SPECIAL REPORT

US seeks to make science free for all

Moves to make research funded by the US government available to everyone could mark a turning point in a publishing revolution. **Declan Butler** reports.

The push to open up scientific knowledge to all looks set to go into overdrive. Over the past decade, the accessibility offered by the Internet has transformed science publishing. Several efforts have already tried to harness the web's power to make research papers available for free. Now two parallel efforts from the US government could see almost all federally funded research made available in free, publicly accessible repositories.

Traditional science publishing relies on institutions and libraries buying subscriptions and site licences to academic journals. Some 'open-access' publishers, such as the non-profit Public Library of Science (PLoS), make papers free to readers immediately and try to cover the costs of peer review and publication by charging authors a fee. But author-pays business models are still in their infancy, and the papers they produce account for only a fraction of the literature.

The US government and many other research funders are largely taking a different tack — one that can instantly make huge numbers of scientific articles publicly available after a certain delay. Increasingly, they are making it a condition of funding that when scientists publish in a peer-reviewed subscription journal they must place of copy of their paper in a free, publicly accessible database. Such archives, however, mostly contain the authors' final version of the manuscript rather than the published, version of record available on the publisher's website.

The argument that everyone should have free access to the fruits of taxpayer-funded research has proved popular with lawmakers keen to reap the benefits of investment in science. And distributing results as widely as possible is predicted to produce socioeconomic gains, such as helping doctors keep up with medical research.

"The notion of open government and open access has taken a firm hold," says John Hawley, executive director of the American Society for Clinical Investigation in Ann Arbor, Michigan. "If that means public-access mandates, so be it."

Public access was boosted in late 2007, when the US Congress passed a bill making it compulsory for scientists funded by the National Institutes of Health (NIH) to deposit their papers in the agency's PubMed Central archive within 12 months of publication.

The agency had introduced a voluntary policy in 2005, but the idea flopped when scientists showed little interest in depositing their articles. Since the measure became compulsory, submissions to PubMed Central and use of the archive have skyrocketed (see 'Where freedom grows'). PubMed Central now holds nearly 2 million articles, and on a typical weekday some 420,000 users between them download about 750,000 articles.

In recent years similar mandates have been imposed by research funders in other countries, including the Wellcome Trust — Britain's largest research charity — all the UK government's research councils and the European Research Council.

In the United States, two recent proposals could see a policy similar to that of the NIH soon cover most federally funded research. The Federal Research Public Access Act (FRPAA), a bill reintroduced in the Senate in June last year by Joseph Lieberman (Independent, Connecticut) and John Cornyn (Republican, Texas), would apply to all research funded by federal agencies with annual research budgets of more than $100 million, with a few exceptions such as classified research. The House could consider the bill within months.

Harvard's Stuart Shieber backs author-pays models.

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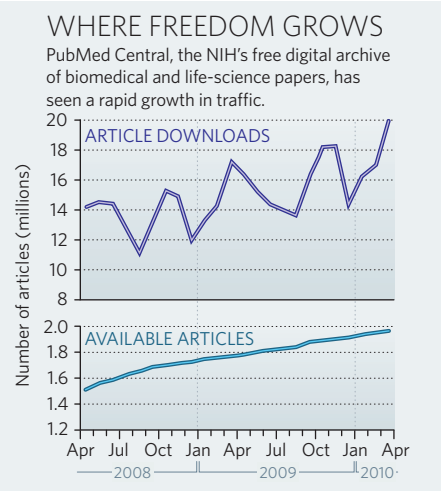
Meanwhile, a six-week public consultation on whether and how public-access policies might be implemented ended on 21 January. Organized by the White House's Office of Science and Technology Policy (OSTP), the consultation has sparked intense speculation that President Barack Obama might soon sign an executive order bringing a policy covering similar ground to the FRPAA into force. That order might also dispense with the $100-million budget cap, but, being an executive order, it would be more vulnerable than a federal law to being overturned by a future administration.



SOURCE: PUBMED CENTRAL

Fledgling model

The various public initiatives enjoy wide support among leaders of research agencies, universities, libraries and research charities. A broad consensus on the need to enable public access to all US federal research emerged in a report published in January by the Scholarly Publishing Roundtable, a panel of librarians, academic leaders and publishers convened last June by the OSTP and the House Committee on Science and Technology.

The report recommended that archiving policies should not damage commercial and not-for-profit scholarly publishing businesses. As with the NIH mandate, it says that publishers should be allowed to delay archiving an article for several months or more after it is published, so that they don't lose business from their paying subscribers.

Some publishers aren't satisfied. One panel member, YoungSuk Chi, vice-chairman and managing director of global academic and customer relations for Amsterdam-based Elsevier, dissented from the report, saying that it supports "an overly expansive role of government and advocates approaches to the business of scholarly publishing that I believe are overly prescriptive". In a joint statement to the OSTP, the Association of American Publishers (AAP) and the Washington DC Principles Coalition for Free Access to Science — which represents society publishers — slammed NIH-style mandates as "a means for facilitating international piracy", saying that they would "damage the very institutions that researchers, the public and government itself rely on to peer review, publish, disseminate and preserve scientific information". The statement argued that the government should instead make research results available as summaries, reports and data.

Many of these organizations' members,

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Harvard University is part of a group seeking ways to bolster open access to research papers.

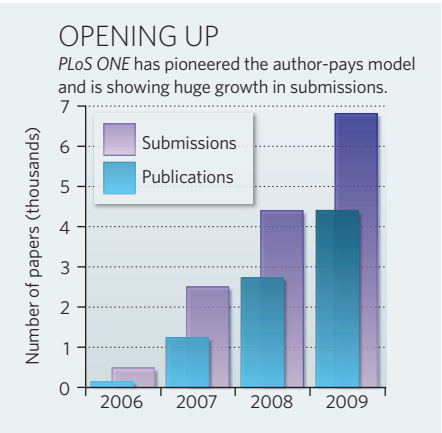
however, already have policies allowing scientists to deposit their own versions of manuscripts in free public archives, and some allow them to post a copy of the final published version. Many journals, including *Nature*, also help authors fulfil institutional mandates by depositing articles in PubMed Central on the authors' behalf.

Allan Adler, the AAP's vice-president of government and legal affairs, says that its message is being heard in Washington and that he expects the two US proposals to "get more careful consideration than did the NIH mandate". One member of the AAP has explicitly distanced itself from the organization's stance, however. Mike Rossner, executive director of Rockefeller University Press in New York, wrote to Bart Gordon (Democrat, Tennessee), chairman of the House Committee on Science and Technology, on 31 March saying: "We strongly support the efforts of the federal government, such as the NIH mandate and the Federal Research Public Access Act, to provide public access to the results of federally funded research."

Mark Patterson, director of publishing at PLoS's European office in Cambridge, UK, said that although the roundtable's proposals would "significantly improve" access, they don't go far enough. He argues that bills such as the FRPAA should specifically support models in which authors' fees allow articles to become freely available the moment they are published.

For now, mandates seem to be the tool of choice for governments and funders to engineer greater public access, whereas the author-pays method remains a fledgling business model. Publishers such as PLoS and the for-profit BioMed Central, which in 2008 was bought by international publisher Springer, based in Germany, have only recently shown that their author-pays model can be sustainable for at least some forms of journal (see 'Opening up'). But the model has proved unable to generate the investment needed for highly selective journals or for those that provide substantial amounts of editorial added value, such as reviews.

A growing number of funders are paying author fees on behalf of the scientists they support, but this approach is still far from becoming mainstream. In a bid to change that, five large US research centres, including Harvard University and the Massachusetts Institute of Technology, both in Cambridge, Massachusetts, launched the Compact for Open-Access Publishing Equity in September 2009 to encourage more funders and institutions to pay author fees. This could "reduce the risk to publishers of moving to an open-access business model", says Stuart Shieber, who heads Harvard's Office for Scholarly Communication and is one of the drivers behind the initiative.



SOURCE: PLOS ONE

Matthew Cockerill, managing director of BioMed Central, welcomes the move. "The Compact members are actively thinking about how to bring about a sustainable change in how their scholarly output is communicated, and are beginning to set up the necessary funding channels to facilitate this," he says.

Hybrid vigour

Three more institutions, including Columbia University in New York, signed up to the Compact last December. The funds created by the Compact's founding institutions are small, however, and researchers have so far been slow to tap into them. But some fear that the Compact's policies could slow the transition to greater open access because they explicitly discourage paying author fees to 'hybrid journals'. These subscription journals — such as *The EMBO Journal*, published by Nature Publishing Group — give authors the option to pay a fee to make an individual article open access.

Shieber says he is open to revising the policy, but adds that it is motivated by a belief that scarce author fees should go first to pure open-access journals. He also notes concerns that some subscription journals are charging open-access fees while also making money from subscriptions. To ease those worries, some publishers, including Oxford University Press and Nature Publishing Group, modify the subscription prices of hybrid journals in response to open-access uptake.

"The hybrid model is far less risky than betting on a full author-pays business model," says Philip Davis, a graduate student in science publishing at Cornell University in Ithaca, New York. He argues that hybrid journals are a key mechanism to allow subscription-based journals to move to greater open access without jeopardizing their viability. "I'd much prefer a transition in business models, and most hybrid publishing models allow for this transition."

One problem is that little research has been done to explore how a transition to greater open access would best be designed, says Mark McCabe, an economist at the University of Michigan in Ann Arbor. "An ideal future does not consist of only open-access journals, but rather a mix of open-access, subscription-based and perhaps hybrid journals," he says.

Patrick Labelle, a librarian at the University of Ottawa, Canada, which is a member of the Compact, is convinced that open access will win out over conventional scholarly publishing. "The rapid pace that we have seen in the past few years by institutions, granting agencies, publishers and researchers is indicative that change is upon us," he says. "Open access will, one day, prevail over traditional publishing models." ■

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