Preprints, journals, and the balance of speed and quality in research dissemination

JST/STM Joint Seminar, October 2021
Dr Theodora Bloom, Executive Editor, The BMJ
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 6.7% of revenues from drug & device companies through advertising, reprint sales, & sponsorship. For The BMJ it’s 14%. The BMJ is an open access journal that charges article-processing fees for Research Articles.
- I am a founder of the MedRxiv clinical preprint server.
- I am European Coordinator for the quadrennial Peer Review Congress.
- I am on the Board of AIP Publishing
What I’m going to talk about

● How the pandemic has changed the workings of a journal and a preprint server
● Journals and preprints and what each is for
● How we can balance speed with quality
First, a few thoughts on how we got to where we are with academic publishing.
In an ideal world, research dissemination looks like this

1. Discuss ideas
2. Do some research
3. Read / use other people's work
4. Prepare it for public sharing
5. Share it with the world
6. Read / use other people's work

This cycle represents a continuous process of research, dissemination, and collaboration.
How it worked for 150 years


MOLECULAR STRUCTURE OF NUCLEIC ACIDS

A Structure for Deoxyribose Nucleic Acid

WE wish to suggest a structure for the salt of deoxyribose nucleic acid (D.N.A.). This structure has novel features which are of considerable biological interest.

A structure for nucleic acid has already been proposed by Pauling and Corey. They kindly made their manuscript available to us in advance of publication. Their model consists of three intertwined chains, with the phosphates near the fibre axis, and the bases on the outside. In our opinion, this structure is unsatisfactory for two reasons: (1) We believe that the material which gives the X-ray diagrams is the salt, not the free acid. Without the acidic hydrogen atoms it is not clear what forces would hold the structure together, especially as the negatively charged phosphates near the axis will repel each other. (2) Some of the van der Waals distances appear to be too small.

Another three-chain structure has also been suggested by Fraser (in the press). In his model the phosphates are on the outside and the bases on the inside, linked together by hydrogen bonds. This structure as described is rather ill-defined, and for this reason we shall not comment on it.

We wish to put forward a radically different structure for the salt of deoxyribose nucleic acid. This structure has two helical chains each coiled round the same axis (see diagram). We have made the usual chemical assumptions, namely, that each chain consists of phosphate diester groups joining 3',5'-ribofuranose residues with 3',5'-linkages. The two chains (but
But now, research dissemination looks like this:

1. **Discuss ideas**
   - Read / use other people's work
2. **Do some research**
3. **Write a description**
4. **Submit to a journal**
   - Rejection: try elsewhere
5. **Do more work as requested**
6. **Resubmit**
7. **Publication**
   - Be judged by publications
8. **Get grants**
9. **Promotion**
   - Read / use other people's work

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*BMJ*
Problems:

Problem 1: Publication venue as a quality measure. Perverse incentives.

Problem 2: Because of problem 1: repeat cycles at other journals, delaying publication

Problem 3: Expensive and/or difficult to access all published work

Problem 4: All of these lead to a bias to publishing positive results, and the system is SLOW
Setting up medRxiv
The case for preprints

- **Speed up science: faster dissemination** within the research community
- Allow pre-publication peer review and feedback, making ‘better’ articles
- Give authors precedence
- Freely available (but not always fully ‘open’)
- Surface data that may not survive peer review
- **Risk of surfacing incorrect information, conclusions or assumptions that could be harmful to the health of individuals or whole populations**

http://asapbio.org/
medRxiv: a server for health science preprints

- Conceptually and technologically similar to bioRxiv
- Not-for-profit
- A service not a product
- Publisher-neutral
- Operated by CSH Laboratory
- Managed in partnership with BMJ and Yale University
- Launched Q2 2019
- Now supported by CZI
**medRxiv submission requirements**

1. Original research article
   - Original clinical/health research, including clinical trials, observational or qualitative research, quality improvement and implementation, policy studies, and medical education
   - Systematic reviews and meta-analyses
   - Methodological research
   - Clinical study Protocols
   - Not commentaries, editorials, opinion pieces, essays, letters to editors, narrative reviews, case reports

2. Standards and norms
   - Follow ICMJE guidance
   - Funding and competing interests statements
   - Statement of IRB / ethics committee oversight
   - Study registration when applicable (e.g. ClinicalTrials.gov; PROSPERO)
   - Data availability statement
   - EQUATOR Network reporting guidelines checklists
medRxiv: risk mitigation

Is it nonsense?
Is it non-science?
Is it a paper?
Is it research?
Is it plagiarized?
Is it a health threat?
Is there a benefit to sharing now vs. after peer review?
Caution: Preprints are preliminary reports of work that have not been peer-reviewed. They should not be relied on to guide clinical practice or health-related behaviors and should not be reported in news media as established information.

We also urge journalists and other individuals who report on medical research to the general public to consider this when discussing work that appears on medRxiv and emphasize it has yet to be evaluated by the medical community and the information presented may be erroneous.
What effect has the pandemic had?

Thoughts from medRxiv and The BMJ
COVID-19 SARS-CoV-2 preprints from medRxiv and bioRxiv

19,278 Articles (14,841 medRxiv, 4,437 bioRxiv)

High-throughput Activity Assay for Screening Inhibitors of the SARS-CoV-2 Mac1 Macdomain
10.101/2021.10.07.463234 — Posted: 2021-10-07

Monitoring sociodemographic inequality in COVID-19 vaccination coverage in England: a national linked data study
10.101/2021.10.07.21264681 — Posted: 2021-10-07
Monthly posted:

- Monthly Posts
- Cumulative New Papers

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- > 32,000 total posted
- > 7,500 revised after posting
- < 20% rejected
Widespread recognition of the value of preprints...

Europe PMC: unlocking the potential of COVID-19 preprints

Summary

- Europe PMC is now indexing full-text preprints related to the COVID-19 pandemic.
- The project will make COVID-19 scientific literature available in PubMed Central (PMC).
- Researchers and healthcare professionals will be able to access this work more easily, accelerating research into better treatments or a vaccine.

Reference: medRxiv preprint 1, medRxiv preprint 2, medRxiv preprint 3 & The Lancet Infectious Diseases paper

nature briefing

Age is the biggest predictor of who will die

Four studies (three of which have not yet been peer-reviewed) from Spain, England, Italy and Geneva, Switzerland, pinpoint the infection fatality ratio (IFR), which is the proportion of people infected with the virus, including those who didn't get tested or show symptoms, who will die as a result. All found that the IFR was close to zero in younger age groups.

NIH Preprint Pilot

The NIH Preprint Pilot is a project of the National Library of Medicine (NLM). During the pilot, NLM will make preprints resulting from research funded by the National Institutes of Health (NIH) available via PubMed Central (PMC) and, by extension, PubMed. The pilot aims to explore approaches to increasing the discoverability of early NIH research results posted to eligible preprint servers. PMC already makes available more than one million peer-reviewed papers resulting from NIH-supported research collected under the NIH Public Access Policy. This pilot builds on PMC’s NIH repository role as well as 2017 NIH guidance (NOT-OD-17-050) that encourages investigators to use interim research products, such as preprints, to speed the dissemination and enhance the rigor of their work.
but also worries about their misuse
Effect of Dexamethasone in Hospitalized Patients with COVID-19: Preliminary Report

Thousands of lives have been saved: Dexamethasone, including in low doses in hospitalised patients. The drug has been shown to reduce oxygen by 20%.

Funded by the UK National Institute for Health Research.


Abstract

Background: Coronavirus disease 2019 (Covid-19) is associated with diffuse lung damage. Glucocorticoids may modulate inflammation-mediated lung injury and thereby reduce outcomes in patients with severe disease.

Abstract

BACKGROUND

Coronavirus disease 2019 (Covid-19) is associated with diffuse lung damage. Glucocorticoids may modulate inflammation-mediated lung injury and thereby reduce outcomes in patients with severe disease.
The BMJ: print magazine, online journal

- News
- Features
- Investigations
- Education
- Campaigns
- Opinions
- Guidelines
- Commentary
- Analysis
- And Open Access Research
- Articles supported by article-processing charges
BMJ journals portfolio
Outline of the BMJ review process

Author(s)
- Manuscript submission
- 80% of manuscripts are initially rejected
- Reviews returned to authors
- Authors invited to revise and resubmit
- Rejection is still possible, but authors may be asked to resubmit

The BMJ editorial team
- Initial decision
- Reject
- Review
- Reviews returned to BMJ editor
- Editorial committee decision
- Reject
- Revise
- Final decision
- Reject
- Accept
- Proofreading and technical checks
- Article and all reviews published online

Academic reviewers

Patient reviewer(s)
BMJ's covid-19 hub supports health professionals and researchers with practical guidance, online CPD courses, as well as the latest news, comment, and research from BMJ. The content is free and updated daily.

Guidance

Education
Testing for SARS-CoV-2 antibodies
How might antibody testing be used?
A living WHO guideline on drugs for covid-19
A rapid recommendation on corticosteroids

Training
Covid-19 related courses
(24 courses)
BMJ Learning offers online courses directly related to

Management
Covid-19 diagnosis and management
The latest practical guidance from BMJ Best Practice on diagnosis and management of patients with covid-19

Clinical decision support
Diagnosis and management of related conditions, with patient information to support shared decision making

Patient information
Information for patients
Information for patients from BMJ Best Practice

Infographics
Free
Covid-19 antibody tests
Updated: 8 Sept
English

Covid-19: Long covid
Updated: 11 August

Remote consultation of covid-19
Updated: 25 Mar
English (UK) English (US)
Publishing work that has previously been a preprint
What are preprints and journals for?
Functions of scholarly communication

Basic functions (adapted from Roosendaal & Geurts 1998):
- Registration, for claiming precedence
- Certification, for establishing validity
- Awareness, e.g. through dissemination or alerting
- Archiving, to preserve the record

Additional functions/roles that journals took on:
- Selection
- Facilitation of rewarding, through metrics
- Creating research communities

Preprints provide registration, archiving, and some awareness

Journals also provide registration, archiving, and awareness, but a key function is certification of validity.

Bi@nca Kramer
@MsPhelps

BMJ
Clinical research has additional imperatives

Do some research

Discuss ideas

Prepare it for public sharing

Read / use other people's work

Share it with the world

Change clinical practice

Read / use other people's work

Discuss ideas

Do some research

Prepare it for public sharing

Share it with the world

Change clinical practice
The Digital and Trustworthy
d and living
Evidence Ecosystem

Synthesize evidence
Relevant, structured and living systematic reviews

Produce evidence
More relevant and higher quality primary research, real world evidence and big data

Evaluate and improve practice
Recording real world evidence in structured EHRs and registries, linked to evidence production

Implement evidence
Trustworthy evidence and guidelines for CDS in EHRs and quality improvement initiatives, linked to evaluation of care and production of new evidence

Disseminate evidence and recommendations to clinicians
Trustworthy, well disseminated and living clinical practice guidelines

Disseminate evidence to patients
Trustworthy evidence for shared and personalized decisions, in living decision aids, linked to living guidelines

Helen MacDonald and Reed Siemieniuk, on behalf of colleagues at the BMJ and the non-profit MAGIC research and innovation program.
Rapid Recommendations and Living Systematic Reviews: journals provide context and add meaning

Rapid Recommendations process step by step (with target times)

- **Step 1:** Monitor and identify potentially practice changing evidence
- **Step 2:** Executive + chair triggers process and RapidRecs panel (day 7)
- **Step 3:** Systematic reviews created by separate teams (day 45)
- **Step 4:** RapidRecs created in MAGICapp and as synopsis paper (day 60)
- **Step 5:** RapidRecs + reviews submitted for peer review (day 60)
- **Step 6:** RapidRecs and reviews disseminated globally (day 90)
Some issues are currently not helped by preprints

Avoidable waste in the production and reporting of research evidence
Chalmers and Glasziou. The Lancet 2009, Volume 374, 86-89

Waste in covid-19 research: how do we make the outpouring of research more effective?

Paul Glasziou, Sharon Sanders, Tammy Hoffmann, BMJ 2020;369:m1847 doi: 10.1136/bmj.m1847
“Peer-reviewed articles had, on average, higher quality of reporting than preprints, although the difference was small, with absolute differences of 5.0% ... There were larger differences favoring peer-reviewed articles in subjective ratings of how clearly titles and abstracts presented the main findings and how easy it was to locate relevant reporting information.”
Retracted coronavirus (COVID-19) papers

We've been tracking retractions of papers about COVID-19 as part of our database. Here's a running list, which will be updated as needed. (For some context on these figures, see this post, our letter in Accountability in Research and the last section of this Nature news article. Also see a note about the terminology regarding preprint servers at the end.)


6. “A review of convalescent plasma transfusion in COVID-19: Old wine reserved for special occasions,” published in...
Thank you!

Web: bmj.com
Email: tbloom@bmj.com
Twitter: @TheoBloom

https://www.ibiology.org/biomedical-workforce/preprints/