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Evaluating Grant Peer Review in the Health Sciences

A review of the literature

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Summary

More than 95% of the £2 billion of public funding for medical research each year in the UK is allocated by peer review. Long viewed as a respected process of quality assurance for research, grant peer review has lately been criticised by a growing number of people within the scientific community and without. Detractors highlight its perceived inefficiency and structural flaws that compromise its effectiveness in allocating funding. This report presents the findings of a wide-ranging literature review to evaluate these criticisms. It concludes with a discussion of some modifications to the peer review process to address some of them.

What is grant peer review?

In its most basic form, peer review involves external (and sometimes internal) academic reviewers in the process of deciding which applications to a funding body are rewarded with financial support. In this report, we focus on grant peer review as a *prospective* process rather than one that judges the quality of research *ex post*. Reviewers' comments on an application may be returned to investigators for amendment; this iterative process can continue for several rounds before a final decision on worthiness for funding is made.

There are typically three stages to any peer review process:

1. A triage stage – in which applications that clearly do not meet the criteria of the funding body concerned are rejected;
2. A review stage – in which proposals are reviewed, by individuals or committees, and assessed for their quality. Dimensions of quality included in the assessment may include methodological rigour, the originality of the research proposal and the prior record of the investigators involved;
3. A decision phase in which the final outcome of the review process is relayed to the applicants.

Is peer review of grants in the health sciences a good thing?

Robustly evaluating the strengths and weaknesses of grant peer review in the health sciences is difficult. Whether because of peer review's established reputation, or its centrality in the medical sciences, very few studies have provided *empirical* grounds either for its censure or continued support. It is particularly difficult to evaluate for efficiency and effectiveness since the definition of these terms vary between stakeholder groups and the operational priorities of the funder. Nevertheless, we have conducted an assessment of the

strength of the evidence supporting a number of key criticisms made of the grant peer review system for the health sciences. The results are presented in the table below.

| Evaluation question | General critique | Particular criticism(s) | Is the criticism valid? | Strength of the evidence base (1 = weak; 5 = strong) |
|---|--|---|-------------------------|--|
| Is peer review an efficient system for awarding grants? | Peer review is an inefficient way of distributing research funding | High bureaucratic burden on individuals | Unclear | 2 |
| | | High cost | Yes | 4 |
| | | Doubtful long-term sustainability | Unclear | 2 |
| Is peer review an effective system for awarding grants? | Peer review does not fund the best science | It is anti-innovation | Unclear | 2 |
| | | It does not reward interdisciplinary work | Unclear | 2 |
| | | It does not reward translational/applied research | Unclear | 2 |
| | Peer review is unreliable | Ratings vary considerable between reviewers | Yes | 4 |
| | Peer review is unfair | It is gender-biased | Unclear | 3 |
| | | It is age-biased | No | 4 |
| | | It is biased by cognitive particularism | Unclear | 3 |
| | | It is open to cronyism | Unclear | 3 |
| | Peer review is not accountable | Review anonymity reduces transparency | Yes | 4 |
| | Peer review is not timely | It slows down the grant award process | Unclear | 2 |
| | Peer review does not have the confidence of key stakeholders | | No | 4 |

How might peer review be improved?

Potential modifications to the grant peer review process may be considered to improve efficiency or effectiveness. With respect to efficiency, for example, improvements could be brought about by *moderating demand* to ensure that the number of applications received is kept below a certain threshold – thus reducing the burden on reviewers and applicants. This could be achieved by (i) reducing advertising; (ii) changing deadline systems for funders that use fixed milestones for submission; or (iii) limiting the number of applications from particular institutions. It may also be possible to *streamline assessment procedures* using tighter systems of triage on applications received.

With respect to effectiveness, there may be other ways of *supporting the “best” research*. The Defense Advanced Research Projects Agency (DARPA) in the United States appoints expert individuals to head research programs in specific streams under its remit. Each

program leader then assesses the strength of applications for funding, individually. This helps ensure high responsiveness and significant resource allocation in a short period of time to potentially high impact projects. On the other hand, the DARPA model is arguably less accountable than current peer review systems; furthermore, its track record of successful outcomes can best be described as patchy. At the Canadian Health Services Research Foundation (CHSRF) by contrast, a broad range of stakeholders (including lay people and policymakers) are involved in the review process to ensure that it is as representative as possible.

A full list of possible modifications is outlined in the table below.

| Modification category | Type of change | Discrete policy options | Advantages | Disadvantages |
|-------------------------|--|--|---|--|
| Improving efficiency | Moderating demand (input-level change) | Reducing advertising | Insufficient evidence to draw clear conclusions | Insufficient evidence to draw clear conclusions |
| | | Changing deadline system for those funders that use fixed milestones | Anecdotal evidence suggests load on reviewers is reduced; quality of applications may be higher | No evidence that this reduces demand |
| | | Limiting number of applications from particular institutions | Studies suggest savings may be considerable | Savings may be lost if proposals become more complex |
| | Streamlining assessment procedures | Triage | Eliminates incomplete or ineligible applications | Involves pre-screening applicants at the least transparent stage of the review process |
| | Consolidating grant awards | Longer grant durations | Insufficient evidence to draw clear conclusions | Insufficient evidence to draw clear conclusions |
| | | Awarding grants to larger research groups | Insufficient evidence to draw clear conclusions | Insufficient evidence to draw clear conclusions |
| Improving effectiveness | Supporting the 'best' research | Supporting innovation: the DARPA model | Strong incentive to support high risk but potentially high dividend research | Poor transparency; indifferent record of success |
| | | Supporting translational research: the CHSRF model | Improves links between researchers and decision-makers by building the latter into review process | Insufficient evidence to draw clear conclusions |
| | Improving fairness | Blinding | Helps avoid most egregious cases of discrimination | Anonymisation may not be possible for all research proposals |
| | Strengthening reliability | More effective training for reviewers | Insufficient evidence to draw clear conclusions | Insufficient evidence to draw clear conclusions |
| | Improving accountability | Signing | Increases accountability to researchers | No evidence that it is effective |

Other, more radical modifications to the peer review process – and indeed alternatives to it – are beyond the scope of this report. A fuller discussion of alternatives to peer review is provided in a forthcoming RAND Europe document.