

# Who is paying the piper?



by Nick Lane PhD

Open access to journal content – free to read, download and use – is an ideal of our free information age, but comes with some unexpected costs. We look into the twists and turns of recent policy mandates, and ask what it all means for ophthalmologists.

Late at night on October 23, 2007 after the usual last-minute shenanigans, the US Senate gave their overwhelming approval to a bill mandating public access to tax-payer-funded research. It's a long way from law even now, and is expected to fall foul of the President's veto on budgetary grounds (as part of a larger appropriations bill). But it was swiftly acclaimed as a milestone victory for the open-access movement – the self-styled 'archivangelists'.

The decision is just the latest in a highly charged year. Last February, the EU teetered on the brink of a similar decision but backed down at the last minute under intense industry pressure. Even so, the commissioner for science and research, Janez Potočnik, made it plain that the EU will promote access to the research it funds, and pledged €85m, over two years, to improve public access.

Other major organisations did adopt, pledge, or recommend mandates for open access in the last year, including the Canadian Institutes of Health Research, the UK Department of Health, the British Heart Foundation, European Research Council, European University Association, and India's National Knowledge Commission.

Both ophthalmologists and patients have much to gain from open access to journals, notably ophthalmologists working in small private clinics without institutional access to subscription journals.

Melissa Norton MD, series editor of BioMedCentral journals, is unequivocal about the value of open access: "When I worked as an MD in the States, I was not affiliated to an institution, like many ophthalmologists, and so was obliged to subscribe to journals myself. Open access is hugely beneficial for all medics and patients who are not affiliated to a big institution."

But mandating open access doesn't necessarily come cheap, and several large funding bodies are being careful to protect the value added by the journals industry.

Last March, for example, the Howard Hughes Medical Institute – one of the largest private supporters of medical research in the US – announced an agreement with Elsevier to make the work it funds freely available to the public six months after publication. HHRI will pay Elsevier up to \$1500 per research paper, for which Elsevier will deposit a copy of the authors' manuscript on PubMed (but not the final edited, formatted paper).

This agreement came into force in September, and follows a similar mandate from the UK's Wellcome Trust, who also agreed to pay Elsevier to make their research publicly accessible. In this case, the Wellcome Trust will pay even more (up to \$6000 per paper) for immediate public access to the final published paper.

The announcements from Wellcome and HHRI amount to double payments – journals retain subscription

charges and in addition are paid to deposit copies, even though they permit self-archiving after six months anyway. Not surprisingly, the open-access archivangelists sneered at these arrangements.

All this means that ophthalmologists active in research may face some surprising costs, either directly in substantial publication costs, or indirectly via contracting research budgets. Much depends on which model of access ultimately prevails, and on the transition period from here to there. *EuroTimes* looked into the possibilities.

## A profitable collision

"An old tradition and a new technology have converged to make possible an unprecedented public good," said the Budapest Open Access Initiative in 2002. As sound bites go, it's one of the best. The old tradition is academic publishing – especially the willingness of academics to publish their research, and peer-review that of others, for nothing. The new technology is the internet. And the principal beneficiaries are not just researchers and the public, but librarians – the profession whose *raison d'être* is the dissemination of knowledge and information.

More than anyone else, librarians have driven the open-access movement. But unlike some of their idealistic colleagues, the librarians' cause from the start has been the deepening financial predicament undermining their work – the serials crisis. The Budapest Initiative signally fails to mention academic publishers, who have rarely been tempted to offer their services for free. And viewing

Journal price vs impact – how do they stack up?

\$ rank	Journal	Price (\$)	Impact factor	IF Rank
1	Vis Res	4,055.00	2.027	11
2	Exp Eye Res	3,443.00	2.695	7
3	Graefe's Archive	1,888.00	1.498	19
4	Doc Ophthalmol	1,359.00	1.239	23
5	Prog Ret Eye Res	1,109.00	7.577	1
6	Vis Neurosci	1,014.00	1.566	17
7	Ophthalm Epidemiol	852.00	1.190	25
8	Eye	850.00	1.867	14
9	Cornea	786.00	1.358	21
10	Inv Ophthalmol Vis Sci	710.00	3.643	3
11	BJO	645.00	2.459	8
12	Retina	557.00	1.286	22
13	Clin Exp Ophthalmol	516.00	1.193	24
14	J Glaucoma	474.00	1.426	20
15	Ophthalmology	460.00	3.664	2
16	JCRS	459.00	1.941	13
17	Am J Ophthalmol	439.00	2.393	9
18	Ophthalmologie	412.00	1.559	18
19	Arch Ophthalmol	410.00	3.274	6
20	Optom Vis Sci	389.00	1.569	16
21	Acta Ophthalmol Scand	312.00	1.581	15
22	JRS	259.00	1.948	12
23	Surv Ophthalmol	219.00	3.621	4
24	J Vis	-	3.469	5
25	Mol Vis	-	2.239	10

open access from a financial point of view is certainly a salutary exercise.

Since 1993, the retail price index has risen by about 30 per cent, whereas the average cost of journal subscriptions has risen by 275 per cent. Pam Sieving, librarian and informationist at the NIH, told *EuroTimes* that for a while periodicals spending kept up, to the cost of monographs and books, but ultimately some subscriptions had to be cut. And responding to the threat of falling revenues, publishers pushed up subscription charges still further, escalating costs.

Internet access seemed to offer a way out of spiralling costs, Sieving recalls, if only because it should save on the high printing and distribution fees commanded by traditional journals. And as she says, "Information wants to be free!" making the web an ideal outlet.

But a series of mergers and consolidations in the publishing industry gave publishers greater negotiating power to command high prices for blocks of journals in a 'Big Deal'. Along with high spending on digital libraries like ScienceDirect (which reputedly cost \$200m), the reorganisation preserved high subscription charges, and delivered burgeoning profits.

Set in this context, the Budapest Initiative and more recent initiatives suggested two explicit routes to free open access – the so-called gold and green routes. What they didn't reckon on was the wiliness of journals, and the extent to which journal impact factors govern academic career progression these days.

The gold route was a new model of internet publishing, true open-access journals like those of the Public Library of Science (such as *PLoS Medicine*) and the BioMedCentral (BMC) titles (such as *BMC Ophthalmology*). Both organisations are innovative and admirable, the BMC for example, recently introducing an excellent 'open peer review' system, in *Biology Direct* – both referees' comments and authors' responses are appended in full to the end of the paper.

But the gold-access journals also highlight some of the more intractable dilemmas, especially when the older print journals make a transition first to 'hybrid journals', and later to full open access. The big questions are 'Who pays?' and 'How much?'

PLoS started out not as some governmental organisation but as a pressure group (founded by the former head of the NIH, Nobel Laureate Harold Varmus). Failing to persuade any of the established print journals to switch over to an open-access model, PLoS attracted a charitable endowment of \$10m and founded its own journals, to show how it all really ought to be done. Instead of charging for subscriptions, PLoS charged its authors direct, about \$1500 per paper, as an 'article processing charge' (APC), including the costs of organising peer review.

PLoS targeted the high end of the market, declaring its chief rivals to be *Nature*, *Science* and the *NEJM*. Its business plans immediately drew scepticism from *Nature*, which claimed that the APCs set by PLoS were far too low for a sustainable business model.

PLoS rebutted these claims, but the release of financial statements detailing a loss of \$1.4m on revenues of \$5m (in September 2006) seem to justify *Nature's* claims.

To survive, PLoS was obliged to raise its APC to about \$2,700, and admitted it might need a top-up to its endowment, hardly an encouragement to smaller independent journals considering a switch to open access.

## How big is your APC?

Exactly what qualifies as a 'fair' APC is a moot point. A number of traditional print journals now offer open access if the author or institution pays an APC, but the prices currently range up to \$5000 per paper. These prices are in addition to the subscription charges, meaning that such hybrid journals are effectively being paid twice for the same articles – a security against potentially falling subscriptions, they say; but no solution to the serials crisis.

The problem of hybrid journals double charging could be solved by a complete transition to a gold open-access model, like that of PLoS and BioMedCentral; but if so the APCs are far more likely to rise than fall.

Much depends on impact factors and perceptions of added value. Journals such as *Nature* that have high impact factors reject 90 per cent of manuscripts submitted, and offer value-added services such as news and features, book reviews, and editorials. If they were to switch to a gold open-access model, they say, the APCs would need to be set at about \$10,000. A few authors would be obliged to subsidise free access for the wider reading public: an inequitable solution where the few pay for the many.

According to Dr Thomas Liesegang, MD, editor of the *American Journal of Ophthalmology*, a serious problem with this is that only departments rich enough to publish in top journals could afford to do so, unless funding bodies paid, which would amount to a public subsidy of commercial journals.

And assuming such funding bodies included pharmaceutical companies, top medical journals like the *NEJM* and *The Lancet* – already denounced as ‘an extension of the marketing arm of pharmaceutical companies’ by Richard Smith, the open-access-defending former editor of the *BMJ* – would face even greater conflicts of interest.

Dr Liesegang notes that, while researchers generally welcome open access as readers, only a few put their money where their mouth is as authors. He told *EuroTimes*, “Researchers are under a lot of pressure to publish in journals with high impact factors, for the sake of their careers. If the top journals started charging APCs, they would be in a position to charge authors or their funders whatever the market would bear.”

Or, as Dr Jeffrey Drazen, MD, editor in chief of the *NEJM*, put it: “In our capitalist society, one of our basic tenets is who pays the fiddler calls the tune.”

At the other end of the spectrum, imposition of gold open access could put numerous small, unaffiliated journals out of business. Dr Liesegang estimates that if obliged to depend on APCs literally hundreds of small journals could be lost.

Prof Barry Fuller, editor of *CryoLetters*, agrees. He told *EuroTimes* that small journals often depend entirely on subscription charges, as they are too specialist to attract advertising revenues. A gold open-access model could put them out of business if a sizeable part of their content is from researchers in the developing world.

While researchers from the developing world often do have access to subscription journals via various schemes – or even just emailing authors for PDF reprints – they are unwilling to pay an APC for publication. While larger publishers, like BMC, waive the APC in these cases, small, unaffiliated journals just can’t afford to do so.

The alternative is the green route to open

access, which is to say that authors are responsible for archiving their own work in a digital repository, such as PubMed, or their own institute’s digital archive

Most journals already permit self-archiving after a six-month embargo period, and indeed some journals, including the *AJO* (published by Elsevier), go so far as to deposit papers in PubMed on behalf of the author. (“All they have to do is tick a box, but still some refuse, I really have no idea why,” says Dr Liesegang.)

One reason why the commercial journals seem inclined to permit self-archiving (usually six months after publication) is that the impact has been very low. In 2003 the *NIH* encouraged its researchers to archive copies of their own work, on PubMed. When pressed by Congress, however, it transpired that only four per cent of all eligible papers had actually been archived by 2005. Most researchers seem ignorant of self-archiving, or don’t care much.

The recent decision from the Senate to mandate archiving on PubMed is partly a response to the poor showing from the *NIH*; and, as in Europe, has been furiously opposed by publishers and their PR representatives. But the publishers cry to arms, directed by the ‘pit bull of PR’, Eric Dezenhall – ‘public access equals government censorship’ – hardly washes.

The difference here is that, unlike large funding bodies such as Wellcome and the HHMI, the Senate bill does not offer payments (equivalent to APCs) to journals: it merely mandates that all researchers funded by the *NIH* should publish only in journals that permit free open access within a year of publication.

Such an arrangement might force top journals to make their archives freely available to the public. But more likely it would eat into *NIH* research budgets, as researchers end up paying for the privilege out of their own pockets. Some sources suggest that as much as 10 to 12 per cent of research budgets may end up being spent on publishing costs. If this money is earmarked for publications, grants will either contract, or fewer will be awarded.

### Carrots and sticks of the marketplace

How any of this works out will depend a great deal on the mechanics of the marketplace, and that is changing rapidly. Around five to 10 per cent of journals are now open access, either by the gold or the green model.

Though researchers can effectively damage their careers by publishing in journals with low impact factors, or even none at all (it usually takes a couple of years for *ISI* to rate journals), the impact factors of open-access journals are rising with their



length of time in business and profile. Most of the BMC titles now have respectable impact factors, for example. How they fare in the marketplace, though, will depend not only on their impact factors, but also on their APCs.

While PLoS is a non-profit organisation, BMC operates for profit. Despite this, its APCs are currently more than \$1000 lower. Melissa Norton, series editor of the BMC journals, told *EuroTimes* that their APCs, of around \$1500, barely break even. Presumably, then, it’s only a matter of time before the APCs rise, but how much they rise will depend a lot on the market.

In general, subscription charges differ little between commercial publishers (like *Nature*) and non-profit organisations like the American Academy for the Advancement of Science (which publishes *Science*). Indeed the current *bête noir* of the open-access movement is the American Chemical Society, an organisation under fire for the remuneration it affords its employees and directors.

It’s highly unlikely, then, that publishing charges will be drawn down through the operation of non-profit organisations like PLoS, the AAAS or the ACS.

Two factors, however, might conspire to lower costs: the operation of more transparent fees through APCs, and the improved organisation of purchasers.

At present there is little relationship between subscription prices and impact factor. While it wouldn’t occur to most researchers to submit an article to a journal on the basis of its subscription price (usually known only to librarians), a transparent association between impact factor and price could unlock some real competition between journals.

In this context, journals that offer more – including opening their archives free to the public – would stand to gain. While non-profit organisations like the National Academy of Sciences opened the *PNAS*

archives long ago (after a six-month embargo) commercial publishers are now following suit. Springer, for example, made *Graefes Archives of Ophthalmology* freely available to the public this October, right back to Volume 1 in 1854.

But Springer also took a hit in October, which may exemplify the power of the purchaser to call the tune: the Max Planck Institute in Germany cancelled its online subscriptions to 1,200 Springer journals, in protest at its high access fees – which the MPI say is more than twice that of other major publishing houses – as of January 2008.

And Springer is just the latest casualty in a series of high-profile clashes between publishers and subscribers. From 2002 onwards, a number of universities, including the University of California, Cornell and Harvard, have threatened to cancel subscriptions and even to boycott all associations with publishers (such as editing or peer reviewing for journals).

While all eventually negotiated terms (protected by non-disclosure agreements), we do look to be entering a new era, in which the balance of power is shifting. Pressure groups formed from networks of universities, such as EurOpenScholar, announced in October, are likely to keep the pressure on the other foot, as will the Senate decision.

The outcome may well be fewer subscriptions, lower APCs, more open access, competition between publishers, and a shift in the funding of publications towards the research budgets, making the economics of publishing a concern for researchers, including ophthalmologists, for the first time.

It won’t be a straightforward ride, but the archivangelists may yet win an unlikely victory for the librarians. We risk the loss of numerous small independent publishers and a readjustment of research budgets, but stand to gain greater openness in pricing, and far more open access.

### Online guide to open-access journals

Biomedical Central Ophthalmology  
[www.biomedcentral.com/bmcophthalmol/](http://www.biomedcentral.com/bmcophthalmol/)

Public Library of Science  
[www.plos.org/journals/](http://www.plos.org/journals/)

PNAS Archives  
<http://www.pnas.org/contents-by-date.0.shtml>

PubMed  
[www.ncbi.nlm.nih.gov/sites/entrez](http://www.ncbi.nlm.nih.gov/sites/entrez)