

Publishing Open-Access Journals



A brief overview from the
Public Library of Science

February 2004

Table of Contents

- I. Overview of the publishing process
- II. Essential steps in publishing an open-access journal
 - A. Low-cost strategies for receiving manuscripts, managing peer review, and online hosting
 - B. Higher-cost strategies
 - C. Features of journal management systems
- III. Optional steps in publishing an open-access journal
 - A. Linking and other ways of enhancing online content
 - B. Copyediting
 - C. Layout
 - D. Producing journals in print and other media
- IV. Staffing considerations
 - A. Editorial staff
 - B. Administrative staff
 - C. Production staff
- V. Generating revenue for open-access journals
- VI. Costs for research articles in *PLoS Biology*
 - A. Electronic manuscript management
 - B. Production costs
 - C. Additional variable costs
- VII. Additional resources
 - A. General information
 - B. Listservs and newsletters
 - C. Journal management systems

**Committed to making
the world's scientific
and medical literature
a public resource.**

www.plos.org

Publishing Open-Access Journals

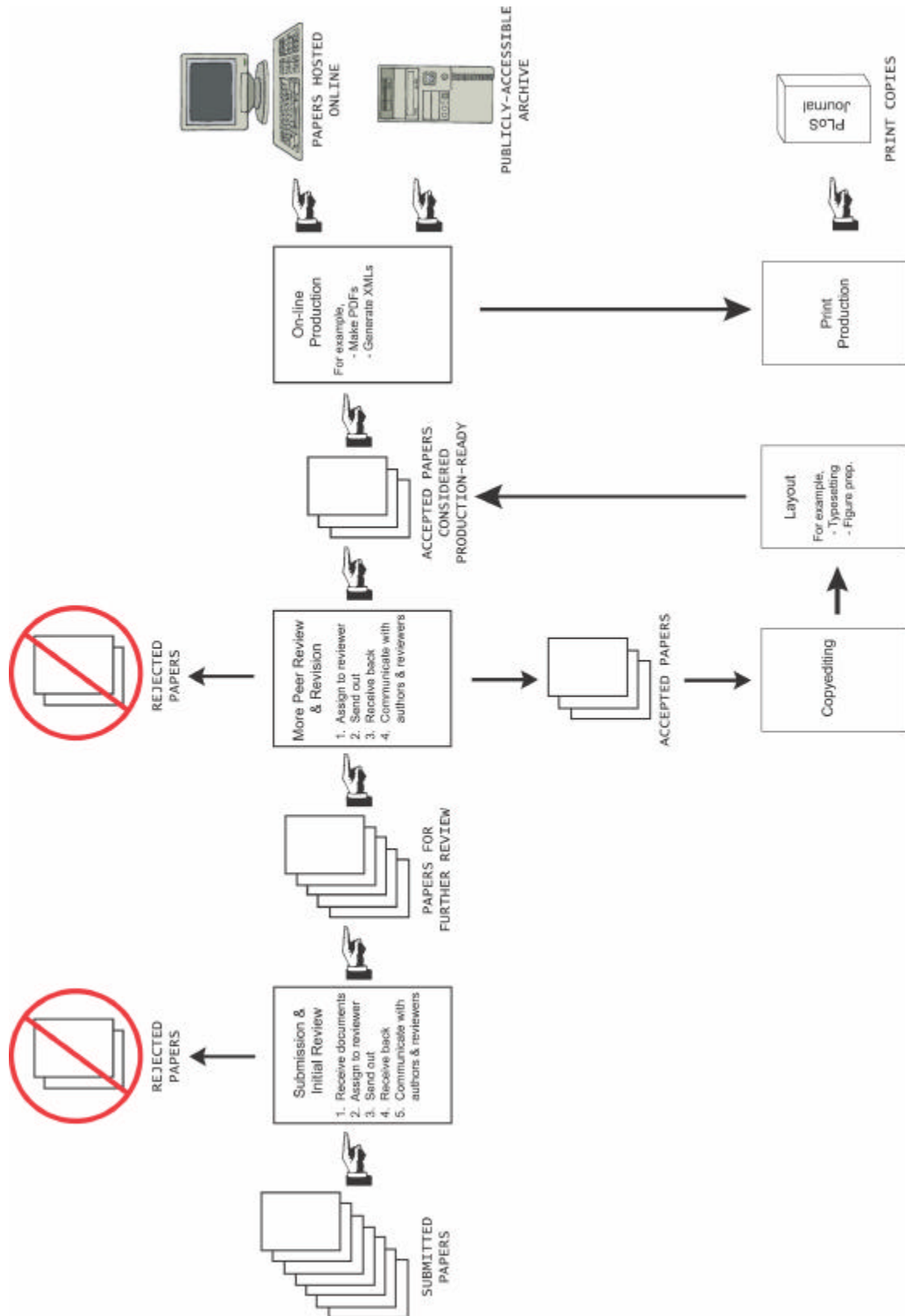
A brief overview from the Public Library of Science

Summary

There are many different paths to producing a journal, either online or in print, with a tremendously wide spectrum of costs that can be generated or avoided during the publishing process. The aggregate cost of shepherding manuscripts through peer review, preparing selected papers for publishing, and finally disseminating articles depends on the particular steps that a publisher deems necessary for a particular journal. Using unpaid academic editors and an open-source online journal management system, eschewing frills in the production process, and publishing online directly in archives with minimal formatting requirements (for example, those that accept articles as simple PDF files), a publisher could potentially produce a peer-reviewed journal spending little or no money. Additional steps in the publishing process—from copyediting, to using professional editors, to formatting articles to meet the more stringent technical standards for online publishing and for archiving in repositories such as PubMed Central—can increase costs marginally or substantially, depending on which components of the process are added. For *PLoS Biology*, the Public Library of Science [PLoS] chooses to include many steps beyond the minimal requirements for overseeing peer review of submissions and for online hosting for accepted articles; consequently, our costs are considerably higher than those that other predominantly electronic journals might generate in the publishing process.

This is the preliminary version of a document that we anticipate will evolve over time. In its present state, this paper concerns predominantly production rather than editorial systems, structures, and costs. However, as PLoS grows as a publisher and launches new journals with different editorial and production systems, and as more open access publishers share their editorial and production costs, we will plan to update this document with additional information as it becomes available.

I. Overview of the publishing process



II. Essential steps in publishing an open-access journal

A. Low-cost strategies for receiving manuscripts, managing peer review, and online hosting

At a minimum, publishing an open-access scientific journal entails (1) receiving manuscripts, (2) overseeing the process of peer review and revision, (3) formatting papers for electronic archiving and online hosting, and (4) depositing them in a stable, publicly accessible electronic archive. This sequence is illustrated in Figure I: Overview of the Publishing Process. Strategies to keep these essential steps inexpensive, at close to zero cost, include:

- **Using an end-to-end electronic and online journal management system (JMS) for receiving manuscripts and managing their distribution during the peer-review process.**

Traditionally, a substantial portion of journal editorial and production costs have come from copying, mailing, scanning, and otherwise manipulating and transporting paper documents. Those expenses can be almost entirely avoided if manuscripts and figures are received, distributed, reviewed, revised, and formatted electronically. Mandating that authors submit papers in digital formats is a first step in this direction. A second is choosing the right JMS. One electronic JMS that is both well-regarded and free to use is Open Journal Systems, an open-source program produced and currently supported by the Public Knowledge Project at the University of British Columbia in Canada.¹

- **Ensuring that the final digital version of the paper is generated, hosted, and archived as inexpensively as possible.**

The essential component of online publishing that makes open access possible is the fact that once an article has been peer-reviewed, edited, and formatted, it is fairly inexpensive to disseminate that article broadly through the Internet. One way to publish a journal online at little or no cost to the journal itself is to deposit it directly in an open-access archive. One such archive is PubMed Central, the open-access repository for full-text biomedical literature operated by the U.S. National Library of Medicine.² As long as the electronic version of a journal article conforms to the appropriate digital format, its online hosting and archiving are free at PubMed Central. The technical requirements for publishing in that repository, as in many others, include what is known as XML encoding (a process necessary for articles to be formatted properly and searched effectively), as well as a particular Document Type Definition (DTD).³ Currently, generating the appropriate XML and DTD for submission to PubMed Central is a complex enough technical task that most editors prefer to outsource the “markup” of their articles to a

1 For more information about Open Journal Systems, see http://pkp.ubc.ca/OJS_Sheet.html. For more information on alternative open-source and inexpensive systems, see http://pkp.ubc.ca/ojs/other_OJS.html.

2 For details about PubMed Central’s formatting requirements, see <http://www.pubmedcentral.nih.gov/about/pubinfo.html>.

3 For an argument for XML in scientific, technical, and medical publishing, see http://www.dclab.com/stm_xml.asp. A tutorial on XML and DTDs can be found at <http://www.w3schools.com/dtd/default.asp>. Another is located at <http://www.xml.com/pub/a/98/10/guide0.html>.

third party. The cost of outsourcing can vary widely from vendor to vendor. For example, PubMed Central offers a markup service via a vendor called Data Conversion Laboratories for \$5/page to convert articles to XML from a PDF; our vendor, Allen Press, charges \$3.25/page to markup the composed page.⁴ However, standard word processing software, such as Microsoft Office XP, is now providing more XML support,⁵ and as authors understand these built-in features better, in three-to-five years XML-tagged source documents may be more prevalent.

To qualify as “open access” according to the Bethesda Definition, an article must be deposited in a centralized, publicly accessible repository, such as PubMed Central.⁶ Although all repositories prefer XML, articles in many different formats—including simple PDFs—can be deposited in a number of publicly accessible archives, such as those affiliated with many universities. More than 160 such repositories currently exist.⁷ The Open Society Institute’s *Guide to Institutional Repository Software* lists available open-source software that has been designed for the purpose of facilitating such repositories, including ARNO, CDSware, DSpace, Eprints, Fedora, i-Tor, and MyCoRe.⁸

By placing articles with minimal “markup” directly in one of these repositories and by foregoing other online hosting (on its own Web site, for example), a journal could be hosted online at no cost to the journal itself. It should also be noted that publishing through a robust repository like PubMed Central ensures that the digital format of online articles remains suitable for future searching, mining, and interoperability with other archives. Minimally, a repository should be selected on the basis of its likelihood to maintain the compliance, administrative responsibility, organizational viability, financial sustainability, technological and procedural stability, system security, and procedural accountability required to ensure that archived journals do not disappear. This is the purpose of OAI (Open Archive Initiative)-compliant software such as those programs listed above.⁹ For more information on guidelines to follow, please see the *SPARC Institutional Repository Checklist and Resource Guide*.¹⁰

4 A list of vendors who offer XML markup services can be found at <http://publishing.xml.org/players/>.

5 A constantly updated list can be found at <http://www.garshol.priv.no/download/xmltools/>.

6 According to the widely accepted Bethesda Definition, an open-access article is one for which “a complete version of the work and all supplemental materials . . . in a suitable standard electronic format is deposited immediately upon initial publication in at least one online repository that is supported by an academic institution, scholarly society, government agency, or other well-established organization that seeks to enable open access, unrestricted distribution, interoperability, and long-term archiving (for the biomedical sciences, PubMed Central is such a repository).” See <http://www.earlham.edu/~peters/fos/bethesda.htm> for more details about the Bethesda Statement on Open-Access Publishing.

7 For a list of institutional repositories, see <http://www.arl.org/sparc/core/index.asp?page=m1>. For more general information about institutional repositories, see http://www.alpsp.org/http_openarc.htm. For a suggestion of the minimal criteria for an archival repository, see <http://www.diglib.org/preserve/criteria.html>. For more information on the relatively minimal costs involved in setting up and maintaining such an archive, see <http://www.arl.org/sparc/core/index.asp?page=g20#6>.

8 Their very informative guide is found at <http://www.soros.org/openaccess/software/>.

9 Further information about the OAI can be found at <http://www.openarchives.org>.

10 See http://www.arl.org/sparc/IR/IR_Guide.html.

B. Higher-cost strategies

At an increased cost, software is available that allows for customization of a JMS to suit an organization's specific editorial and production needs.¹¹ For example, PLoS uses AllenTrack, a commercial system (by Allen Press with customization by eJournalPress) that allows for a number of additional steps in the publishing and editorial processes beyond what a smaller or less editorially complicated journal would need—at a system cost of \$20 per submitted manuscript (which for us includes a 20% volume discount and is exclusive of initial setup costs). (Special features we consider valuable include flexibility and robustness of the submission system and the editorial workflow, creation of a merged PDF “on the fly” from a wide variety of file types, and the handling of special characters.) Some of the most frequently used systems are AllenTrack, BenchPress, EdiKit, Editorial Manager, eJournalPress, Rapid Review, ScholarOne, and XPress Track. For learned and scholarly publishers, ESPERE offers an institutionally created and maintained JMS for those who choose to become members of their consortium; included among the members of this consortium are the Company of Biologists, the Society for Endocrinology, and the Royal Society. Information about these JMS programs may be found in Section VII below.

As mentioned in the previous section, a journal Web site may not be required as long as the only concern is the distribution of articles, which can be easily accomplished by directly depositing them in open-access online repositories. Additionally, distribution may be increased by paying an aggregator service like Ingenta¹² or EBSCO¹³ to store and distribute the articles to their users. If the choice is made to establish a Web site for the journal, it is necessary to consider its size and complexity and the kind of functionality required (e.g., Web forms, statistics tracking). These considerations will help determine how to develop, host, and maintain the site. A basic site (for example, a site consisting of informational pages, a current table of contents, and the tables of contents from past issues) can easily be developed and maintained either in-house or through a freelancer and hosted anywhere.¹⁴ Costs for these services vary widely, but examples include:

- \$125/hr for site design (<http://www.btobonline.com/webPriceIndex/>)
- \$40/mo for a Yahoo! hosting package. This includes a custom domain name, 350 MB storage, 35 GB/mo data transfer, etc.

If the decision is made to offer full-text content on the journal Web site, the setup and maintenance costs will be significantly greater. In this case, it may be beneficial to work with organizations and companies that specialize in online journal hosting. One option is to join online consortia, like the BioOne alliance of bioscience research journals.¹⁵ Another

11 For a list and description of some of the more well-known systems, see <http://www.arl.org/sparc/core/index.asp?page=h16#journals>. For a review and evaluation of several of these systems, see Gerry McKiernan's “Web-Based Journal Manuscript Management and Peer-Review Software and Systems” (<http://lysander.emeraldinsight.com/vl=3245357/cl=56/fm=html/nw=1/rpsv/cw/mcb/07419058/v19n7/s7003/p31>).

12 See <http://www.ingentaselect.com>.

13 See <http://ejournals.ebsco.com>.

14 A directory of hosting options may be found at

http://dmoz.org/Computers/Internet/Web_Design_and_Development/Hosting/Directories/.

15 See <http://www.bioone.org>.

option is to be published through an associated institutional or university library. For example, *The Journal of Insect Science* is published by the University of Arizona Library.¹⁶ A third option is journal publication through the group of JMS providers that also specialize in journal Web site development, hosting, and/or maintenance services, including: Allen Press,¹⁷ Berkeley Electronic Press,¹⁸ Cadmus—via AIP Publishing Services,¹⁹ HighWire Press,²⁰ and ScholarOne.²¹ PLoS employs a full-time Web manager and uses Allen Press for development, maintenance, and hosting of our journal Web site.

C. Features of journal management systems

In selecting a JMS, journal publishers may want to consider such factors as:

• Stability of the software vendor and prospects for effective technical support

In particular, the following considerations should be taken into account:

- ✓ How long has the system been in use?
- ✓ How many clients does the vendor have?
- ✓ How many users are there per client?
- ✓ How do they deal with spikes in user load?
- ✓ What is the current version in use?
- ✓ What is the frequency of upgrades in general and the date of the next upgrade in particular?
- ✓ What are the client-side requirements for hardware and software?
- ✓ What is the level of quality assurance for platform and browser compatibility?
- ✓ Was the system developed in-house or based on external components?

• Security

- ✓ How secure is the data?
- ✓ Who stores the data?
- ✓ How is the system monitored?
- ✓ What is the security system?
- ✓ Does the security system have technical certification that provides for secure uploading and downloading of information?
- ✓ Does the system allow for different roles (read-only, read-write, editor, author, etc.)?

16 See <http://www.insectscience.org>.

17 See <http://www.allenpress.com>.

18 See <http://www.bepress.com>.

19 See <http://www.aip.org/publishing/services/>.

20 See <http://www.highwire.org>.

21 See <http://www.scholarone.com>.

• Flexibility of feature-set and possibility for customization

- ✓ How flexible is the system?
- ✓ Can it be adapted to an unusual editorial workflow?
- ✓ Does it support automated notifications?
- ✓ Does it provide reports and statistics?
- ✓ Does it allow for double-blind reviews?
- ✓ Is there version control for manuscripts so it is clear when a manuscript has been revised?
- ✓ Does it allow the publisher to determine what graphics formats can be used?
- ✓ Does it allow the journal to determine limits on the length of titles, abstracts, and manuscripts?
- ✓ Does it allow authors to track the status of papers?

• Costs

- ✓ Are there high front-loaded setup costs?
- ✓ Are there high ongoing, per-submission costs?
- ✓ How much does training and support cost?

A somewhat dated but good general overview of JMS features, including lists of articles on the subject and an evaluation of some of the available systems, can be found in Kam Shapiro's "Bibliography and Summary: Electronic Peer Review Management."²²

III. Optional steps in publishing an open-access journal

A. Linking and other ways of enhancing online content

Online publishing allows references to be linked directly to abstracts, other papers, and other kinds of information that enhance the content of an article. Providing linking features for a journal can be quite inexpensive; for example, linking to abstracts in PubMed is free. Inclusion in PubMed Central provides links from the references to other full-text articles in PubMed Central as well as to the abstracts in PubMed. A free reference-linking system, called Link Openly,²³ is available. Other services, such as CrossRef, allow for more comprehensive linking to abstracts and limited access to full-text articles; these services frequently cost something.²⁴

²² See <http://spo.umdl.umich.edu/monthly/peerreview.html>.

²³ See <http://www.openly.com/link.openly/>.

²⁴ Details of costs for CrossRef are available at http://www.crossref.org/02publishers/20pub_fees.html. Also, in all of these cases, many of the referenced articles will not be freely available in full text unless users have subscriptions.

B. Copyediting

Copyediting is an optional, if often desirable, step in the production of a journal. An issue to consider when making the choice to include copyediting in the production process is an evaluation of whether copyediting is valued by the journal authors and readers and whether authors are willing to pay for copyediting service. In one survey, the importance of copyediting as a publishing function ranked among authors second only to peer review and content compilation.²⁵ Copyediting can cost up to \$20 per final composed page. Further details may be found at the Public Knowledge Project's very useful FAQ site.²⁶

C. Layout

PDF generation is a process that requires a certain amount of page layout. PLoS estimates that page composition, whether performed in-house through a desktop publishing program (PageMaker, InDesign, Quark) or done by a professional compositor, can cost as little as the paid time spent by an editor or administrative assistant to as much as \$25 per page. Even if a journal uses a professional compositor, the prices can vary, depending on how the manuscript is presented to the compositor. The manuscript may be provided as a hardcopy that needs to be rekeyed, as an unedited word-processing file along with an edited hardcopy that needs to be incorporated, or as an edited word-processing file (the least expensive option); PLoS pays \$16 per page for typesetting from an edited file.

Another cost often incurred by journals is for proof corrections. Again, we advocate an all-electronic process; proofs are sent to the authors as a PDF, and all corrections are made via e-mail. If the journal layout is managed in-house, this cost may simply reflect the paid time spent by the person making corrections to the file. If the corrections are handled by the compositor, there is usually a per-correction fee. (PLoS pays \$3 per alteration, exclusive of printer's errors.) We have found that one way to minimize these costs is by copyediting the manuscript electronically with the Track Changes function toggled on and subsequently sending that version to the authors for their approval of the changes before sending the manuscript into composition. This results in fewer surprises in the proofs and consequently fewer corrections. (PLoS averages 1.4 corrections per typeset page.)

Additional costs may be incurred for figure preparation, although an all-electronic workflow through a JMS can substantially decrease these. While electronic figures do have associated costs,²⁷ the expense is considerably less when the process is all-electronic, even if a professional compositor is involved. This is especially true when it comes to color images. Color figure preparation that requires scans and separations can cost as much as \$210 each; the same figure prepared electronically costs PLoS \$30, a considerable savings.

25 See <http://www.alpsp.org/2003ppts/swa040403.ppt>.

26 See <http://www.pkp.ubc.ca/ojs/faq.html>.

27 Figure preparation requires an estimated 30 minutes to 1.5 hours for each figure. This includes the time for checking proper resolution, sizing, and working with authors to provide more suitable versions when necessary.

D. Producing journals in print and other media

Print production and distribution entail substantial additional costs. A relatively small fraction of those lies in converting files to computer-to-plate processes. The bulk of the expenses are generated simply from the costs of printing ink on paper and mailing hardcopies around the world. While there can be some cost savings by limiting the amount of color, by decreasing the quality of the paper, or by mailing by a cheaper class of postage, there is very little else a journal can do to keep these costs down.

In addition to print, or in lieu of it, many publishers choose to produce journals in other formats and using other media, such as CD-ROMs. The advantage of a CD-ROM is that it tends to be less expensive to produce and ship than a print journal. Furthermore, unlike an online journal, it does not require a reliable Internet connection to be useful.

IV. Staffing considerations

A. Editorial staff

• Professional and Academic Editors

Most society and non-profit journals do not use professional editors. Instead, they pay nominal fees, if any fee at all, to academics in the field, who volunteer their services as editors and reviewers.

• Managing Editors

Society and non-profit publishers quite often employ a managing editor, especially if they publish more than one journal. The managing editor oversees the peer review and, when applicable, the copyediting and production processes to ensure that they proceed efficiently. These tasks are performed either by way of a vendor, other staff, or the managing editor him/herself. For a small journal, the person who acts as publisher may often execute the tasks that a managing editor takes on at a larger publication.

B. Administrative staff

For publishers that have automated their manuscript submission, handling, and production systems, very few additional administrative services are usually needed. The few remaining tasks can quite often be taken up by volunteer editors or by a managing editor, and many society publishers do in fact operate with little or no administrative support.

C. Production staff

If the publisher does not choose to include copyediting or relatively glamorous layout and design in the production of a journal, then no more than one staff person is usually necessary for production-related tasks. These may include:

- Taking images from authors and formatting them properly for publication
- Placing the images into the digital journal page (usually a templated format in Pagemaker, Quark, or a similar program)
- Placing reviewed and edited text into the page
- Coordinating or generating the XML “markup” of papers, if any
- Converting the “design file” to a PDF document or other format suitable for dissemination

At the other end of the spectrum, commercial publishers can have production teams of dozens of people to support even a small number journals. PLoS employs both a small in-house production staff and a vendor, Allen Press, for the electronic end-to-end process.

V. Generating revenue for open-access journals

Many sources of revenue are available to support open-access journals. These include, but are not limited to, the following:

- Charging authors for submission and/or publication
- Advertising
- Applying for grants from funders interested in broadly disseminating knowledge
- Collecting scholarly or academic society membership fees
- Adding valuable services such as customized search capabilities
- Maintaining Web portals for particular subdisciplines in a field
- Collecting revenue from print subscriptions
- Requesting financial support for open access from universities and consortia, either as “institutional memberships” or in another form

For a more comprehensive discussion of sources of revenue for open-access journals, see the Open Society Institute’s *Open Access Journal Business Guides*.²⁸ A more thorough discussion of several of the sources of revenue listed here can be found in the PLoS Background Paper on *Open-Access Publishing of Medical and Scientific Literature*.²⁹

28 See <http://www.soros.org/openaccess/oajguides/>.

29 See http://www.plos.org/downloads/oa_background.pdf, especially pp. 5-6.

VI. Costs for research articles in *PLoS Biology*

All figures below are approximate. PLoS outsources many of these steps and performs others in-house, which requires that some of the prices listed be estimates. For the most part, the pricing the PLoS has received from Allen Press is based on volume discounts granted in anticipation of the large quantity of material we envision publishing in the near future.

A. *Electronic manuscript management*

(cost depends on manuscript volume, which is the total number of rejected and accepted manuscripts)

Cost per manuscript submitted ³⁰	\$20
average 100 manuscripts/month	
Therefore cost per published article	\$200
Cost per issue	\$2000

³⁰ This price assumes the volume discount we receive for our relatively high projected annual number of manuscript submissions. It is normally granted to journals with over 1,000 submissions per year or for multi-journal publishers.

B. Production costs: for published research articles only

<i>Per page costs</i>	<i>Per article costs</i> (assume 11-page article)	<i>Per issue costs</i> (assume 110-page book)
Pre-editing macro		
\$0.90/page	\$10/article	\$100/issue
Copy editing		
\$20/page	\$220/article	\$2200/issue
Figure preparation		
\$13.65/page	\$150/article	\$1500/issue
Layout		
\$16/page (text)	\$176/article	\$1760/issue
\$12.50/page (graphics)	\$138/article (avg. 6/article)	\$1380/issue
Proofs/correction		
\$4.75/page	\$52.25/article	\$522.50/issue
XML Mark-Up		
\$3.25/page	\$35.75/article	\$357.50/issue
PDF creation		
\$1.50/page	\$16.50/article	\$165/issue
Figure conversion to JPEG		
\$1.60/page	\$17.50/article	\$175/issue*
XML upload/QC		
\$3.75/page	\$41.25/article	\$412.50/issue
Deposit to CrossRef/PMC		
\$1.15/page	\$12.50/article	\$125/issue*
TOTAL		
\$74.05/page	\$869.75/article	\$8,697.50/issue
TOTAL (including electronic manuscript processing)		
	\$1069.75/article	\$10,697.50/issue

*Includes front section content

C. Additional variable costs

It is not yet possible to apportion the following costs accurately on a per-article or per-issue basis:

- Print production and distribution (these costs are recovered in part by charging a subscription fee for the print edition)
- Marketing (initially high because of the costs of launching journals)
- Web hosting (not stable because of fluctuating usage)
- Editorial staff (PLoS uses professional editors for *PLoS Biology* and *PLoS Medicine*; the editors are also involved in advocacy and marketing)
- Front section content (an additional cost that most journals do not incur)
- Overhead (other staff, rent, office, administration etc.)

VII. Additional resources

A. General information

- Budapest Open Access Initiative: Frequently Asked Questions: Implementation
<http://www.earlham.edu/~peters/fos/boaifaq.htm#implementation>
- SPARC's Publishing Resources and Journal Repositories
<http://www.arl.org/sparc/core/index.asp?page=h16>
- Directory of Open Access Journals
<http://www.doaj.org/>
- ALPSP's Hot Topics: Open Access Journals
http://www.alpsp.org/http_openacc.htm
- ALPSP's Hot Topics: The Electronic Editorial Office
http://www.alpsp.org/http_editoff.htm

B. Listservs and newsletters

- SPARC Open Access Newsletter
<http://www.arl.org/sparc/soa/index.html>
- Open Access News
<http://www.earlham.edu/~peters/fos/fosblog.html>
- American Scientist Open Access Forum
<http://american-scientist-open-access-forum.amsci.org/archives/American-Scientist-Open-Access-Forum.html>

- Open Access Now
<http://www.biomedcentral.com/openaccess/>

C. Journal management systems

- AllenTrack, <http://www.allentrack.net>
- BenchPress (HighWire), <http://benchpress.highwire.org>
- EdiKit (Berkeley Electronic Press), <http://www.bepress.com/services.html>
- Editorial Manager (Aries Systems Corporation), <http://www.editorialmanager.com>
- eJournalPress, <http://www.ejournalpress.com>
- ESPERE, <http://www.espere.org>
- Open Journal Systems, <http://www.pkp.ubc.ca/ojs/>
- Rapid Review (Cadmus Professional Publication),
<http://www.cadmusknowledgeworks.com/products/rapidreview.asp>
- ScholarOne, <http://www.ScholarOne.com>
- XPress Track, <http://www.xpresstrack.com>