



Peer Review of Research: Current Issues, Best Practices and a Case of Abuse

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Peer Review of Research Proposals and Manuscripts

- The traditional articles of faith:
 - Indispensable to scientific publication and grant-awarding processes
 - Critical to the Self-Regulation of Science
- But Peer Review little studied until recently
- And, recent studies raise doubts about its efficacy
- Current status: still “indispensable,” but in need of reform

History of Peer Review

- “Practically no historical accounts of the evolution of peer review exist. Biomedical journals appeared in the 19th century as personal organs, following the model of more general journalism.”
- “The practice of editorial peer reviewing did not become general until sometime after World War II. Contrary to common assumption, editorial peer review did not grow out of or interact with grant peer review. “

History of Peer Review, contin.

- “Editorial peer review procedures did not spread in an orderly way”
- Peer review procedures “not developed from editorial boards and passed on from journal to journal. Instead, casual referring out of articles on an individual basis may have occurred at any time, beginning in the early to mid-19th century.”

--**J. C. Burnham, JAMA Vol. 263, No. 10, 9
March 1990**

Calls to Study Peer Review

- We know little about one of the central processes of science--Bailar and Patterson, “Journal peer review: the need for a research agenda, *N Engl J Med.* 1985;312:654-657
- Why? “Perhaps because scientific publishing without peer review seems unimaginable,” it had not been studied and tested--Richard Smith, *Editor, BMJ, 1997*

The Problem with Peer Review

“The problem with peer review is that we have good evidence on its deficiencies and poor evidence on its benefits. We know that it is expensive, slow, prone to bias, open to abuse, possibly anti-innovatory, and unable to detect fraud. We also know that the published papers that emerge from the process are often grossly deficient.”--**Richard Smith**, *Editor, BMJ*, editorial, 1997

The Problem with Peer Review, continued

“There seems to be no study too fragmented, no hypothesis too trivial, no literature citation too biased or too egotistical, no design too warped, no methodology too bungled, no presentation of results too inaccurate, too obscure, and too circular, no conclusions too trifling or too unjustified. . . for a paper to end up in print.”

Drummond Rennie, M.D. “*Guarding the Guardians,*” JAMA (1986) 256:17 2391-2.

A Research agenda for Peer Review

- What are its chief weaknesses?
- How does it work?
- What are its objectives?
- Is it effective in funding and publishing the best research?
- How might it be improved?

International Meetings on Peer Review

- First International Congress, Chicago, 1989
- Second International Congress, Chicago, 1993
- Third International Congress, Prague, 1997
- Fourth International Congress, Barcelona, 2001
- Fifth International Congress, Chicago, September, 2005

Growth of Research on Peer Review

“It seems clear that there were few articles being published on peer review before we started the initiative in 1986 [first international Congress], and that now there are about 170 to 200 per year.” --

Drummond Rennie, 2002

How Does Peer Assessment of Research Work?

“We know surprisingly little about the cognitive aspects of the process--what a reviewer (or an editor) does when he or she assesses a study submitted for publication. Consequently, we have few ideas about how to improve the process, teach it, and defend it. “

--Jerome P. Kassirer, MD, Edward W. Campion, MD “*Peer Review: Crude and Understudied, but Indispensable,*” *JAMA*. 1994;272:96-97

Measuring Quality of Peer Review Against Its Objectives

“The quality of a process can only be tested against its agreed objectives. Editorial peer-review is widely used, yet there appears to be little agreement about how to measure its effects or processes. . . . Until we have properly defined the objectives of peer-review, it will remain almost impossible to assess or improve its effectiveness.”

-- Tom Jefferson, MD; Elizabeth Wager, MA; Frank Davidoff, MD, “*Measuring the Quality of Editorial Peer Review*,” JAMA 2002;287:2786-2790.

Is Peer Review Effective in Funding the Best Research?

- “An experiment in which 150 proposals submitted to the National Science Foundation were evaluated independently by a new set of reviewers indicates that getting a research grant depends to a significant extent on chance. . . .
--- Cole S, Cole JR, Simon GA, “Chance and consensus in peer review,” *Science*. 1981 Nov 20;214(4523):881-6.

Is Peer Review Effective in Funding the Best Research?

“The degree of disagreement within the population of eligible reviewers is such that whether or not a proposal is funded depends in a large proportion of cases upon which reviewers happen to be selected for it. No evidence of systematic bias in the selection of NSF reviewers was found.”

---Cole S, Cole JR, Simon GA, “Chance and consensus in peer review,” *Science*. 1981 Nov 20;214(4523):881-6.

Is Peer Review Effective in Publishing the Best Research?

“Editorial peer review is widely used to select submissions to journals for publication and is presumed to improve their usefulness. Sufficient research on peer review has been published to consider a synthesis of its effects. . . . Editorial peer review, although widely used, is largely untested and its effects are uncertain.”

--Tom Jefferson, MD; Philip Alderson, MBChB; Elizabeth Wager, MA; Frank Davidoff, MD, “*Effects of Editorial Peer Review: A Systematic Review*,”
JAMA. 2002;287:2784-2786.

Snapshot of other findings from research on Peer Review

- Blinding reviewers to the author's identity does not usefully improve the quality of reviews
- Passing reviewers' comments to their co-reviewers has no effect on quality of review
- Appreciable bias and parochialism have been found in the peer review system
- Developing an instrument to measure manuscript quality is the greatest challenge

--Smith and Goldbeck-Wood, editorial, *Evidence on Peer Review: scientific quality control or smokescreen?*
BMJ 1999; 318: 44-45

What have we learned from the growing body of research?

“studies . . . fail to show any dramatic effect, let alone improvement, brought about by editorial peer review. . . .”

What have we learned from the growing body of research?

“... despite this, it continues to be the experience of editors that peer review is extraordinarily effective . . . Why? It makes good sense that editors would want to enlist the services of those more expert in a particular subject than themselves. And there are powerful reasons why editors might wish to spread the responsibility for unfavorable decisions about manuscripts. . . .”

What have we learned from the growing body of research?

“ . . . But there is another important factor. Peer review represents a crucial democratization of the editorial process, incorporating and educating large numbers of the scientific community, and lessening the impression that editorial decisions are arbitrary.”

--Drummond Rennie, “Editorial: Fourth International Congress on Peer Review in Biomedical Publication,” *JAMA* 2002;287:2759-2760

Best Practices:
Ethical Guidelines for Reviewers
American Chemical Society, 2000

1. Every scientist has an obligation to do a fair share of reviewing.
2. A reviewer who feels inadequately qualified should not review.
3. Reviews should evaluate mss objectively, fairly, and professionally.
4. A reviewer should be sensitive to the appearance of conflicts of interest.

Ethical Guidelines for Reviewers

American Chemical Society, 2000

5. Reviews should avoid personal bias.
6. Reviewers should respect confidentiality of review process.
7. Reviewers should explain and support their judgments adequately.
8. Reviewers should be alert to missing citations to similar work.

Ethical Guidelines for Reviewers

American Chemical Society, 2000

9. Reviewers should be prompt with reviews.

10. Reviewers should not use information from ms under review without permission.

11. Reviewers should be constructive in their criticisms.

Resources for Mentors on Responsible Peer Review

- Nicholas Steneck, *Introduction to RCR* (ORI: 2004) <http://ori.dhhs.gov>
- Francis L. Macrina, *Scientific Integrity: Text and Cases in Responsible Conduct of Research, 3rd Edition* (American Society for Microbiology Press, 2005)
- Daniel Vassig, *Responsible Authorship and Peer Review*, (Columbia University: on-line RCR tutorial; available, ORI web-page)

“Open to Abuse”: Misconduct in Peer Review--an ORI case

Dr. L, a researcher at a U. S. cancer institute, who was serving as a mail-in reviewer for an NIH Study Section, recognized some text in an grant application under review (submitted September, 1991) which had apparently been plagiarized from his own earlier unfunded grant application submitted in January, 1990.

Reviewer Misconduct, contin.

- The allegedly plagiarized text appeared in the September, 1991 application of Dr. F, Ph.D., Professor and Chairman of the Department of Biochemistry and Molecular Biology at a Midwest medical school.

Reviewer Misconduct, contin.

Dr. L notified the NIH scientific review officer who contacted ORI. Together, they determined that Dr. F had been a member of the same NIH Study Section June, 1990 when Dr. L's application had been reviewed. Dr. F was an assigned reviewer of Dr. L's application. The question arose whether Dr. L's application had been deliberately underscored through Dr. F's influence?

Reviewer Misconduct, contin.

Meanwhile, comparison of Dr. L's original application with the later submission by Dr. F and his Research Fellow, showed six long sections of the Background Section and one Methods section, which were essentially verbatim reproductions.

Reviewer Misconduct, contin.

Dr. F was informed by NIH that his application had been deferred and referred to ORI. ORI sent the case to Dr. F's medical school to initiate an Inquiry into possible plagiarism by Dr. F through abuse of the peer review system

Reviewer Misconduct, contin.

Dr. F claimed to the Medical School that he had hand-written such a document in 1989 a year and more before seeing Dr. L's application and had circulated the ideas to the community, so Dr. L may have actually plagiarized him instead.

Reviewer Misconduct, contin.

- Dr. F also told the College inquiry Committee that he had been called by the Scientific Review Administrator (SRA) in DRG about potential reviewers for his application, and that he had suggested Dr. L. He argued that he would not plagiarize the work of Dr. L and still suggest him as a reviewer.

Reviewer Misconduct, contin.

- But asked if she had requested names of potential reviewers from Dr. F for his application a year earlier, the SRA and she said, no, she had not done so.

Reviewer Misconduct, contin.

- The Medical School Investigation Committee carefully examined Dr. F's handwritten draft purportedly written by July 10, 1989 (provided by F in photocopy only)
- Dr. F claimed that this established his priority of the questioned passages.

Reviewer Misconduct, contin.

But the IC found (among other things):

- The page numbers cited in one reference were not assigned by the journal until at least October 5, 1989, three months later than Dr. F claimed to have written the draft;
- The name of the Department did not include "Molecular Biology," as presented in the document, until July 1, 1990, a year after Dr. F claimed to have written it;

Reviewer Misconduct, contin.

- Dr. F had also claimed that he had given his handwritten draft (purportedly 1989) to colleagues to review, including Dr. K.
- Contact by the Committee, Dr. K said he had not seen the handwritten document in 1989. Instead, he said that Dr. F had given him a copy to review in May 1992, and that he had returned it to Dr. F shortly thereafter.

Reviewer Misconduct, contin.

The Investigative Committee concluded that Dr. F's handwritten 1989-draft document was fabricated or fraudulent and had been utilized and perhaps intentionally written for the express purpose to attempt to deceive the committee .