A systematic map and review of changes to peer review to help build the evidence base for peer review innovations

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Aims of the systematic map & review

To map and summarise current evidence about peer review innovations

Scope:
Peer review of health applications for funding

Exclusions:
• Outside health care
• Peer review of articles etc.
• No empirical data in report
Model of peer review process and potential innovations

Sandpit process
Team forming, storming, pitching and peer review

- Funding decision
- Successful project
Some potential metrics for judging peer review innovations

Potential review quality metrics:

• Consistency in report scores (?)
• Completeness of report
• Perceived report quality: to Board, to applicant
• Accuracy at predicting Board decision, project success, project impact
• Resistance to bias against specific methods, applicants, organisations, innovative proposals
Some potential metrics for judging peer review innovations

Potential review **efficiency** metrics:

- Funder effort or costs per completed report
- Report return rate
- Median time taken to return report
- Percent of reports contributing useful information to Board decision
Systematic map of peer review studies

1824 references screened, 83 studies included:

- 50% from USA
- 50% other (mainly Australia, Canada & Europe)

Study types:
- 61% observational
- 31% surveys, interviews or focus groups
- Only 7% were experimental evaluations
Systematic map of peer review studies

Range of peer review innovations studied:
- Scoring /ranking approaches (12%)
- Alternative reviewer configurations (12%)
- Identifying peer reviewers (7%)
- Involvement of patients/public (6%)
- Simplified or accelerated peer review (6%)
- Incentives for peer reviewers (1%)
- Methods to improve peer reviewer response rates (0%)

Measures and metrics studied:
- Stakeholder opinions (30%)
- Ability of peer review to identify successful research (22%)
- Bias in peer review (20%)
- Consistency in review scoring/judgements between reviewers (18%)
- Other (22%)
Systematic review of studies

Focus on 8 studies on efficiency and effectiveness (Australia, Canada, USA)

Results:

• **Shortened proposals / simplified processes** (3 studies): reduced overall PR time; variable reliability between approaches; some cost savings

• **“Virtual PR” - videoconferencing / teleconferencing** (2 studies): similar outcomes to face-to-face meetings & can result in time and cost savings. But some disadvantages

• **Delphi-type consensus approach** (1 study): promising for selecting innovative proposals in a specialist area

• **Training video** (1 study) improves reviewers’ accuracy in scoring proposals

• **Involvement of patients and care-giving stakeholders alongside scientists** (1 study): beneficial to overall perspective of PR

**Overall conclusions:** Some promising PR innovations are available, but limited detail on results; poor quality evidence; heterogeneity; variable generalisability to NIHR
Conclusions and recommendations

• Shorter proposals and virtual peer review meetings offer promise in speeding up peer review and reducing costs; considerable uncertainty remains on how this impacts quality and effectiveness of peer review

• More robust studies of efficiency and effectiveness are needed, comparing a wider range of innovations

• Study methods and settings were poorly reported in all eight studies, hindering assessment of generalisability

• We recommend that peer review innovations should be described more comprehensively and evaluated more rigorously
An evaluation of NIHR peer review processes

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Also: A Bull, F Chinnery, E Guegan, J Hinks, J Lathlean, N McArdle, B Moran, L Worswick, J Wyatt

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Process evaluation with NIHR stakeholders

• Stakeholder views: research funding applicants, peer reviewers, funding board members, secretariat staff

• Opinions on:
  - current peer review process at NIHR (external to board meeting)
  - potential changes or innovations which could help to determine what an alternative or improved peer review system might look like

• Thematic template method to analyse and summarise data

• Interviewees were supportive of the need for peer review

• Generally felt current processes were working well
Suggestions for changes:

Reduce the time commitment and volume of paperwork:
Ask reviewers to comment on - **importance** of study; - **strengths and weaknesses** of application; - and “**fixable flaws**”.
And only from within their area of expertise.

- “I do wonder about ... asking reviewers to focus on particular areas... if I knew what NIHR were looking to me for, I can ... focus on the bit you’ve asked me to look at. That would be helpful as it would be less daunting in [terms of] the potential workload.” (Reviewer)

- “Simple approach, 2-3 key questions to respond to: i. “Importance of study”, ii. “methodological quality/research methods”, iii. “strengths and weaknesses of proposal.” (Board member)

- “Process should allow for separating out major problems from fixable flaws.... particularly important in commissioned stream.” (Board member)
Suggestions for changes:

Reduce time commitment and volume of paperwork - Develop a more proportionate process with the number of reviewers reflecting the cost and content of an application

- “[Ask] fewer more highly selected reviewers ... people with selected experience so they have a good grasp of what is important and what is not.” (Applicant)

- “We always have at least 3, usually 5, sometimes more. It’s not fair if only a couple. Whilst 3 is a good number, 5 is not particularly useful ... An ideal number depends on what they say and how extensive it is; if it’s all the same [this is not necessarily] a major advantage for people on the panel. If reviews are brief then 3 is not enough.” (Board member)

- It is difficult trying to balance all of this information ... and Board members can be swamped with overwhelming amounts of info.” (Board member)
Suggestions for changes:

Give reviewers more feedback, guidance and training

• “It feels that it is left down to reviewer as to the extent of what they look at... and what reviewers feel they are there to do.” (Board member)

• “[It would] be quite useful to get specific feedback to see if ... the review is useful, so I can pitch it [the next review] at the right level.” (Reviewer)

• “I never had any training on how to peer review grants. Maybe if you offered a day where people came ... and learnt how to be good peer reviewers then they might be more confident to say yes when they’re asked ... I’d like to hear from a chair on an NIHR panel: what makes a really useful review.” (Reviewer)
Evaluating the quality of review reports: Comparing reviewer and board scores

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Plot of mean reviewer vs. Board scores
Culture differences in peer review

ROC curves for different types of NETSCC review
Reviewer and board scores – conclusions

• Overall, no clear boundary between scores which result in funding and those that are rejected

• Limitations to this analysis: reviewer usually scores one proposal, Board members compare multiple proposals and aim for consistency; Board considers reviewer comments and score

• Board scores are excellent predictor of outcome; average reviewer scores are only a fair predictor

• Influence of reviewer scores is fair and similar from 4 to 7+ reviews - suggesting sometimes 4 reviews may suffice