

# medRxiv:

## A paradigm shift in disseminating clinical and public health research

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## **Preprint (n):**

a research manuscript yet to be certified by peer review and accepted for publication by a journal

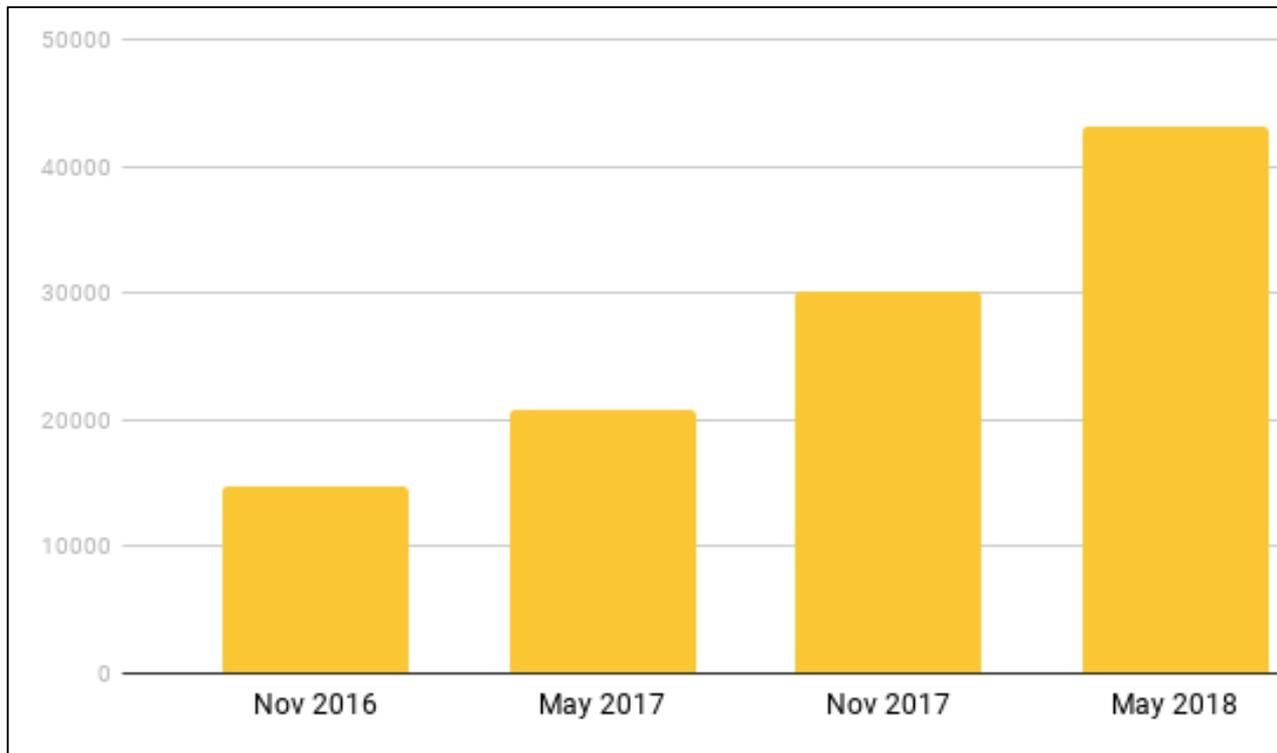
## **Preprint server (n):**

an online platform dedicated to the distribution of preprints

# Preprint servers are proliferating



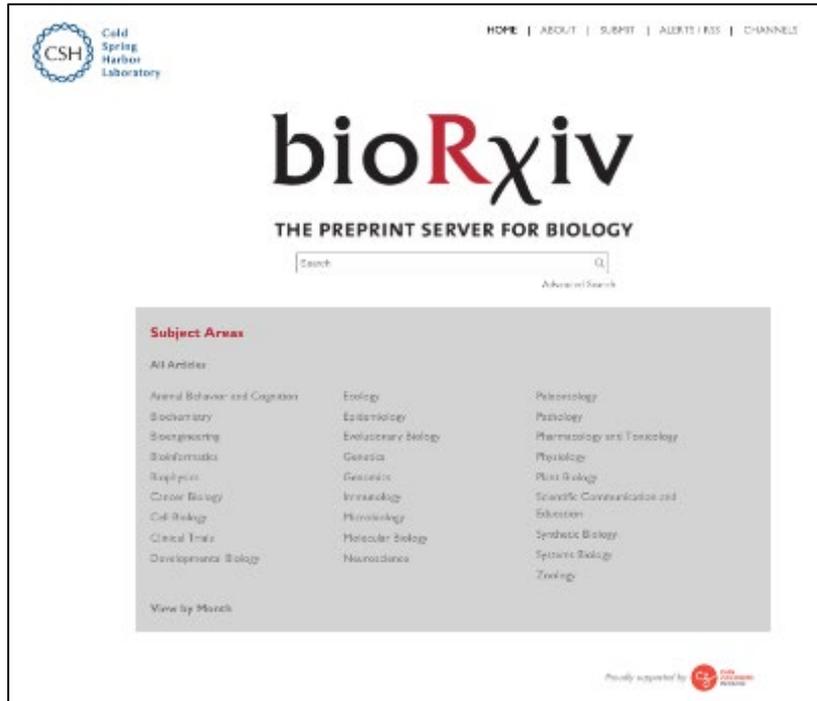
# Preprint volume across disciplines is growing



30% preprint growth for the past 2 years, compared with 2-3% for articles

Source: Jennifer Lin, CrossRef

# bioRxiv: a server for life science preprints



- A service, not a product, of Cold Spring Harbor Laboratory
- Opened Nov 2013
- Free for authors and readers
- Registration only for submitting author
- Not-for-profit
- Hosted by HighWire Press
- Publisher neutral
- Supported by



# bioRxiv: new manuscripts and usage

## In total

- 42,000 posted manuscripts
- 178,000 unique authors
- 14,700 institutions
- 110 countries

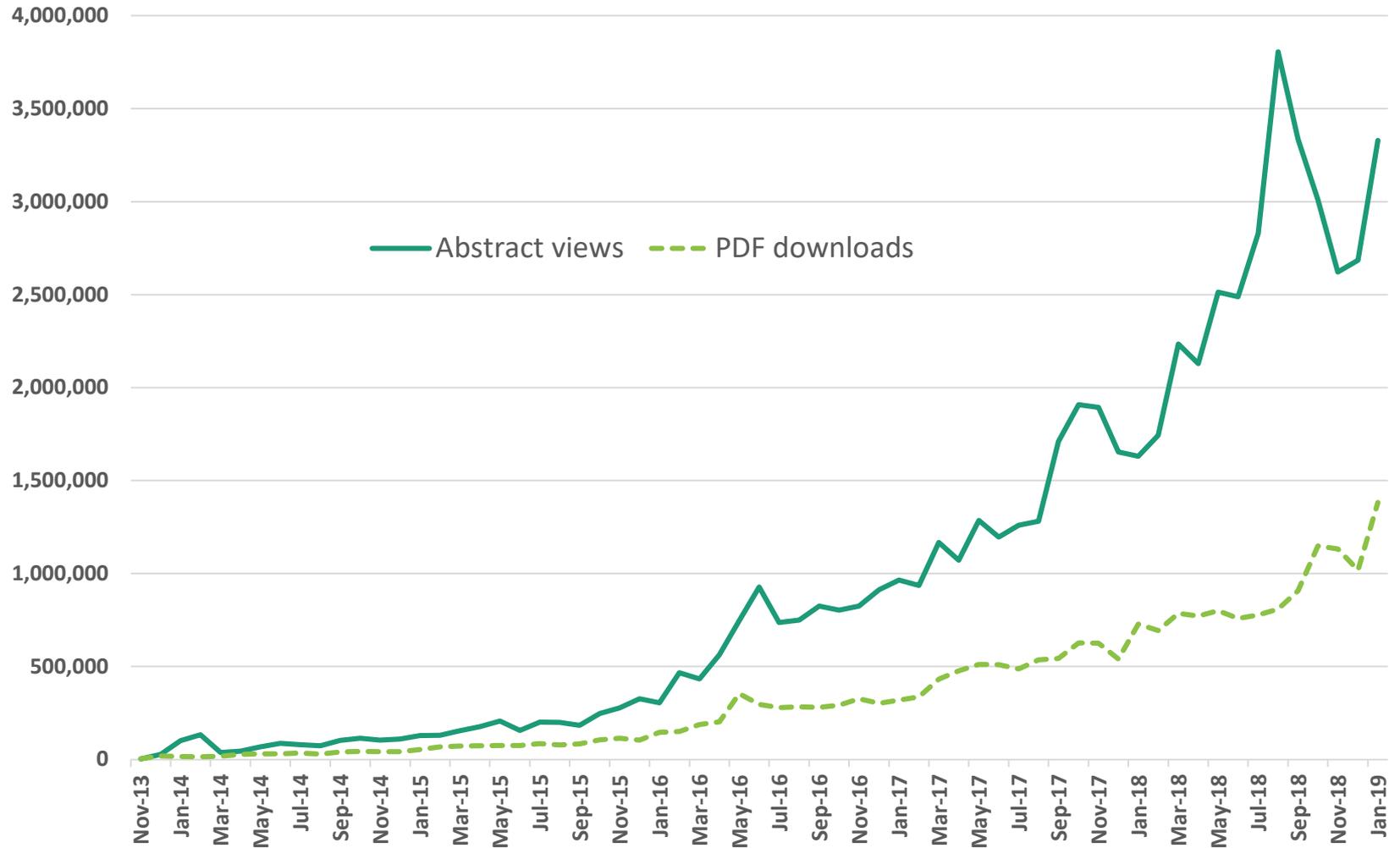
## In January 2019

- 2170 new papers
- 850 revisions
- 3.3m page views
- 1.3m PDF downloads

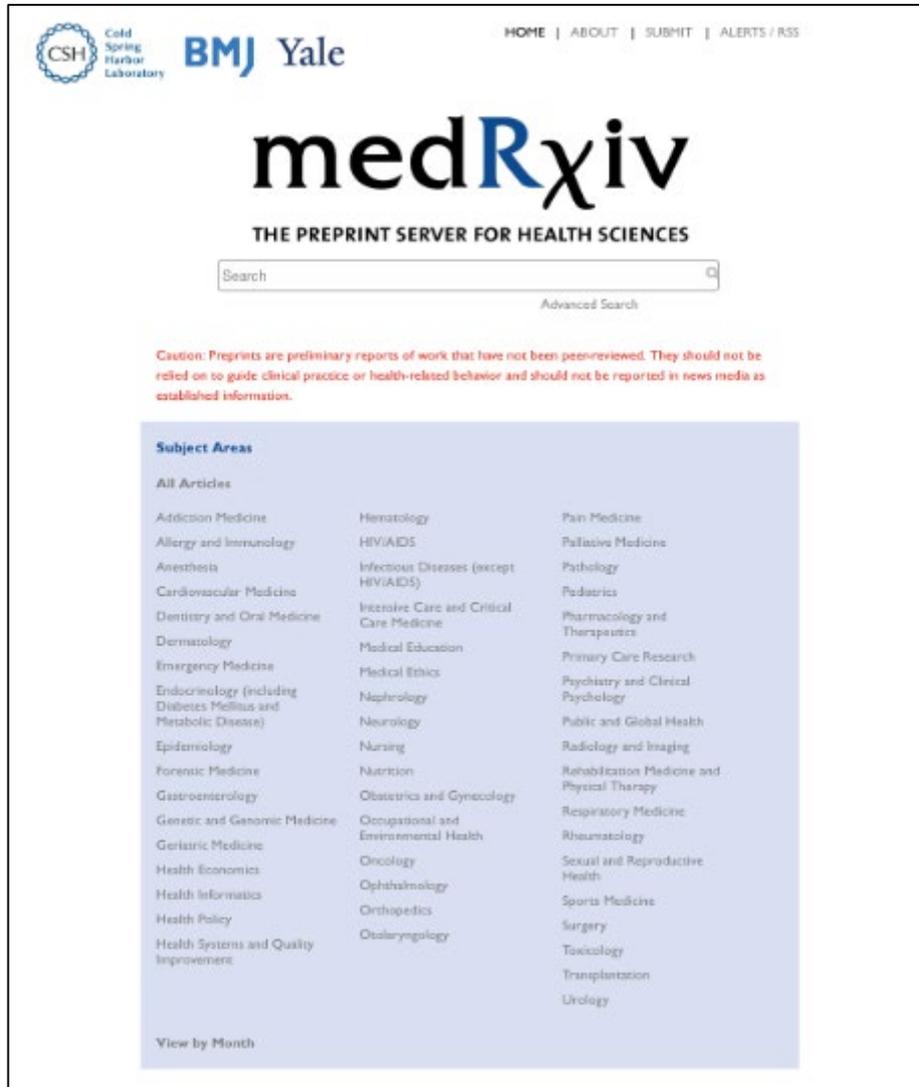


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# bioRxiv: usage is growing



# medRxiv: a server for health science preprints



The screenshot shows the medRxiv website homepage. At the top left, there are logos for CSH Cold Spring Harbor Laboratory, BMJ, and Yale. Navigation links for HOME, ABOUT, SUBMIT, and ALERTS / RSS are at the top right. The main title 'medRxiv' is prominently displayed, with the tagline 'THE PREPRINT SERVER FOR HEALTH SCIENCES' below it. A search bar is present, with a 'Search' button and a link to 'Advanced Search'. A red warning message states: '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 behavior and should not be reported in news media as established information.' Below this is a 'Subject Areas' section with a list of medical specialties organized in three columns. At the bottom left of the subject areas, there is a 'View by Month' link.

CSH Cold Spring Harbor Laboratory BMJ Yale

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# medRxiv

THE PREPRINT SERVER FOR HEALTH SCIENCES

Advanced Search

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 behavior and should not be reported in news media as established information.

### Subject Areas

All Articles

Addiction Medicine	Hematology	Pain Medicine
Allergy and Immunology	HIV/AIDS	Palliative Medicine
Anesthesia	Infectious Diseases (except HIV/AIDS)	Pathology
Cardiovascular Medicine	Intensive Care and Critical Care Medicine	Pediatrics
Dentistry and Oral Medicine	Medical Education	Pharmacology and Therapeutics
Dermatology	Medical Ethics	Primary Care Research
Emergency Medicine	Nephrology	Psychiatry and Clinical Psychology
Endocrinology (including Diabetes Mellitus and Metabolic Disease)	Neurology	Public and Global Health
Epidemiology	Nursing	Radiology and Imaging
Forensic Medicine	Nutrition	Rehabilitation Medicine and Physical Therapy
Gastroenterology	Obstetrics and Gynecology	Respiratory Medicine
Genetic and Genomic Medicine	Occupational and Environmental Health	Rheumatology
Geriatric Medicine	Oncology	Sexual and Reproductive Health
Health Economics	Ophthalmology	Sports Medicine
Health Informatics	Orthopedics	Surgery
Health Policy	Otolaryngology	Toxicology
Health Systems and Quality Improvement		Transplantation
		Urology

View by Month

- 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 June 2019

# medRxiv: leadership team



Yale

BMJ

# Rapid, early sharing of new science and information

- By removing the lag time to publication, after 10 years there could be a five-fold acceleration in scientific discovery.

([Steve Quake](#), Stanford Medicine Big Data 2017 talk)

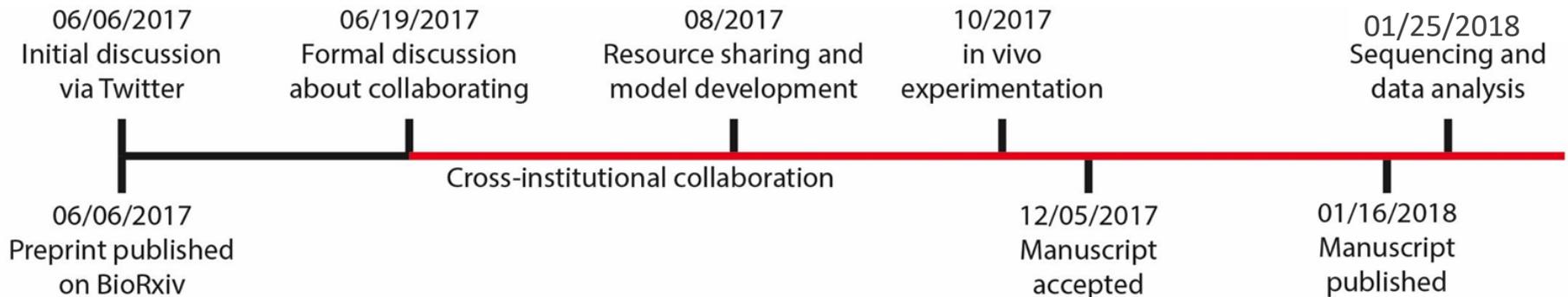


**Mike Feigin**  
@mikefeigin

This is a great paper on GPCRs and cancer. I saw the preprint 6+ months ago and we started a collaboration. Tomorrow, tumors will be collected. All that time would have been wasted without [@biorxivpreprint](#)

**Chris Natale** @Natale\_CA

I'm very excited to share our latest [@eLife](#) paper on [#GPER](#) and [#melanoma](#). I hope this work can help rekindle a conversation about differentiation-based cancer therapies in the era of [#Immunotherapy!](#)  
[elifesciences.org/articles/31770](http://elifesciences.org/articles/31770)



\*Not drawn to scale

# Preprints in medicine: potential benefits

## **Rapid, early sharing of new information**

- Establishes provenance of ideas while papers peer reviewed
- Facilitates awareness, prompts scientific feedback
- Enhances collaboration among scientists
- Demonstrates scientific productivity
- Promotes transparency, particularly for studies presented at conferences, but also links protocols, sensitivity analyses and supplementary materials (not all journals publish)

## **Make less “publishable” studies more readily available**

- Medical education evaluations
- Quality improvement & healthcare delivery innovations
- Confirmatory or contradictory results
- Negative or inconclusive clinical trial findings

**May facilitate replication and reproducibility studies, promote data sharing**

# bioRxiv: early experiences

- 8% of papers have comments, rising over time
- >100k tweets annually related to preprints
- 50% of authors report receiving feedback
  - 80-90% receive feedback via email, not comments
- 15% of authors report preprint posting stimulated new collaborations

# Preprints in medicine: concerns and perceived risks

## **Editors worry about:**

- Harm to the public from wrong information, magnified by media reporting
- ‘Persistent preprints’ with results/conclusion that changed after peer review
- Manipulation by commercial interests
- Undermining established medical communication norms
  - Peer-reviewed journals
  - Conferences
  - ClinicalTrials.gov

## **Authors worry about:**

- Journals that won't publish their paper if it's preprinted

# medRxiv: mitigating concerns and risks

- Submission requirements for authors
- Established screening process
- Clear posting criteria
- Signaling the need for caution when scientists and non-scientists read and review preprints

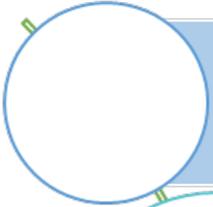
# medRxiv: submission requirements

- Follow ICMJE guidance, including author names, contact info, affiliation
- Funding and competing interests statements
- Statement of IRB / ethics committee approval
- Study registration (ClinicalTrials.gov or other ICMJE approved registry for trials, PROSPERO for reviews) and/or link to protocol
- Data sharing / availability statement
- EQUATOR Network reporting guidelines checklist(s)

## medRxiv: allowed article types

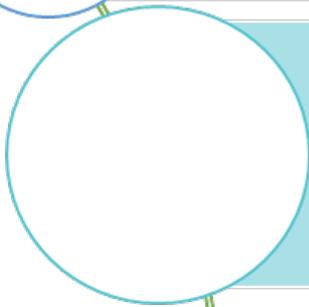
- Original research in the biomedical sciences, including clinical trials, observational research, surveys, quality improvement and policy studies, and medical education
- Systematic reviews and meta-analytic research;
- Methodological research
- Protocols (to accompany study preprints)

**Not Allowed:** commentaries, editorials, opinion pieces or essays, letters to editors, narrative reviews, medical-legal research, case reports



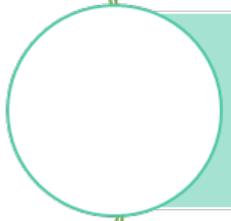
**1. Author submits manuscript to medRxiv**

- Submission is subject to automated checks built into the site to ensure required information (e.g. author contact, etc.) is submitted.
- PDF is generated, bearing a watermark identifying the work as a preprint



**2. CSH staff review for:**

- General structure and organization as a research article
- Plagiarism, obscenity
- Statements confirming authorship, affiliation, contributions, and consent to submit
- Statements on funding, competing interests, trial registration, data sharing, and research checklists
- Statements confirming IRB review and patient consent
- Any other general concerns to warrant immediate escalation



**3. medRxiv Affiliate (subject area expert) reviews for:**

- Allowed article type and subject area
- Meets reasonable criteria for a scientific report in this area
- No patient identifiable information or other ethical concerns
- Any concerns about content: flag for escalation



**4. Escalation reviews for:**

- Meets reasonable criteria for a scientific report
- Posting is in best interests of patients and clinicians, public health



**5. (Flagged Submissions) medRxiv Leadership reviews for:**

- Best interests of patients and clinicians, public health - post/don't post



**Article posted to medRxiv**

# medRxiv: screening step 1

## **In-house team checks for:**

- Submission requirements are met
- No evidence of obscenity, defamation, plagiarism
- Appropriate article type
- Images/identifiers of human subjects or small human populations (not acceptable)

## medRxiv: screening step 2

**Affiliates (PI's or equivalent) recommend posting or flag for further examination after considering:**

- Does the preprint meet reasonable criteria for a scientific report in this area of study
- Is the content sufficiently described and detailed, regardless of quality of the science (not a review for accuracy)
- Would distribution before study is vetted through peer review create potential risk to the health of patients or the public?

Which studies put public's health at risk?

# Harmful to public health?

**What do clusters of similar HIV genetic sequences tell us about HIV risks in Africa?**

“...most sex partners are in or close to home, genetic diversity showed little or no geographic structure in the three studies that looked at the issue. Evidence from these studies does not support the common view that sex accounts for most HIV infections in Africa. Studies did not do what they...”

Rejected from bioRxiv.



**The Moral Hazard of Lifesaving Innovations:  
Naloxone Access, Opioid Abuse, and Crime\***

Jennifer L. Doleac

Anita Mukherjee

March 31, 2019

**STAT**

**Amid Efforts to Expand Naloxone Access,  
Controversial New Study Questions its Value**

concern that it encourages riskier behaviors with respect to opioid abuse.

## medRxiv: screening step 3

**No fool proof strategy, so plan for the first 6-12 months (as we learn more and proceed cautiously) is to have an experienced medical editor accept or reject postings**

- Approves affiliate recommendations
- Addresses concerns identified by affiliates or in-house team
- Consults with leadership team on decisions as necessary

## medRxiv: posting criteria

**The medRxiv leadership team makes the final determination regarding appropriateness for preprinting on the server**

- medRxiv reserves the right not to post any manuscript
- Decisions are communicated to corresponding author by “The medRxiv Team”

# medRxiv: urging caution in using preprints



BMI Yale

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All Articles

Addiction Medicine

Allergy and Immunology

Anesthesia

Cardiovascular Medicine

Hematology

HIV/AIDS

Infectious Diseases (except  
HIV/AIDS)

Pain Medicine

Palliative Medicine

Pathology

Pediatrics

# medRxiv: urging caution in using preprints

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**BMJ** Yale

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**This article is a preprint and has not been peer-reviewed [what does this mean?]. It reports new medical research that has yet to be evaluated and so should not be used to guide clinical practice.**

therefore, continuing efforts are ongoing to explore novel targets and strategies for the management of CaP. A complete understanding of the genetic control of the processes of cellular proliferation and programmed cell death viz . apoptosis may provide the basis for the rational design of novel therapeutic strategies against CaP.

Anesthesia

Cardiovascular Medicine

Dentistry and Oral Medicine

Dermatology

# medRxiv: urging caution in reporting on preprints

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## What is an unrefereed

Before formal publication in a scholarly journal are traditionally "peer reviewed." In this process, authors receive advice from various experts—called "referees"—who read the paper and may identify weaknesses in its assumptions or conclusions. Typically a journal will only publish a paper if it is satisfied that the authors have addressed referee comments and presented support for the conclusions drawn in the paper.

Because this process can be lengthy, authors use preprint servers to make their manuscripts available as "preprints" before formal publication.

**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.**

# Journals: how to signal support for preprints

- Allow direct transfer from or encourage simultaneous submission to journal and medRxiv
- Talk to medRxiv leadership about concerns and opportunities
- Update author instructions, as well as the SHERPA/ROMEO site and Wikipedia to publicly signal support: “journal will consider manuscripts with a version previously posted to medRxiv”

[https://en.wikipedia.org/wiki/List\\_of\\_academic\\_journals\\_by\\_preprint\\_policy](https://en.wikipedia.org/wiki/List_of_academic_journals_by_preprint_policy)

Publisher *	Policy type *	Policy text *
The JAMA Network	Incompatible	"Public dissemination of manuscripts prior to, simultaneous with, or following submission to this journal, such as posting the manuscript on preprint servers or other repositories, is discouraged, and will be considered in the evaluation of manuscripts submitted for possible publication in this journal. The evaluation will involve making a determination of whether publication of the submitted manuscript will add meaningful new information to the medical literature or will be redundant with information already disseminated with the posting of the preprint."
JMIR Publishers (JMIR)	Compatible	JMIR Publishers, publisher of the Journal of Medical Internet Research and other journals has its own Preprint Server <sup>19</sup> but also publishes work that has previously published on other preprint servers. "We advocate open science and have no issues with submissions that were previously posted on other preprint servers. We ask that you disclose this fact in the cover letter" (comments to the editor when you submit). If you have any previous peer-reviews, please upload them as well."
American Association for Cancer Research (AACR)	Compatible	"Posting of manuscripts on institutional websites or on recognized community preprint servers, such as bioRxiv, is permitted under our publication policy. Authors must retain copyright to such postings and are encouraged to contact the journal's editors to discuss their specific manuscript if they have questions. Please note that the AACR does not support posting of revised manuscripts that respond to editorial input and peer review or the final published version to preprint servers."
American Heart Association (AHA)	Compatible	All AHA journals share the same policy: "Posting of un-referenced manuscripts to a community pre-print server by the author will not be considered prior publication, provided that the following conditions are met: 1) During submission, authors must acknowledge pre-print server deposition and provide any associated accession numbers or DOIs; 2) Versions of a manuscript that have been altered as a result of the peer review process may not be deposited; 3) The pre-print version cannot itself have been indexed in MEDLINE or PubMed; 4) Upon publication, authors are responsible for updating the archived pre-print with a DOI and link to the published version of the article."

## After preprinting: corrections

Authors may submit a revised version of an article to medRxiv at any time.

**But...**once posted on medRxiv, articles receive a DOI, are citable, and therefore cannot\* be removed.

\*Take-downs in rare circumstances

# After preprinting: retractions & withdrawals

**Journal driven**: flag and link to journal  
**Retraction**

**Author driven**: flag as **Withdrawn**, give  
explanation, retain original

# After preprinting: withdrawals



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**Withdrawn**

**EM added text for testing: Sequence of cognitive changes associated with development of Alzheimer's disease in Down syndrome - data driven analysis**

Kevin-John Black  
doi: <https://doi.org/10.1101/01000737>

**This article is a preprint and has not been peer-reviewed [what does this mean?]. It reports new medical research that has yet to be evaluated and so should not be used to guide clinical practice.**

[Abstract](#) | [Info/History](#) | [Metrics](#) | [Preview PDF](#)

**Abstract**

Article Summary: In fewer than 100 words, summarize the significance of your article for the general readership of Genetics. This summary may be modified and used in the Issue Highlights section of the journal and the GSA Newsletter. See NCT12345678

**Competing Interest Statement**

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[Anesthesia](#)

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[Dentistry and Oral Medicine](#)

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# After preprinting: takedowns

- Copyright infringement
- Fraudulent authorship issues
- Biohazard
- Serious ethical breaches

*“medRxiv reserves the right to identify and remove any articles that contain plagiarized material or describe experimental work that is not performed in accordance with the relevant ethical standards for research using animals or human subjects”*

# medRxiv

**THE PREPRINT SERVER FOR HEALTH SCIENCES**

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