



# Peer Review: Trends and Current Strategies to Improve the Quality of Arbitration

Dr Theodora Bloom, Executive Editor, *The BMJ*  
Entre Pares Conference, La Puebla, Mexico, September 2016

# What am I going to talk about?

- What do we mean by peer review ?
  - Some background / history of peer review
  - Researching peer review: what do we know ?
  - Open peer review - various flavours
  - Patient peer review
  - Preprints and what they mean for peer review
- 
- All with a biomedical slant



## Introduction

# Competing interests

- I'm Executive Editor of *The BMJ*. It is published by BMJ, a wholly owned subsidiary of the British Medical Association.
- BMJ (the company) receives 8.7% of revenues from drug & device companies through advertising, reprint sales, & sponsorship. For *The BMJ* it's 12%.
- *The BMJ* is an open access journal that charges article-processing fees for Research Articles.
- I chair the Advisory Board of Europe PubMed Central.
- I represent BMJ in discussions towards launching a MedRxiv clinical preprint server.
- I am European Coordinator for the Peer Review Congress.



medRxiv

THE PREPRINT SERVER FOR HEALTH SCIENCES



What do we mean by peer review?

## Meaning and history

# A bet I will make with authors and peer reviewers:

If any of your work has been peer-reviewed, or if you have ever been a peer-reviewer, then at least one of these is true:

- You have complained about peer review to a colleague
- You have heard or read someone complaining about peer review
- As an author, you think peer review has not improved your paper
- As a reviewer, you think you have improved someone else's paper
- You suspect you could come up with a better system



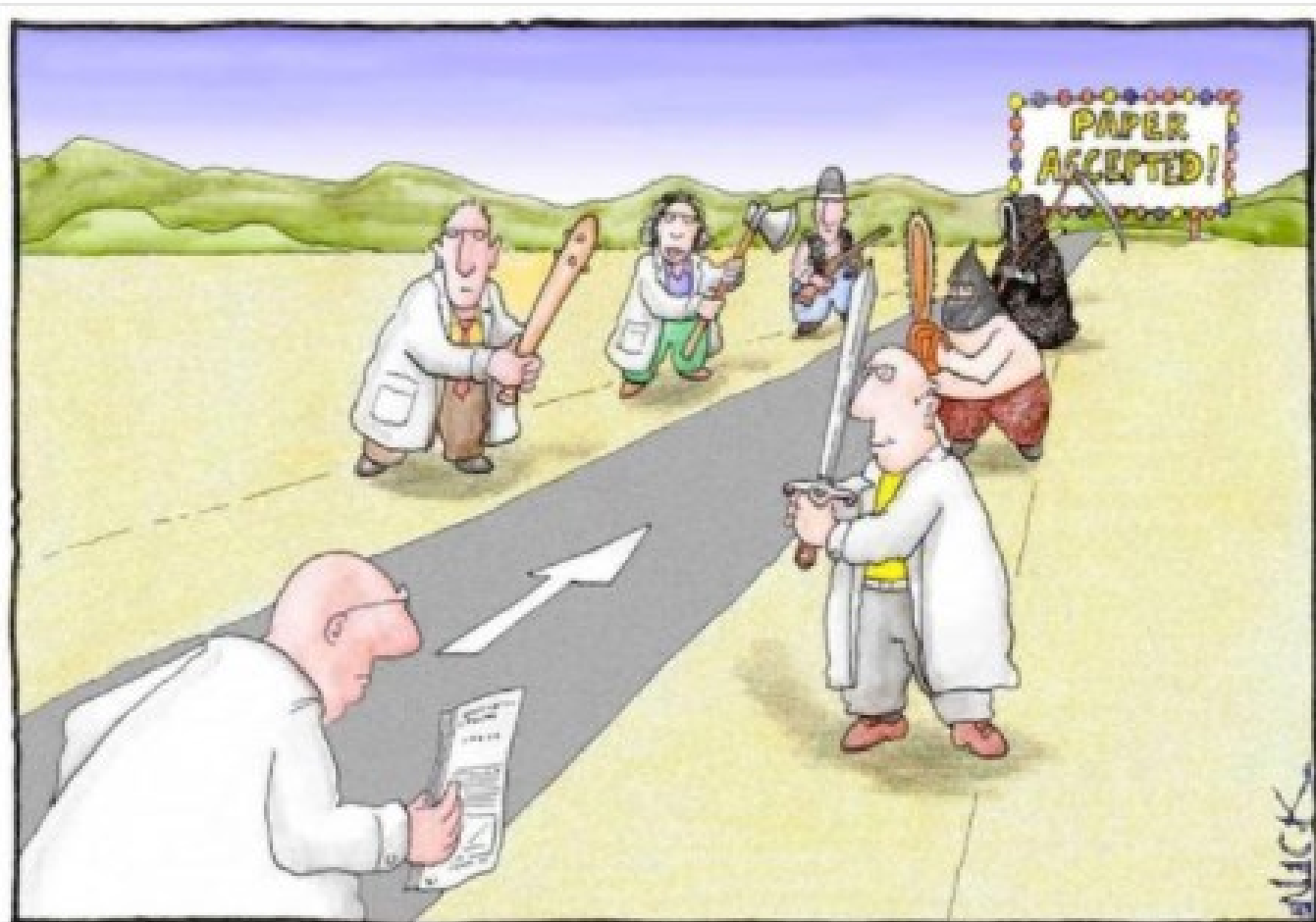
The Sociological Review

@TheSocReview

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Most scientists regarded the new streamlined peer-review process as "quite an improvement"



Meaning and history

## International Committee of Medical Journal Editors (ICMJE) definition of peer review

“Peer review is the critical assessment of manuscripts submitted to journals by experts who are usually not part of the editorial staff.

Because unbiased, independent, critical assessment is an intrinsic part of all scholarly work, including scientific research, peer review is an important extension of the scientific process.”

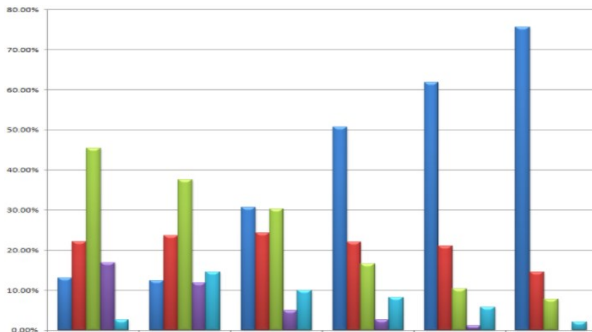
# Technical review vs. editorial selection

## Technical review - by experts in the field

Is the work properly done?

Are the claims statistically valid?

Can the conclusions be drawn from the results shown?



### CHECKLIST





Meaning and history

# Technical review vs. editorial selection

**Editorial selection - by editors, with advice from experts in the field**

Is the work interesting and important to the readers of this journal?

## **Assertion:**

Almost all complaints about 'peer review' are really complaints about editorial selection.



Meaning and history

# The BMJ adopted peer review early on



“It is a laborious and difficult method, involving heavy daily correspondence and constant vigilance to guard against personal eccentricity or prejudice or – the bugbear of journalism – unjustifiable censure. But that method may... be recommended as one that gives authoritative accuracy, reality and trustworthiness to journalism.”

Ernest Hart (Editor of *The British Medical Journal*) writing to US medical editors in 1893



Drummond Rennie: Editorial peer review: its development and rationale, 2002

# Researching peer review

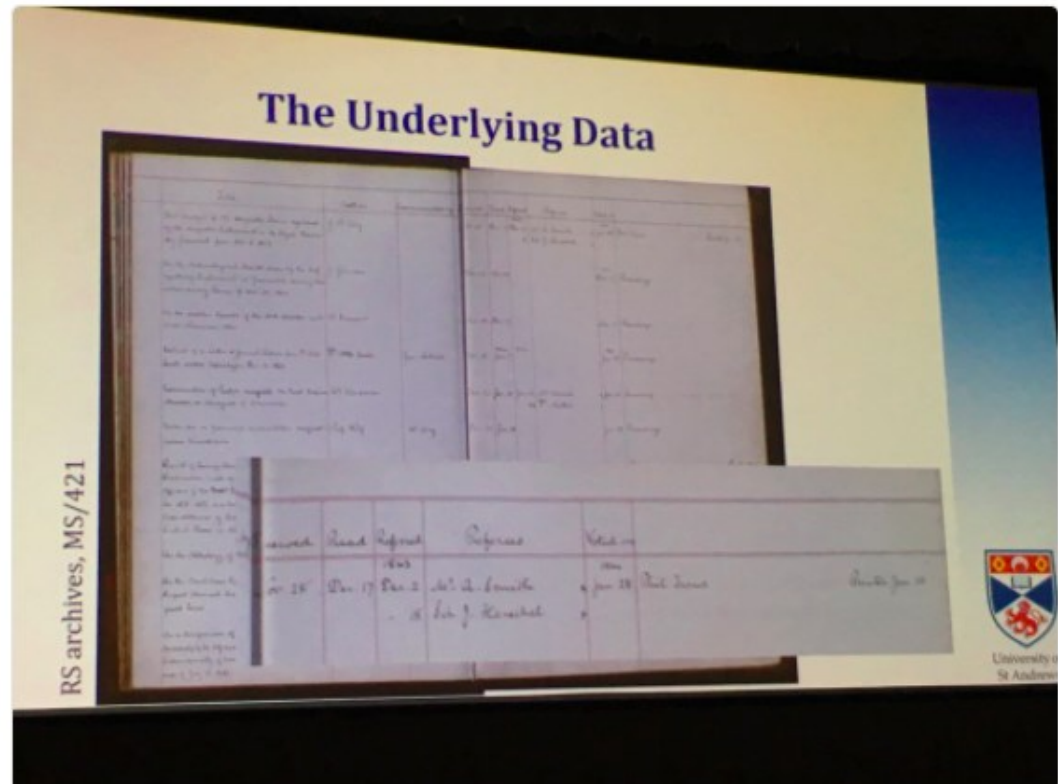
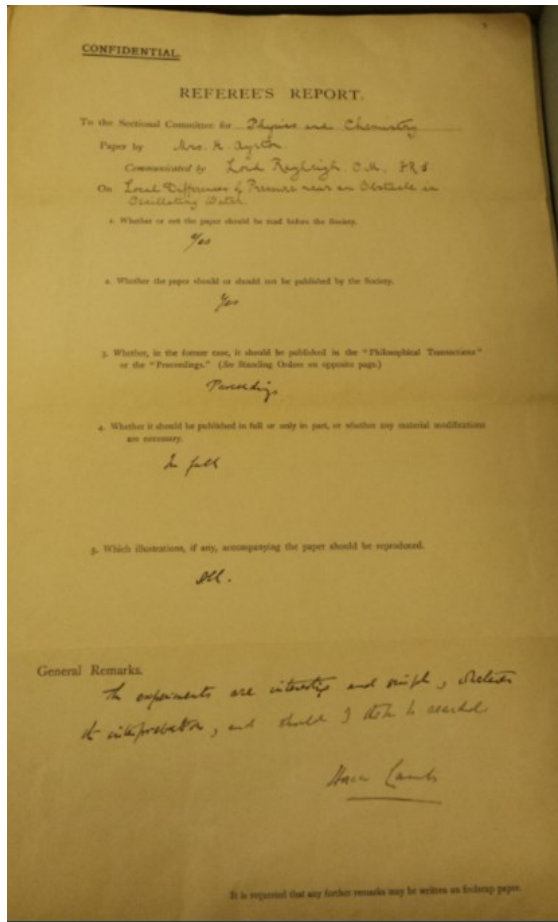
What is it good for? How do we know?

# Researching history



**Theodora Bloom**  
@TheoBloom

Aileen Fyfe seems to have the notebook on peer review from when I started working at a journal, Nature (no PCs) #prc8



10:34 PM - 10 Sep 2017

## 30 years of research on peer review

“We announced in 1986 that we would sponsor and hold a conference to present the results of research into the process of editorial selection and improvement of scientific manuscripts, constituting peer review...

Each of these Congresses, held every 4 years since 1989 and organized by *JAMA* and the *BMJ*, have been devoted to 3 days of presentations of original research into editorial processes.”

Next Congress: 2021



# First: agree how we'll know if a peer review is good

[< Previous Article](#)

**July 1999** Volume 52, Issue 7, Pages 625–629

[Next Article >](#)

To read this article in full, please review your options for gaining access at the bottom of the page.

## Development of the Review Quality Instrument (RQI) for Assessing Peer Reviews of Manuscripts

[Susan van Rooyen](#) , [Nick Black](#), [Fiona Godlee](#)



DOI: [https://doi.org/10.1016/S0895-4356\(99\)00047-5](https://doi.org/10.1016/S0895-4356(99)00047-5)



**Review Quality Instrument (Version 3.2)\***  
**[Posted as supplied by the author]**

1. Did the reviewer discuss the importance of the research question?

1	2	3	4	5
Not at all			Discussed extensively	

2. Did the reviewer discuss the originality of the paper?

1	2	3	4	5
Not at all			Discussed extensively with references	

3. Did the reviewer clearly identify the strengths and weaknesses of the method (study design, data collection and data analysis)?

1	2	3	4	5
Not at all			Comprehensive	

4. Did the reviewer make specific useful comments on the writing, organisation, tables and figures of the manuscript?

1	2	3	4	5
Not at all			Extensive	

5. Were the reviewer's comments constructive?

1	2	3	4	5
Not at all			Very constructive	

6. Did the reviewer supply appropriate evidence using examples from the paper to substantiate their comments?

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# Peer review doesn't find most errors, and training doesn't help much

- 607 peer reviewers randomized to receive face-to-face training, or a self-taught package, or a control
- Each reviewer sent the same three papers, each with 9 major and 5 minor methodological errors inserted.
- At baseline reviewers found an average of 2.58 of the nine major errors...The mean number of errors reported was similar for papers 2 and 3.
- Training had little effect.
- Any effect was short-lived



# How long should reviewers spend on a review?

- Survey of 420 BMJ papers with 690 reviews
- Review quality increases with time spent on review, up to 3 hours but not beyond



**This Issue**

Citations **140**

## Peer Review Congress

FREE

July 15, 1998

# What Makes a Good Reviewer and a Good Review for a General Medical Journal?

Nick Black, MD; Susan van Rooyen, BSc; Fiona Godlee, MRCP; Richard Smith, FRCP; Stephen Evans, MSc

*JAMA*. 1998;280(3):231-233. doi:10.1001/jama.280.3.231

# What makes a good reviewer?

- aged under 40
- known to the editors (experienced at the journal)
- methodological training (statistics & epidemiology)



**This Issue**

Citations **140**

**Peer Review Congress**

July 15, 1998

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FREE

## Two more completed studies:

**Q:** Do tables and figures change much after peer review (clinical trials)?

**A:** Not very much

**Q:** Are author-suggested reviewers different from editor-suggested ones?

**A:** Yes, they're slightly more likely to recommend acceptance

### From Submission to Publication: A Retrospective Review of the Tables and Figures in a Cohort of Randomized Controlled Trials Submitted to the *British Medical Journal*

Presented at the 5th International Congress on Peer Review and Biomedical Publication, Chicago, IL, September 16-September 18, 2005.

David L. Schrager MD, MPH <sup>a, b, c</sup>, Reshmi Sinha BA <sup>a, b</sup>, Sara Schroter BA, MSc, PhD <sup>d</sup>, Pamela Y. Liu <sup>a, e</sup>, Douglas G. Altman DSc <sup>c</sup>

January 18, 2006

### Differences in Review Quality and Recommendations for Publication Between Peer Reviewers Suggested by Authors or by Editors

Sara Schroter, PhD; Leanne Tite, MSc; Andrew Hutchings, MSc; Nick Black, MD

Article Information

JAMA. 2006;295(3):314-317. doi:10.1001/jama.295.3.314

## 2007 Cochrane review on editorial peer review

“...little empirical evidence is available to support the use of editorial peer review as a mechanism to ensure quality of biomedical research. However, the methodological problems in studying peer review are many and complex. At present, the absence of evidence on efficacy and effectiveness cannot be interpreted as evidence of their absence.

A large, well-funded programme of research on the effects of editorial peer review should be urgently launched.”

## A more recent independent meta-analysis (2016)

22 reports of randomized controlled trials - only 7 since 2004

- **training (n = 5): did not improve review report quality**
- **addition of a statistical reviewer (n = 2): improved the final manuscript**
- **use of a checklist (n = 2): did not improve the manuscript**
- **open peer review ([open identities]; n = 7):**
  - **improved quality of the review report;**
  - **did not affect the time reviewers spent on review;**
  - **decreased the rate of rejection**
- **blinded peer review ([peer reviewers blinded to authors' ID]; n = 6):**  
**did not affect the quality of review or the rejection rate**

### **Impact of interventions to improve the quality of peer review of biomedical journals: a systematic review and meta-analysis**

Rachel Bruce<sup>†</sup>, Anthony Chauvin<sup>†</sup>, Ludovic Trinquart, Philippe Ravaud and Isabelle Boutron ✉

<sup>†</sup>Contributed equally

*BMC Medicine* 2016 **14**:85

<https://doi.org/10.1186/s12916-016-0631-5> | © The Author(s). 2016

<https://www.bmj.com/about-bmj/evidence-based-publishing/bmj-research-process>

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Research ▾

Education ▾

News & Views ▾

Campaigns ▾

## Completed research

- Peer Review
- Competing Interests
- Editorial Decision Making
- Open Access Publishing
- Authorship/Contributorship
- Presentation
- Research Ethics
- Collaborative Projects

# Opening up peer review

Blinding versus transparency

## Potential biases in peer review

Peer review research has identified many kinds of potential bias:

- **Author-related**
  - Prestige (author/institution)
  - Gender
  - Geography
- **Paper-related**
  - Positive results
  - English language
- **Reviewer-related**
  - competing interests
  - personal issues



# Can being more open or more closed help?

## Closed review:

- Single blind
  - authors masked
  - reviewers masked
- Double blind - both masked
- Triple blind - editors also masked



## Open review:

- Open reports (published with the final article)
- Open identities (signed reports sent to author)
- Open review in real time
- Open participation (review by the crowd)
- ... and other flavours

# So many flavours of “open peer review”

[illegible]

## Open identities

## Open reports

## Open participation

## Open interaction

## Open pre-review manuscripts (preprints)

## Open final-version commenting

## Open platforms (“decoupled review”)



ASAPbio

BMJ Open Science

Ross-Hellauer T. What is open peer review? A systematic review [version 2; referees: 4 approved]. *F1000Research* 2017, 6:588

(doi: [10.12688/f1000research.11369.2](https://doi.org/10.12688/f1000research.11369.2))

<https://f1000research.com/articles/6-588/v2>

## Peer review transparency

# A call for more openness in peer review



COMMENT • 29 AUGUST 2018

## Publish peer reviews

Jessica K. Polka and colleagues call on journals to sign a pledge to make reviewers' anonymous comments part of the official scientific record.

Jessica K. Polka<sup>✉</sup>, Robert Kiley, Boyana Konforti, Bodo Stern & Ronald D. Vale<sup>✉</sup>

"We think that the value of published review reports to referees, authors, the public and editors far outweighs the risks and toil. In an ideal world, all published papers would be accompanied by the contents of their peer-review reports. For now, we recommend that the practice is encouraged while the scientific community assesses whether and how author characteristics, such as ethnicity and country of origin, influence reviewer feedback. Any structural barriers to equality must be eliminated."



Illustration by David Parkins

ASAPbio

### TRANSPARENT CRITIQUE

#### Potential benefits of published review

- **Encourages good-quality, constructive comments.** The expectation that reviews will be published will encourage editors and reviewers to hold them to a high standard.
- **Preserves useful scholarship.** Peer reviews contain arguments and ideas that can reveal how thinking in a field evolves. This material should be preserved and made available to others.
- **Builds trust.** Readers have a right to understand the level of scrutiny that a paper has undergone.
- **Makes journal decisions more transparent.** Editors must integrate information from diverse sources, including

reviewers, to make their decisions. Published peer review provides a window on the process.

- **Creates a pathway for crediting reviewing.** Reviewers can point (even privately) to their work as evidence of scholarly activity for grants and promotions.
- **Provides a resource for training.** Reports can show people how to (and how not to) assess a paper.
- **Bolsters systemic study of peer review.** Published reports and rebuttals enable more research on best practices, leading to improvements in the system as a whole.

Does blinding reviewers to authors' identities and/ or revealing the reviewers' identity to a co-reviewer (unmasking) affect the quality of reviews?

**Answer:**

Blinding & unmasking made no editorially significant difference to review quality, reviewers' recommendations, or time taken to review



van Rooyen S, Godlee F, Evans S, Smith R, Black N.  
Effect of blinding and unmasking on the quality of peer  
review: a randomized trial. JAMA 1998; 280; 234-7.

# Does revealing the reviewer's identity to the author affect the quality of the reviewer's opinion?

## Answer:

No important effect on quality of the review, recommendation regarding publication, or the time taken to review. But it significantly increased the likelihood of reviewers declining to review.

→ *The BMJ* introduced signed reviewers' opinions



van Rooyen S, Godlee F, Evans S, Black N, Smith R. Effect of open peer review on quality of reviews and reviewers' recommendations: a randomised trial. *BMJ* 1999;318:23-7.

## Does telling the reviewer that their review will be posted with the final article alter review quality?

### Answer:

No important effect on quality of the review or recommendation regarding publication. But it increased the likelihood of reviewers declining to review and increased the time taken preparing a review.

→ *The BMJ* posts peer reviewers' reports with published articles



van Rooyen S, Delamothe T, Evans SJW. Effect on peer review of telling reviewers that their signed reviews might be posted on the web: randomised controlled trial. *BMJ* 2010; 341:c5729.

Researching peer review

## Fabulous blog analyses of research in this area:

### Weighing Up Anonymity and Openness in Publication Peer Review

- Hilda Bastian, May 2015

<http://blogs.plos.org/absolutely-maybe/2015/05/13/weighing-up-anonymity-and-openness-in-publication-peer-review/>



### The Fractured Logic of Blinded Peer Review in Journals

- Hilda Bastian, October 2017

<http://blogs.plos.org/absolutely-maybe/2017/10/31/the-fractured-logic-of-blinded-peer-review-in-journals/>





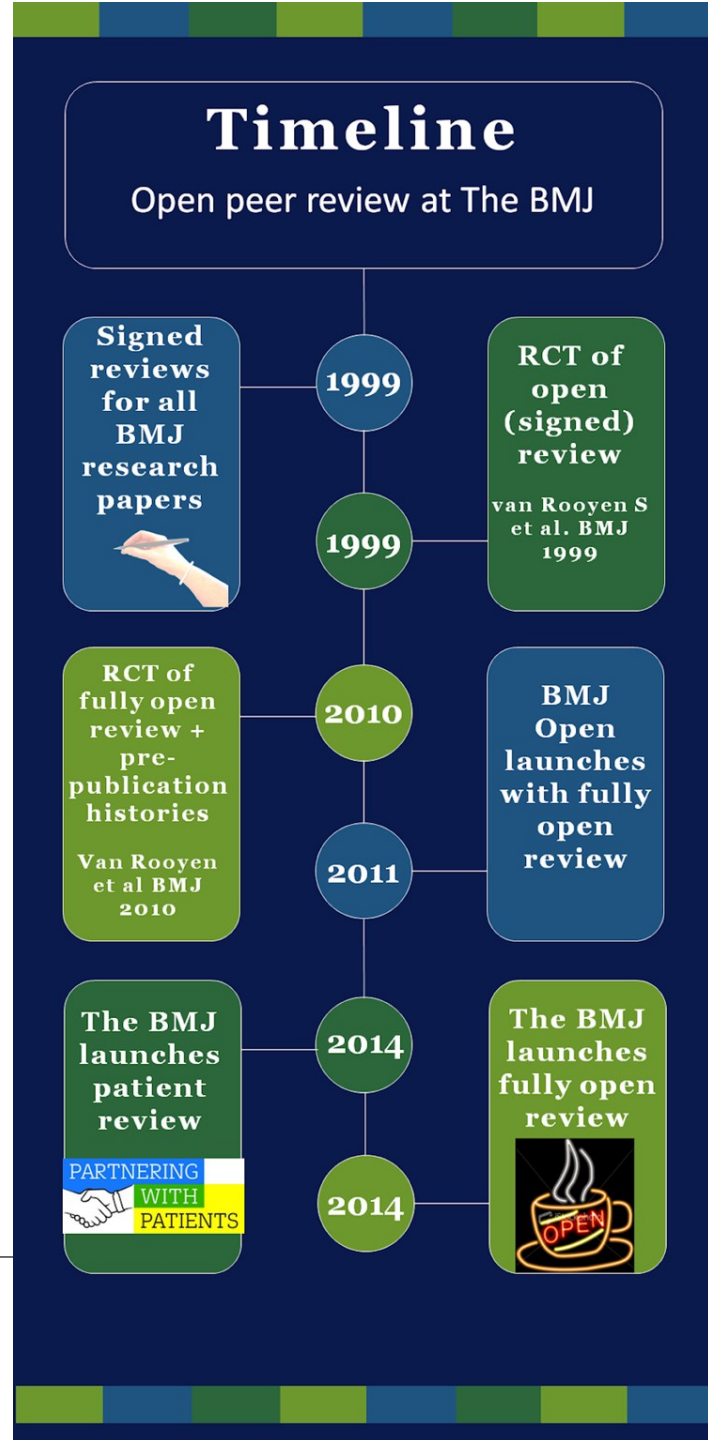
Peer review transparency

## Summary of *The BMJ*'s approach

*The BMJ* publishes all research with open access, identifies all reviewers to authors, and, since early 2015, publishes a detailed “prepublication history” that includes reviewers’ signed reports.

This open peer review policy draws on evidence from two randomised controlled trials of open peer review, and on 19 years experience of mandatory open peer review.

We also have very active commenting



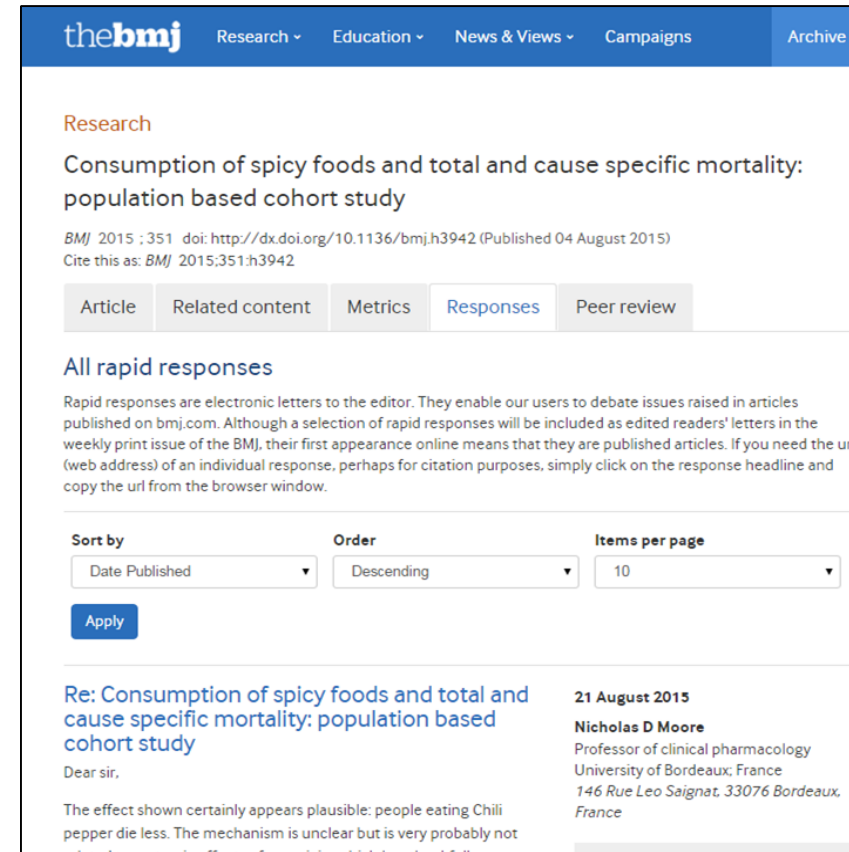


# Post publication peer review

Authors should respond promptly to substantive queries and requests from the editors or readers after publication, particularly regarding the integrity of the published article

Concerns may be raised through:

- letters to the editor
- complaints to the editor, the publisher, or via the Committee on Publication Ethics
- media or social media



The screenshot displays the BMJ website interface. At the top is a blue navigation bar with the 'thebmj' logo and links for Research, Education, News & Views, Campaigns, and Archive. Below this, the 'Research' section is highlighted. The main article title is 'Consumption of spicy foods and total and cause specific mortality: population based cohort study'. Below the title, the citation information is provided: 'BMJ 2015 ; 351 doi: http://dx.doi.org/10.1136/bmj.h3942 (Published 04 August 2015)' and 'Cite this as: BMJ 2015;351:h3942'. A row of tabs includes 'Article', 'Related content', 'Metrics', 'Responses' (which is selected), and 'Peer review'. Under the 'Responses' tab, the heading 'All rapid responses' is shown, followed by a paragraph explaining that rapid responses are electronic letters to the editor. Below this, there are three dropdown menus for 'Sort by' (set to 'Date Published'), 'Order' (set to 'Descending'), and 'Items per page' (set to '10'). An 'Apply' button is located below these menus. The first response is displayed, dated '21 August 2015' by 'Nicholas D Moore', a Professor of clinical pharmacology at the University of Bordeaux, France. The response text begins with 'Dear sir,' and discusses the effect of eating chili pepper.

# Patient peer review

Peer review by the people most affected by the research

## Partnership with patients, carers and advocates

*“The BMJ has committed to improving the relevance and patient centredness of its research, education, analysis, and editorial articles by asking patients to comment on them.”*

### Patient and public partnership



The BMJ's patient partnership strategy, launched in 2014, introduced innovative [internal editorial changes](#) aimed at making patient partnership integral to the way the journal works and thinks. We did this because we see partnering with patients, their carers, community support networks, and the public as an ethical imperative essential to improving the quality, safety, value, and sustainability of health systems.

The strategy was drawn up with and continues to be informed by a dedicated international [patient advisory panel](#).

Patient partnership

## Patient peer review

- authors of research papers state if/how they involved patients in setting research question, outcome measures, design and implementation of study, and results dissemination
- patient editor involved in research team discussions
- patient review of papers



# How does it work?

- Database of patient volunteers
- Invitations sent alongside 'regular' peer reviewers

Ongoing research:

- Similar likelihood of accepting an invitation
- Similar likelihood of delivery
- Slightly faster at delivering
- Most would recommend it to other patients, other journals
- Most don't mind open review
- Most authors respond courteously

## Guidance for BMJ Patient and Public Reviewers

### Patient and public review at *The BMJ*

If you're a patient living with disease or have experienced a significant illness or medical condition, a carer of a patient, a patient advocate acting on behalf of a patient group, or you play a leading part in advocating for patient participation and partnership in healthcare we'd like to invite you to take part in a unique initiative. *The BMJ* has committed to improving the relevance and patient centredness of its research, education, analysis, and editorial articles by asking patients to comment on them. We need your help to make these changes.

If you already review for *The BMJ* as a researcher or clinician, but you are also interested in reviewing as a patient, carer, or patient advocate, you can do this too.

Patient and Public review is a new initiative for *The BMJ*. We are taking the lead here, and we hope other publishers will follow. We are working hard to make our processes as straightforward and smooth as possible for patient and public reviewers and welcome suggestions for how we could do this better.

## Patient partnership

**thebmj** Research ▾ Education ▾ News & Views ▾ Campaigns Archive

Research

PAin SoluTions In the Emergency Setting (PASTIES)—patient controlled analgesia versus routine care in emergency department patients with non-traumatic abdominal pain: randomised trial

2015 ; 350 doi: <http://dx.doi.org/10.1136/bmj.h3147> (Published 21 June 2015)  
Cite this as: 2015;350:h3147

Article Related content Metrics Responses **Peer review**

Status	Comments	Date
Original article submission	<a href="#">Access document</a>	22 December
Decision letter	<a href="#">Access document</a>	30 March 201
Author response	<a href="#">Access document</a>	23 April 2015

## Open peer review with patient review

Reviewer(s)' Comments to Authors:  
Reviewer: 1

### Recommendation:

#### Comments:

Pain and its control is of the greatest importance to patients. As a sign of current or developing health problems it is a key factor in prompting patients to seek medical attention. It is widely understood among the general population that good, effective tools (drugs, etc.) for the relief of many kinds of pain are available, so expectancy for relief is high. Optimising use of these tools clearly makes sense as part of good clinical care and to enhance patient comfort and satisfaction. The best patient care often results from patient and clinician working in partnership with professional staff relinquishing some of their authority to better meet the patient's perceived needs. Wherever possible, patients should be given the opportunity of choice in treatments, although for some patients (those who are gravely ill or uncomfortable in making decisions) this might inflict an additional burden and they would prefer to have their health managed entirely by experts.

This study, where participants are randomised to one arm where standard treatment is applied (TAU group) or to another which permits a measure of personal control in their own therapy (PCA group), in some ways reflects this no choice/choice scenario, albeit group allocation was imposed by the researchers. What is gratifying in the outcome is that where partial patient control was exercised, pain relief appears to have been superior and patient satisfaction higher. More analgesic was used by the PCA group which could be a downside. There are several possible reasons for the favourable reaction in the PCA patients which are not discussed but which may include a feeling of "ownership" in the intervention and of satisfaction that they had contributed personally to their treatment.

No overt statement in the text is made to the role, if any, of patient/public/carer input to the development, etc of the project, but perhaps this is made in the separate protocol paper (no. 22 in ref. list)?

David Britt

#### Additional Questions:

Please enter your name: David Britt

Job Title: Retired (Patient Reviewer)

Institution: N/A

Reimbursement for attending a symposium?: No

A fee for speaking?: No

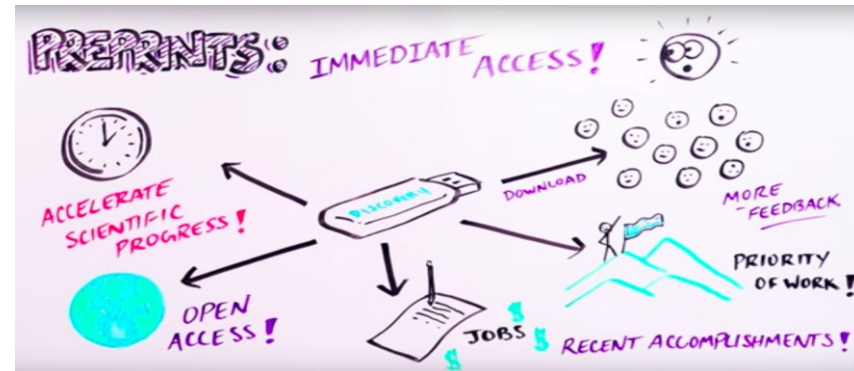
# Publishing more quickly

The case for preprints

# The case for preprints

- **Speed up science: faster dissemination**
- Allow pre-publication peer review and feedback, making 'better' articles
- Give authors precedence
- Freely available (but not always fully 'open')

<http://asapbio.org/>





## Preprints

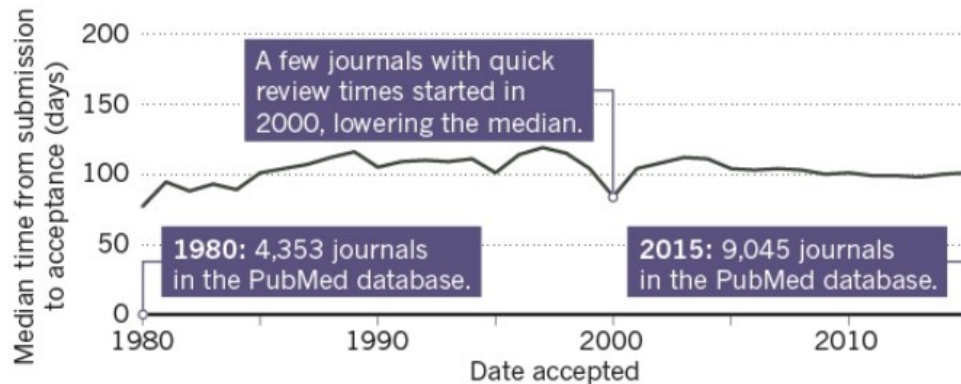
# Speed matters

### PAPER WAIT

Some scientists complain that publishing papers takes too long, but data show a complex picture.

#### REVIEW TIME

An analysis of all papers in PubMed up to 2015 with listed submission and acceptance dates suggests that the median time from submission to acceptance has hovered at around 100 days, although it has gone up at some journals.



*Nature* **530**, 148–151  
doi:10.1038/530148a



### How Much Faster?

- Let  $\alpha$  = time from publication to new discovery
- Let  $\delta$  = publication delay time
- Then if  $n$  discoveries are needed for a major breakthrough, need to wait  $n(\alpha + \delta)$ .
- If the delay is removed, then get  $1 + \delta/\alpha \approx 2$  fold acceleration



### More Realistic Tree Model

- Now suppose each discovery yields two new ideas which in turn lead to discoveries.
- Then the number of discoveries as a function of time is  $2^{t/(\alpha + \delta)}$  and if  $\alpha \approx \delta$  then the fold improvement is  $\approx 2^{t/2\alpha}$
- After ten years there is a five fold acceleration in scientific discovery!

**Steve Quake**, Stanford.

<https://www.youtube.com/watch?v=zt9hlbet2Lk&feature=youtu.be&t=405>

# Balancing speed with reliability, reproducibility and patient / public safety



**Risk of surfacing errors, assertions, assumptions that could be harmful to health**

## Why Most Published Research Findings Are False

John P. A. Ioannidis

Published: August 30, 2005 • <https://doi.org/10.1371/journal.pmed.0020124>

## Most Published Research Findings Are False—But a Little Replication Goes a Long Way

Ramal Moonesinghe , Muin J Khoury, A. Cecile J. W Janssens

Published: February 27, 2007 • <https://doi.org/10.1371/journal.pmed.0040028>

Preprints

## Risk mitigation

- Screening
- Highlighting
- No press releases
- Open commenting
- Links to published articles
- Assessing what changes?
- A peer-to-peer network for researchers
- Still under development

# medRxiv

THE PREPRINT SERVER FOR HEALTH SCIENCES



# BMJ



# BMJ

Closing

## Summary

- Defining peer review
- Some history
- Researching peer review
- Open peer review
- Patient peer review
- Preprints

# Thank you!

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**BMJ**