Effectiveness of peer review

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Goals of authors and editors

- Advancement of scientific understanding and improvement in treatment and prevention of disease
- Poor research is the fault of authors
- Poor research and fraud could be less likely if research were not a career necessity for physicians
Errors in medical articles

- Poor research that has survived the peer-review process
- Peer review should weed out serious methodological errors
Functions of peer review

- Filtering out incorrect or inadequate work
- Improving accuracy and clarity of published reports
Efficacy

- Good evidence
  - Deficiencies
- Poor evidence
  - Benefits

- Expensive, slow, prone to bias, open to abuse, and unable to detect fraud
Readability of articles

- 101 manuscripts before and after peer review
- Gunning fog index and Flesch reading ease score
- Readability scores improved significantly
- But both remained difficult to read at publication
  - Roberts, Fletcher, Fletcher. JAMA 1994
Detecting mistakes

- 420 reviewers
- Modified a paper accepted for publication introducing 8 areas of weakness
- Number of weaknesses found - 2
- No differences between groups
  - JAMA 1998
Quality of peer review

- No formal training available

- Attempts to improve quality
  - Blinding reviewers
  - Rating reviewers
  - Checklists
  - Workshops for reviewers
Type of reviewer

- Author-recommended reviewers vs editor-identified reviewers
- Grades assigned by author-recommended reviewers better
  - 2-3 times more likely to assign high grade
  - Recommend publication
- Clustering of grades
- Recommended use of rating relative to other manuscripts in the same field
  - Chance, Concurrence, and Clustering
  - Reviewers' Recommendations on 1,000 Submissions to JCI
Effect of blinding reviewers

- **Expectation**
  - Decrease bias

- **Facts**
  - Better quality after blinding
    - 127 consecutive manuscripts
    - Two external reviewers
    - Blinding successful for 73%
    - Quality of reviews higher for blinded manuscripts (3.5 vs 3.1 on a 5-point scale)
    - 43% of reviewers signed their reviews
      - McNutt, Evans, Fletcher, Fletcher JAMA 1990

- **Difficulty**
  - Blinding reviewers, esp. in specialty journals
Masking and blinding

- 527 manuscripts in BMJ randomized
- Two reviewers
- Review quality assessed by two editors and corresponding author
- No difference in assessment between
  - Masked and unmasked groups (2.82 vs 2.96)
  - Blinded and unblinded groups (2.87 vs 2.90)
- Reviews recommending publication were scored more highly
  - Van Rooyen, Godlee, Evans, Smith, Black. JAMA 1998
Blinding on acceptance

- Blinded reviewers and editors gave better scores
- Blinded reviewers provide more unbiased reviews
  - Fisher, Friedman, Strauss. JAMA 1994
Open review

- Authors and reviewers in equal positions and for increasing accountability
- Protocols of systematic reviews on the web together with software that allows anybody to comment in a structured way—so long as they give their names
  - Cochrane
Open peer review

- Identity of authors and reviewers known

Arguments in favor

- Increased accountability
- Fairness
- Transparency
- Leads to better quality reviews
- No evidence that anonymous peer review is superior
Identity of reviewers known

- Increases credit and accountability
  - Most reviewers agreed to be identified, and most authors favor open peer review
- If reviewers have to sign their reviews
  - Put more effort
  - Produce better reviews
  - (?? blunt their opinions for fear of causing offence)
  - More reviewers will decline to review if their identity will be revealed to authors
Exchanging comments of reviewers

- Indian and non-Indian reviewers
- 100 manuscripts to pairs of peer reviewers
- Non-Indian reviewers scored higher (56.7 v. 48.6)
  - Especially those in non-exchanged group (58.4 v. 47.3)
- Training programs to improve quality of peer reviews in India.
  - Das Sinha, Sahni, Nundy. NMJ I 1999
Training and peer review

- Intervention groups identified more errors after training (3.14 vs 2.96 vs 2.13)
- Evidence for benefit of training was not apparent on further testing six months after the interventions
- Training associated with an increased likelihood of recommending rejection (92% and 84% vs 76%)
Use of checklist

- Beneficial especially to new reviewers
Postpublication peer review

Readers assume that articles in peer-reviewed journals are scientifically sound

- Evidence to the contrary
- Misleading work identified after publication
- “Ultimate interpretation and decision about the value of an article rests with the reader”
- Publishing corrections, retractions, and letters critical of articles
Quality of peer review

- Outcome measures to assess peer review
- Properly defined objectives
- Almost impossible to assess or improve its effectiveness
  - Jefferson, Wager, Davidoff. JAMA 2002
Conclusion

Is peer review beneficial?

- Yes!
- Journals should work to strengthen it
- Methodological review compulsory
- Impossible to eliminate misleading studies
But!

An imperfect peer-review system is a safeguard without which quality of published research would be lower.