NEWS

Preprint server aims to lead medical research into era of open science

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A new online repository for unpublished health and medical manuscripts launched in June: **medRxiv** (pronounced ‘med-archive’) hosts original research, reviews and meta-analyses in disciplines ranging from neurology to sports medicine.

The project is a collaboration among **Cold Spring Harbor Laboratory New York** — which also runs the biological preprint server bioRxiv — Yale University and the publishing company BMJ.

Preprint servers host work that has not yet been peer reviewed or edited. Manuscripts typically appear online within days of being submitted after being quickly screened for offensive or non-scientific material. By contrast, academic journals typically require three independent experts to scrutinize manuscripts — a process that can take up to six months.

The launch is part of a global move toward 'open science,' an umbrella term for transparency and accessibility in science, which includes everything from sharing data to making research manuscripts freely available online. bioRxiv launched in 2013; despite some initial **uncertainty about its benefits**, it has proved to be a success: Between 2014 and 2018 the number of researchers who have submitted their work to **the archive grew** from 4,012 to 106,231.

Preprint servers also create opportunities for scientists to **get feedback from their peers** and to improve their work before submitting it to a journal, says **John Inglis**, executive director of Cold Spring Harbor Laboratory Press, who helped set up both bioRxiv and medRxiv. A survey of about 4,500 bioRxiv participants revealed that most receive private feedback on their work, he says.

However, sharing the results of clinical trials and other medical research before the work has been peer reviewed does carry risks, he says; people might stop taking their medications or decide to try new ones on the basis of preliminary results, for example.

"[medRxiv] should not be used to guide clinical practice," Inglis says.

The new server's creators have built in a number of precautions intended to prevent misuse of the information. A team of researchers and a medical editor screen each submission for plagiarism, conflicts of interest and ethical and other compliance; they flag any concerns for further evaluation. The team will reject any paper deemed too "risky" to publish without peer review, Inglis says.

"We feel that we've built in safeguards while still retaining the benefits of the early dissemination of recent research results," he says.

Culture shift:

Science has long been accused of maintaining a 'publish or perish' culture, in which researchers' contributions are measured by the number of journal articles they publish. Academic journals — especially the most prestigious — prefer to publish novel findings, which reduces the incentive for scientists to replicate previous studies or to report negative findings.

Preprint servers allow such "inconsequential" findings to see the light of day in a reasonable period, Inglis says.

For instance, a study published in July, which reported negative results from a trial of low-dose fluoxetine in people with autism, took nearly a decade to reach publication after the trial ended^1.

“I would imagine that it would have been easier for them to submit the initial results to medRxiv,” says **Jeremy Veenstra-Vanderweele**, professor of psychiatry at Columbia University.

medRxiv is “an important step forward for open science,” he says. “At minimum, it should speed the time between study completion and publication for studies that may not have flashy results.”

Still, some skeptics maintain that posting results to medRxiv before peer review runs the risk of inaccurate or overstated conclusions being shared as fact.

“The real dilemma [with medRxiv] is between open science with or without quality control,” **Thomas Ploug**, professor of information communication technology ethics at Aalborg University in Denmark, told *Spectrum* via email. Ploug says he is in favor of open science that incorporates some system of peer review. “I certainly do not believe that scientists (myself included) are always sensitive to the wider societal effect of their research,” he says.

Even the strongest proponents of open science agree that peer review remains the gold standard for quality control.

“Well-known journals have an extensive and detailed peer review process. They often make considerable changes to the manuscripts,” says Inglis. Regardless, he says, the scientific community benefits from seeing research results as soon as possible — even when the published papers end up differing substantially from their preprint form.

As the culture of preprints grows, people will become more savvy about interpreting preprints, says **Chris Gunter**, associate professor of pediatrics and human genetics at Emory University in Atlanta, who serves as an advisor to bioRXiv. In her experience, she says, older doctors are dismissive of preprints, but younger ones are paying attention: “In 5 to 10 years, it will have a transformative effect on how people share science.”

medRxiv has seen 212 submissions so far, and has published 120.

REFERENCES:

1. Herscu P. *et al. J. Autism Dev. Disord*. Epub ahead of print (2019) **PubMed**