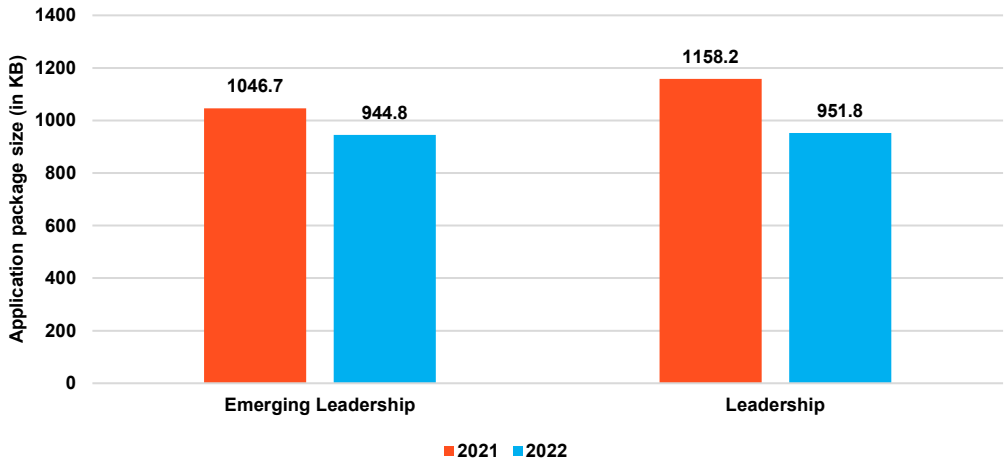
> Most peer reviewers considered that implementation of the policy led to a reduced burden, however 23% did not and some noted that in-depth assessment required careful consideration and time.

One of the intentions of the policy was to reduce burden on peer reviewers, noting that provision of the entire publication list for the past 10 years often meant that the size of the application package exceeded a hundred pages for senior applicants.

An analysis of the application package size in 2022 showed a marked decrease compared to 2021. Figure 12 highlights this difference, as measured by average file size (kilobytes). This translates to an average change in page numbers from 32.5 to 13.9 for Leadership level applicants, and 26.2 to 13.0 in the Emerging Leadership level applicants. The reduction in size for Leadership level applicants is greater, as would be expected given that they are likely to have more publications to report.

Standardising the number of publications across applicants in 2022 also resulted in minimising the variability of the application pack sizes, indicating that the total number of publications produced the highest degree of variability in application packages.

Figure 12. Comparison of the average application file size (kilobytes) in 2021 versus 2022



The results of the 2022 Investigator Grants Peer Reviewer Survey (Figure 8) also suggests that burden was reduced for many peer reviewers, with 57% of respondents agreeing that assessing up

to 10 top publications instead of all publications over the last 10 years reduced the time spent in assessing each application, compared to 23% who disagreed.

Those peer reviewers who disagreed noted in their free text responses that in-depth assessment of publications often required further nuance, and consequently no less time.

Some comments highlighting this issue were:

- *I think having only 10 publications increased the time spent on assessing each application as it required much more nuance. Publication quality is still difficult to assess; in reality it would mean going to the publication in question as the explanations provided by the applicant at times do not readily match…*
- *…however, it takes time to review the explanation for each publication in order to adequately evaluate quality & contribution - so overall there is no less time (and sometimes more) involved in this process. Overall, however I think this is an improvement…*

Opportunities

Opportunity 1

Improve guidance to applicants on the 'quality and contribution' section of the application

One of the recurrent themes identified in the free text responses from the 2022 Investigator Grant Peer Reviewer Survey was the variability amongst applicants in the manner with which the Publications criterion was approached.

Some comments included:

- *The justification section of some applications was less structured and more difficult to assess, likely because the candidates did not have as much coaching as others on how to write this section.*
- *Depended on what the applicant wrote- many people just focussed on how the paper had helped their own research program/career rather than the value to others*
- *Directions that are more clear would help candidates prepare their responses.*
- *However, I think much more guidance should be given to assessor's and applicants about what information to include…There was extraordinary variation in what applicants wrote in the section…*
- *The information provided by applicants varied widely and was limited by word count.*

- *The use of the space to describe publications and the role of the applicant was quite variable across applications. There were quite a few who resorted to Journal-level comments rather than addressing the paper itself and likewise some very different interpretations of what constitutes a "high quality journal".*
- *But some people did not include FWCI but journal rankings. Also some people may not have chosen well as all middle author papers so hard to tell if leading other work and just selected those ones as most impactful. More advice to applicants could help*

Qualitative data analysis conducted by NHMRC also highlights the extent of this issue, with applicants still mentioning their total number of publications, journal impact factors, journal prestige, etc. rather than the quality of the publication in question (see Figures 7, 8 and 9).

Notably, 2022 was the first year that this change was implemented. Consequently, as the sector achieves further familiarity and experience with the policy, a decrease in the variation observed is likely.

However, there remains an opportunity for NHMRC to further improve its guidance to applicants on shifting the focus away from the journal in which a research article is published, to the content of the article itself.[4]

Opportunity 2

Continue to monitor the implementation of this policy and its impact on the Investigator Grant scheme for the next two years.

As a corollary to Opportunity 1 (improving guidance to applicants), similar guidance may also be imperative for peer reviewers, for them to appropriately assess the Publications criterion.

NHMRC's guidance to peer reviewers advises them to review publications on their 'quality', the author's individual contribution to the publication and the publication's contribution to science. The category descriptors for the assessment of the 'Publications' criterion are at Appendix B.

[4] Assessing research on its own merits, rather than on the basis of the journal in which the research is published, is a key principle of the San Francisco The Declaration on Research Assessment (DORA).

However, some peer reviewers note:

- *Some applicants provided excellent evidence of contribution, and research quality whereas many provided only scant detail. It is not clear what the role of the reviewer is in verifying all information provided (or not provided). Metrics may be a good way to benchmark, but only if all applicants provide the same or similar metrics. Claims about the applicants role in the research are less believable if a generic statement is used for all 10 publications*
- *Really it is still gut feel. The guidelines are not very specific and the qualitative descriptors are not really different enough to help.*
- *I was unclear exactly how to benchmark someone who had e.g. 7 papers listed in total (all high quality, excellent research contribution), compared to someone who had 10 listed (most high quality, some not so/middle author)...more guidance on that would be useful...*

Additionally, comments from peer reviewers in the 2022 Investigator Grant Peer Reviewer Survey also note misconceptions that are often contrary to NHMRC policy that still exist amongst the sector. Some examples are included below.

- *Assessing candidates, I also wanted the following information (and sought it via SciVal/Google Scholar): FWCI, total publications, h index.*
- *Focusing on the top 10 publications is a good idea, but it would also be useful to have a summary of the applicant's publication record, e.g. total number of publications, number of first and last author paper, number in Q1, or other metrics.*
- *While quality is important, the number of publications should also count.*
- *There were occasions when I had to google to check the quality of journals...*
- *Application assessment should be done by NHMRC staff using criteria like h-index, IF, citation indices, etc. This is what I have to do now by myself.*

NHMRC's guidance to peer reviewers could be strengthened by including guidelines and principles for identifying 'quality research' which are independent of journals in a particular field and could be applied to all fields. For example, peer reviewers could be advised to focus on the creativity and innovation of ideas, rigour of experimental design, statistical significance of findings, reproducibility of results, analytical strength of interpretations and significance of outcomes, all of which serve as surrogates for measuring research quality of a publication, irrespective of the field of research.

Recommendations

Recommendation 1

> Continue to monitor the implementation of this policy and its impact on the Investigator Grant scheme for the next two years.

Based on the results of the survey and other data analyses presented above, it can be concluded that the implementation of the policy in the 2022 Investigator Grant scheme:

- supported NHMRC's policy of emphasising the quality, not quantity, of publications and drive sectoral change to value research quality rather than quantity of publications
- helped make assessment of publications equitable for applicants across all career stages and research fields
- reduced peer reviewer burden.

As such, it is recommended that the policy be implemented unchanged for at least another two consecutive years prior to making any further changes.

Although reducing the number of publications for the EL1 category could potentially be worth considering, it is not recommended at this stage as analysis of the number of publications showed that only 17 out of 436 (~4%) EL1 applicants nominated fewer than 10 publications in 2022. Nine of the 17 applicants nominated 9 publications, with only one applicant nominating 5 publications.

Recommendation 2

> Improve guidance to both applicants and peer reviewers on the drafting and assessing of quality and contribution of science of publications, respectively.

NHMRC should consider including further explicit guidance to applicants discouraging the mention of total numbers of publication and journal-impact related metrics.

Additionally, there is an increasing number of resources available to editors and peer reviewers for responsible assessment of research manuscripts. These include the Open Reviewers Toolkit[5] created by PREreview in 2021, the European Research Commission's 2021 scoping paper Towards a reform of the research assessment system,[6] innovative indices such as the Research Quality Plus

[5] Foster, A., Hindle, S., Murphy, K. M., Saderi, D. (2021). Open Reviewers Bias Reflection Guide. Zenodo. https://doi.org/10.5281/zenodo.5484052; Foster, A., Hindle, S., Murphy, K. M., Saderi, D. (2021). Open Reviewers Reviewer Guide. Zenodo; https://doi.org/10.5281/zenodo.5484087; Foster, A., Hindle, S., Murphy, K. M., Saderi, D. (2021). Open Reviewers Review Assessment Rubric. Zenodo. https://doi.org/10.5281/zenodo.5484072;

[6] Directorate-General for Research and Innovation. 2021. Towards a reform of the research assessment system

Scoping report. European Commission. https://op.europa.eu/en/publication-detail/-/publication/36ebb96c-50c5-11ec-91ac-01aa75ed71a1/language-en

(RQ+)[7] developed by the International Development Research Centre (IDRC) in Canada, and other resources that provide advice on downplaying indexes and boosting quality of research .

Previous advice received from NHMRC's Research Quality Steering Committee also indicate that aspects of The Hong Kong Principles for assessing researchers[8] (responsible research practices; transparent reporting; open science; diversity of research; and recognition of all contributions to research) could apply to the assessment of publications by NHMRC peer reviewers.

Recommendation 3

> Conduct Phase 2 of this evaluation work once the policy has been implemented for three consecutive years.

ONHMRC should consider undertaking Phase 2 of this evaluation work once the policy has been implemented in the Investigator Grant scheme for three consecutive years to ensure policy stability, manage change fatigue and minimise confusion among applicants and peer reviewers.

A list of possible evaluable questions for Phase 2 of this evaluation work is provided at Appendix C.

[7] McLean R, Ofir Z, Etherington A, Acevedo M, and Feinstein O, 2022. Research Quality Plus: Evaluating Research Differently. IDRC, https://idrc-crdi.ca/en/rqplus

[8] Moher D, Bouter L, Kleinert S, Glasziou P, Sham MH, Barbour V, et al. (2020) The Hong Kong Principles for assessing researchers: Fostering research integrity. PLoS Biol 18(7): e3000737. https://doi.org/10.1371/journal.pbio.3000737

Appendices

Appendix A – Evaluable activities

Evaluable activities for this evaluation project occur within those stages of each Investigator Grant scheme round associated with publication assessment. Overall, each round occurs through the following stages:

1. The grant opportunity opens: NHMRC publishes the grant guidelines on GrantConnect.
2. Application phase: applicants must complete the application form and address all eligibility criteria to be considered for a grant. Applications are verified against eligibility criteria and applicants are notified if not eligible.
3. Assessment phase: peer reviewers – informed by the Peer Review Guidelines – assess applications against the assessment criteria.
4. Grant decisions are made; NHMRC's CEO seeks approval of funding recommendations from the Minister for Health, then NHMRC notifies applicants of the outcome.
5. Delivery of grant: Grantees undertake the grant activity. NHMRC manages the grant through the relevant administering institution.

The components of the process in scope for this evaluation occur within the Application phase and the Assessment phase.

Application phase

During this phase, applicants must complete the grant application form and address all eligibility criteria to be considered for a grant.

The application form includes several fields to be completed. Among these that are relevant to this evaluation are:

- ***Descriptive information about the project***, including Field of Research (FoR) and BRA.
- ***Career stage and overview***, where the applicant indicates their status as an early or mid-career researcher (EMCR), which is necessary information for peer reviewers as they will use different scoring structures for 'Leadership' and 'Emerging Leadership' (i.e. <10 years post-PhD).
- ***Publications***, where applicants are required to nominate up to 10 publications from the past 10 years (taking into account any career disruptions) and to provide separate explanations for each, explaining why the publication was selected, including its quality and contribution to science, and the applicant's contribution to the publication. Applicants may include field weighted citation metrics in the explanation field. An 'overall contribution to science' free text box is also provided at the end of this section.

NHMRC accepts 10 types of publications: Accepted for Publication; Books/Chapters; Editorials; Journal Articles (Original Research); Journal Articles (Review); Letters to the Editor; Preprints; Research Report – commissioned by Government, Industry or Other; Technical Report; and Text Book.

Prior to the 2022 round of Investigator Grants, applicants also provided their full list of publications from the past 10 years (taking into account any career disruptions).

Assessment phase

In this phase, peer reviewers assess information provided in the application using assessment criteria, which for Investigator Grants are:

- Knowledge gain (30%).
  - Here the applicant must describe the project being applied for.
- Track record, relative to opportunity (70%), including selected Level (i.e. Leadership/Emerging Leadership)
  - Here the applicant must describe their past research work and what it has led to.
  - Track record assessment comprises consideration of:
    - Publications (35%)
    - Research impact (20%)
    - Leadership (15%).

During the assessment phase, peer reviewers assess applications against the assessment criteria including an overall consideration of value with money. All assessments are on a seven-point scale as follows: (1) weak or limited; (2) satisfactory; (3) good; (4) very good; (5) excellent; (6) outstanding; (7) exceptional.

Appendix B – Category descriptors

Publications (35%)

Publication assessment focuses on up to 10 of the applicant's top publications in the past 10 years (taking into account career disruptions), supported by applicant explanations for each nominated publication. Assessment of publication track record will focus on the quality of the research and contribution to science rather than the quantity of publications.

Table 1. **Category descriptors**

Score	Performance indicator	Category descriptors
7	Exceptional	Relative to opportunity (including career stage) and to their field of research, the applicant demonstrates: • an exceptional record of publications in terms of quality and contribution to science
6	Outstanding	Relative to opportunity (including career stage) and to their field of research, the applicant demonstrates: • an outstanding record of publications in terms of quality and contribution to science
5	Excellent	Relative to opportunity (including career stage) and to their field of research, the applicant demonstrates: • an excellent record of publications in terms of quality and contribution to science
4	Very Good	Relative to opportunity (including career stage) and to their field of research, the applicant demonstrates: • a very good record of publications in terms of quality and contribution to science
3	Good	Relative to opportunity (including career stage) and to their field of research, the applicant demonstrates: • a good record of publications in terms of quality and contribution to science
2	Satisfactory	Relative to opportunity (including career stage) and to their field of research, the applicant demonstrates: • a satisfactory record of publications in terms of quality and contribution to science
1	Weak or limited	Relative to opportunity (including career stage) and to their field of research, the applicant demonstrates: • a weak or limited record of publications in terms of quality and contribution to science

Appendix C – Possible evaluation questions for Phase 2

Below is a series of questions that will provide a focus for Phase 2 of this evaluation work. Some of these questions may require ongoing and future data to answer robustly in the context of future evaluations.

Accompanying each question, in square brackets, is an indication of how the question might be answered, making reference to three evaluation methodologies by number (i.e. [1]=desk-based research, literature review and expert feedback, [2]=survey, [3]=application and peer review data analysis).

Guidance and Category Descriptors

- Are NHMRC's guidance to peer reviewers on the assessment of applications still relevant and appropriate? [1,2,3]
- Do applicants and peer reviewers find the concepts of 'research quality' and 'contribution to science' useful when assessing publications? [1,2]
- How confident are peer reviewers in their use of the Category Descriptors? What changes might be made to improve their usability? [1,2]

Peer Review

- Which surrogate measures of research quality do peer reviewers use in the assessment of publications (e.g. significance of findings, reproducibility of results, analytical strength of interpretations and significance of outcomes)? [1,2]
- Are peer reviewers considering publication statistics such as citation metrics? Are peer reviewers still relying on the reputation of the journal (contrary to advice and policy intent)? [1,2]
- Are there any significant changes to the score for the 'Publications' criterion for returning applicants (noting that any difference in scores may be due to inclusion of more recent publications)? [3]
- Do peer reviewers read the up to 10 publications nominated by each applicant or rely solely on the justification provided? [2]

Career stage

- Are 10 publications across the past 10 years enough for peer reviewers to form a sound judgement on the track record of applicants, particularly at the higher leadership levels? Are there differences in scores in the publication criterion at the higher leadership levels? [1,2]
- Should Emerging Leadership level applicants be asked to provide a lower number of top publications for assessment? [1,2]

Changes to researcher or institutional behaviour

Is the change to the assessment of publications changing researcher behaviour? [1,2,3]

- Are researchers participating in fewer projects?
- Are researchers publishing fewer number of papers every year?
- Are researchers increasing their focus on the research quality and contribution to science of their projects/publications?
- Are EMCRs feeling less pressure to publish to establish their careers?
- Is there an increase in the registration of studies in publicly available repositories?
- Are there any trends in the publication categories of the top 10 publications provided by applicants? Is there a move away from traditional journal-based research articles? Is there an increase in the number of preprints?
- Are research institutions embedding guidelines and standards to promote research quality, and/or altering conditions for appointment or promotion?
- Are there any other changes to the publication patterns of researchers? Is this specific to certain fields and/or BRAs?
- Are any undesirable outcomes occurring? If so, what are these?