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More research will be publicly accessible sooner

Research manuscripts and the associated scientific data generated for projects that are funded by federal agencies in the United States will need to be made publicly available immediately on publication.

Most COVID-19 research content has been freely available since early 2020. Such immediate public access to research results, also through preprinting[1], has opened the eyes of researchers, regulators and publishers to many of the benefits of openly accessible research findings and data. Citing COVID-19 research as "a powerful case study on the benefits of delivering research results and data rapidly to the people", the Office of Science and Technology Policy (OSTP) of the US government is now instructing[2] all federal agencies that fund research to update their public-access policies so that peer-reviewed research and scientific data published in scholarly publications are made immediately available for free. The OSTP is therefore closing the door to public-access embargoes. Since 2013, federally funded research in the United States has been subject to an optional embargo on the free and public release of research findings up to 12 months after their publication in a scholarly journal.

The new guidelines may have come sooner than many expected. However, they are not surprising. Subscribers to Plan S — an initiative that is supported by the European Commission and the European Research Council — have long been advocating[3] for more research to be published open-access under a liberal licence. And, for many years, large publishing houses have been launching more fully open-access journals and adapting their portfolio so as to rely less on subscription revenues and to increasingly adopt business models (typically involving article processing charges and transformative agreements[4]) that allow for more research to be published with open-access licences.

What are the recommendations specified in the Memorandum issued by the OSTP? In particular, they refer to public access through agency-designated repositories and via machine-readable formats; yet, unlike Plan S funders, they do not prescribe any particular publishing licence or journal-publication model (such as subscription-based or open-access), nor do they prescribe which version of the research paper (the accepted manuscript, or the version of record) the policies will apply to. Moreover, the recommendations affect all federally funded co-authors (rather than just principal investigators) and peer-reviewed research articles (hence, these may include non-primary research). Also, the Memorandum instructs the agencies to make their plans public before the end of 2024, and to make the resulting policies effective within one year after the publication of the plans.

Public access to research outputs must be supported by equitable policies.

The Memorandum therefore provides a general framework, and leaves the implementation details to the agencies. Still, the OSTP pledges to facilitate coordination among them as well as engagement with the many stakeholders of the publishing ecosystem (librarians, professional societies, publishers and others) to identify best practices and to reduce inequities in access to research and in research publishing. In fact, the Memorandum states that "financial means and privileged access must never be the prerequisites to realizing the benefits of federally funded research that the American public deserves".

To facilitate the immediate and equitable delivery of federally funded research results to all, the agencies should lay out joined-up policies that ensure equitably distributed funding, technology and infrastructure for the publication and public availability of research outputs[5,6]. In this regard, gold open access — rather than zero-embargo green open access, which may jeopardize[7] the viability of many academic journals — seems to be the best conduit to achieving worldwide reach and impact and to incentivizing the reuse of research findings, methods, data and code. Still, maintaining equitability while transitioning to this publishing model can be expensive and complex[8]. For example, as we stated in an Editorial published in January 2021 in the context of the high article processing charges associated with gold-open-access publishing in highly selective journals (including *Nature Biomedical Engineering* and the other Nature-branded journals), "in a predominantly open-access environment, researchers, institutions and funders with more resources will find it increasingly easier to achieve bigger exposure and rewards"[9]. The OSTP rightly recommends that federal agencies allow their funded researchers to budget reasonable costs of publication (as well as costs associated with maintaining public accessibility to the scientific data); yet, at present, it is unclear what level of support there may be for researchers to be able to meet the requirements to be set out in the new or updated policies and for research institutions to set transformative agreements with publishers.

To increase the return on investments in equity in publishing, setting appropriate policies for open data and open code will be particularly important. Richer datasets and sophisticated algorithms are increasingly becoming essential to solving biomedical, clinical and public-health challenges. Maintaining curated, organized, interoperable and annotated datasets and codes, and making them easily available for reuse, requires resources[6]. The OSTP, federal agencies and all other stakeholders should contribute to providing suitable funds and infrastructure, and eventually close the door to siloed practices in data deposition and sharing.

Regardless of updates to public-access policies and to business models of research publishing, our editorial decisions on individual research manuscripts will be shielded from any financial considerations and publishing models. Nearly 60% of the research content

published in *Nature Biomedical Engineering* since 2017 has been partially or fully funded by the National Institutes of Health of the United States, nearly 20% by the country's National Science Foundation, and about 10% and 4.5% by the Department of Defense and the Defense Advanced Research Projects Agency, respectively. These numbers reflect that the United States is undisputedly a leader in applied biomedical research. A culture of leadership and of measured risk-taking[10] should also translate into exemplary publishing and public-access policies that are progressive, effective and equitable.

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