**Alliance for Taxpayer Access**

# Enhanced Access to the Published Results of NIH Research Will Benefit Science, the Economy and Human Health

Widespread dissemination of research results is an essential, inseparable component of our nation's investment in science and a right of the American taxpayer. It is only through *use* that we obtain *value* from this investment. The open sharing of medical advances and scientific findings will increase and accelerate the return of benefits to the taxpayer.

However, as scientists themselves assert, the current system of disseminating scientific articles, a legacy of print regime, is failing us.[1] Libraries, whose subscriptions finance the system, would agree.[2] Even industry analysts see the imperative for change:

> [W]e would expect governments (and taxpayers) to examine the fact that they are essentially funding the same purchase three times: governments and taxpayers fund most academic research, pay the salaries of the academics who undertake the peer review process and fund the libraries that buy the output, without receiving a penny in exchange from the publishers for producing and reviewing the content....We do not see this as sustainable in the long term, given pressure on university and government budgets.[3]

The Internet now makes expanded access to NIH research feasible and practical. After careful examination of the issues[4] and consultation with stakeholders, NIH has put forward a reasoned proposal to expand access – a proposal that appropriately balances the interests of taxpayers and publishers.[5] The NIH proposal overcomes the counterproductive and unnecessary systemic "friction" of access fees without undermining the subscription business model that supports most existing journals. Its implementation will lead to new and increased usage by millions of physicians, public health officials, patients, students, teachers, scientists, and others. It will effectively leverage the taxpayers' investment in the National Institutes of Health (NIH).

Expanding access to NIH-funded research also offers the potential for downstream economic stimulus. Industry analysts commenting on the NIH proposal have pointed to a "clear opportunity for private-sector

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[1] Open letter to the US Congress signed by 25 Nobel Laureates, August 26, 2004.

[2] For example, SPARC, a coalition 300 major academic and research libraries, was established to "correct market dysfunctions in the scholarly communication system" and to "facilitate the emergence of the networked environment to disseminate research." <http://www.arl.org/sparc/>

[3] Credit Suisse First Boston, *Sector Review: Scientific, Technical and Medical Publishing*. April 6, 2004.

[4] *Access to Biomedical Research Information*, May 2004 <http://www.taxpayeraccess.org/docs/NIH_access_report.pdf>

[5] U.S. National Institutes of Health, "Enhanced Public Access to NIH Information," *NIH Guide*: *Notices.* September 3, 2004. (NOT-OD-04-064). <http://grants.nih.gov/grants/guide/notice-files/NOT-OD-04-064.html>

content companies to more aggressively pursue the business of bringing taxpayer-funded information to market."[6]

More significantly, the accelerated and expanded exchange of credible scientific results will lead to growth in patentable discoveries and their commercial application. New jobs may be supported within the research sector, including industries that support medical research, such as manufacturing of lab equipment, instrumentation, chemical analysis, and so on.

## Improving Outcomes

Recent experience supports this reasoning by demonstrating a compelling connection between expanded access to published scientific literature and improved outcomes:

**1) Expanded access to research increases its impact and better informs subsequent research.**

A growing body of evidence demonstrates that when scientific research is accessed more frequently it is cited more often in subsequent research, a common measure of research impact.[7] This suggests that open access, by eliminating access barriers, will expand the application of research to further advances.

- Research by Brody has documented a significant correlation between online downloads of open access scientific articles in physics and mathematics and their subsequent increased citation factor.[8]

- Perneger has shown that increased download rates for *British Medical Journal* articles correlate to increased citations for those articles in subsequent years.[9]

- Lawrence analyzed nearly 120,000 computer science articles cited in a standard disciplinary bibliography. When he looked at articles with successively higher levels of impact or citations, he found successively higher percentages of open access articles, and vice versa. He found the strength of this correlation steadily increased over a decade.[10]

- Although open access journals, a relatively new phenomenon, have not yet had time to garner the same level prestige as long-established subscription journals, a recent Institute for Scientific Information (ISI) study reported that open access journals already have similar citation factors to traditional journals.

**2) Broader access to knowledge fuels accelerated use and innovation.**

Open access accelerates medical and scientific progress. Maurer and Scotchmer observe that, "If research proceeds cumulatively...then the rate of progress depends on the norms of openness in which the scientists

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[6] Curle, D., "Tax Dollars at Work I: NIH Moves Ahead on Open Access," *Outsell's e-briefs*. September 10, 2004.

[7] A bibliography of literature documenting the connection between open access and research impact is under development at <http://opcit.eprints.org/oacitation-biblio.html>.

[8] Brody, T. & S. Harnad, "Using Web Statistics as a predictor of Citation Impact." 2004, in prep. <http://www.ecs.soton.ac.uk/~harnad/Temp/timcorr.doc>

[9] Perneger, T., "Relation between online 'hit counts' and subsequent citations: prospective study of research papers in the BMJ." *British Medical Journal* (BMJ 2004;329:546-547). September 4, 2004. <http://bmj.bmjjournals.com/cgi/content/full/329/7465/546>

[10] Lawrence, S., "Online or Invisible?" *Nature* 411 (6837): 521 <http://www.neci.nec.com/~lawrence/papers/online-nature01/>.

operate. Scientists cannot have ideas for further advance if they do not know what has already been discovered."[11]

In recent years, open sharing of scientific data has revolutionized life science research and helped establish new fields such as genomics and proteomics. For example, GenBank, the public database of DNA sequences operated by NIH, is accessible freely and without restrictions to all scientists in industry and academia. Commercial companies freely download and use it locally to develop new products in a secure environment. GenBank is credited with playing a critical role in the genomics revolution. Indeed, many of the leading advocates of open access are scientists who have seen first-hand the positive effect of GenBank on their work to better understand and treat diseases.

Open access to the more than 60,000 scientific and medical articles published annually as a result of NIH research will have similarly profound benefits. The huge audience for this information is demonstrated by the experience of shifting the National Library of Medicine's former fee-based directory of biomedical research (Medline) into the freely available PubMed. Use of PubMed, which allows access only to brief abstracts of published biomedical research, increased a hundred fold once it became freely available.

**3) Expanded innovation resulting from enhanced access will improve health care outcomes.**

Open access and cooperative sharing played a key role in the sequencing of the SARS virus in just seven days, expediting the development of diagnostic tests to identify the virus. Researchers found that unprecedented cooperation and speedy scientific advancement allowed them to quickly control outbreaks.

As CDC Director Gerberding declared, "We're only 31 days into the investigation and we have an international collaboration, we've identified the likely cause and also sequenced the virus and created a number of diagnostic tests…. This is a scientific achievement I don't think has ever been paralleled in our history."[12]

And Simon Sutcliffe, president of the British Columbia Cancer Agency, stated, "This collaborative effort demonstrates that the use of genomics crosses the boundaries of health issues and gives us the confidence that we'll be able to meet similar challenges in the future."[13]

**4) More innovation will stimulate the U.S. life sciences economy**

By expanding access to the published results of NIH-funded research, NIH will support extensive state economic development efforts in the life sciences sector. In 2004, 40 states specifically targeted the biosciences for development and all 50 states have economic development initiatives available to assist bioscience companies.[14]

## Protecting the Publishing Industry

Notwithstanding these clear benefits, publishers have raised concerns that expanding access to NIH-funded research will cause a decline in their journal subscription revenue. Putting aside the point that the

[11] Maurer, S. & S., Scotchmer, "Innovation Today: A Private-Public Partnership," *Innovation and Incentives.* 2005 (forthcoming).

[12] Philiposki, K., "SARS Gene Sequence Unveiled," *Wired News.* April 15, 2003.

[13] Dodge, J., "Written in the SARS," *Bio-IT World.* May 9, 2003. <http://www.bio-itworld.com/news/050903_report2510.html>

[14] Batelle Technology Partnership Practice and SSTI, "Laboratory of Innovation: State Bioscience Initiatives 2004." <http://www.bio.org/speeches/pubs/battelle2004/>.

larger economic benefits *far* outweigh any modest risk to particular publishing interests, there are several reasons to believe that subscriptions will not be materially threatened:

- The NIH proposal provides for a six-month embargo on access to articles in PubMed Central. Many subscription-based journals have already implemented such embargoes without a negative impact on their subscription bases. Indeed some journals report that such delayed open access actually increases subscriptions. For example, the American Society for Cell Biology reports that subscriptions to *Molecular Biology of the Cell* have grown steadily since it adopted the policy to provide open access to its articles with just a two-month delay.[15] The increase seems to be a result of the heightened visibility, impact, and usage of the journal's articles.

- Most journals publish more than just NIH-funded research. This means that NIH would only provide open access to a subset of the articles in a given issue of a given journal, again preserving incentives to maintain subscriptions. In addition, most journals publish more than peer-reviewed research articles, including letters, editorials, opinion pieces, review articles, book reviews, news, and conference information, none of which would be captured by NIH.

- Subscription-based journals have continued to thrive in fields where there are open online archives. In physics most new articles are freely available from birth in the arXiv.org open-access archive.

Inevitably in most industries affected by the Internet, established economic interests have resisted efficiencies that benefit the users of information. Ultimately, however, these influences create more dynamic markets that are better adapted to our knowledge economy.

[15] Weitzman, J., "The Society Lady," *Open Access Now.* 2003. <http://www.biomedcentral.com/openaccess/archive/?page=features&issue=6>