

Open Access Medical Journals

*Will the Publishers
Perish?*



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Open Access Journals

- Scientific Journals
 - History, functions
 - Print vs. electronic
- Traditional Publishing Model
 - Trends in scientific publishing
 - Market Problems
- Academic Libraries in Crisis
- Open Access Model
 - Principles
 - Benefits, disadvantages
 - Initiatives, implementation

What is Open Access?

- A model of publishing in which:
 - Articles are available free & universally accessible online
 - Authors retain copyright to their work
 - All articles are archived in an open access repository (e.g., PubMed Central)

Scientific Journals Historical Perspective

- First science journals were launched in Paris & London in 1665
 - Made possible by papermaking, printing technology & an organized postal system
- Since that time, scientists consent to publish their work without payment
- Control of journal publishing shifted from science to professional, for-profit publishing companies
- Until the advent of the internet, this model has been the best form of organization

Functions of Scientific Journals

- Communicate findings
- Control quality by peer review
- Document authorship for personal credit & professional recognition
- Archive
 - Primary & most important purpose of scientific journals

Modified from: Weiss R. *Washington Post*, August 5, 2003:A1.

Problems with Print Journals

Inequitable	Scientists do the work, publishers reap the profits
Inaccessible	Especially to community doctors, patients, & doctors in developing countries
Inefficient	Dissemination involves photocopying journals stored in a library
Expensive	On average, it costs \$5000 to publish an article Hidden costs for libraries: shelving, personnel, etc
Inexpedient	Typical time from submission to publication is 6-12 months
Environmentally unfriendly	Tremendous use of paper

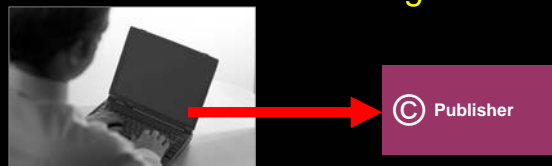
Modified from: Vickers A. www.biomedcentral.com/download/advocacy/vickerspresent.ppt

Print vs. Electronic Journals

	Print	Electronic
Structure	Linear	Linear with hypertext links to reference works & complete databases
Nontextual media	Photos, illustrations, graphs	Also sound & video
Economies	Reading + publishing (space)	Reading
Format	Somewhat constant number of pages; fixed publishing interval	No need for constant number of pages or fixed interval
Advertisements	Fixed in time	Always current

<http://www.janeriks.no/dv/Opp-MF.htm>

Traditional Publishing Model



Result:
Only those who can afford subscription or license have access

Restriction of access finances publishing

Who Pays for Publications in the Subscription & Licensing Model?

- Government agencies, foundations, universities, & companies that sponsor research through subscriptions, site licenses, & publication fees ultimately billed to grants or employers
- Society in the form of increments to university tuitions, healthcare costs, including drug prices, & state & federal taxes that subsidize healthcare, libraries, & education

Scientific Publishing

- \$7-9 billion industry in the US
- Fastest growing media sub-sector in the past 15 years
- Since 1986 the average price of a journal has risen 215%
- Overall, the price per published article is \$5000

Morgan Stanley Equity Research, 2002.
Brown PO. PLoS Biology 2003. <http://www.plosbiology.org/plosone/1/request=get-document&doi=10.1371/journal.pbio.0000036>

Scientific Publishers

- Academic, not-for-profit societies
- University presses
- Commercial publishers
- Currently 24,000 science journals publishing >2.5 million papers per year

Top Commercial Publishers of Scientific/Technical/Medical Journals

Publisher	No. of journals	Share of journals (%)	Share of articles (%)	Revenue	Gross Margin
Reed Elsevier	1,347	18	25	\$5.9 b	64%
Wolters Kluwer	552	7	7	\$3.9 b	23%
Blackwell*	341	4	4	\$273 m	
Bertelsmann	326	4	4		
Wiley	279	4	4	\$873 m	73%
Taylor & Francis	191	2	1	\$147 m	25%
Sage*	123	2	0		
Karger*	101	1	1		

*privately owned

Institute for Scientific Information, 1998.
Factiva.

Typical Income & Costs for a Scientific Journal

Revenues	%
Subscriptions	85
Single copy/back volumes	6
Advertising/ mailing lists	5
Reprints	1
Permissions	1
Other	2
TOTAL	100

Costs	%
Production	58
Postage	6
Distribution	2
TOTAL	66

Gross margin = 34%

Page G et al. *Journal Publishing*. Cambridge University Press:2002:37.

Reed Elsevier



- Based in Amsterdam
- Employs 36,000
- Publishes 1,700 scientific, technical & medical journals
- Owns Mosby, Churchill Livingstone, Harcourt, WB Saunders
- Owns MDConsult (subscribed by 95% of US medical schools) & LexisNexis
- World's 3rd highest internet revenues (after AOL Time Warner & Amazon)
- Revenue: \$5.9 billion
- Gross margin: 64%
- Forbes Headline (11/11/02): "Amid a media recession, Crispin Davis is coining money at Reed Elsevier. How did he pull that off?"

<http://www.reed-elsevier.com/>; Factiva

Trends in Scientific Publishing

- Mergers
- Price Escalation
- Increasing use of information technology
- Bundling

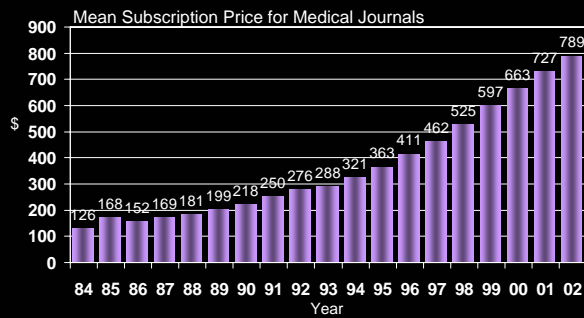
Trends in Scientific Publishing Publishing Company Mergers

1990	Wolters Kluwer buys Lippincott	1998	Wolters Kluwer buys Plenum
1991	Reed Elsevier buys Pergamon	1998	Wolters Kluwer buys Waverly
1997	Harcourt buys Churchill Livingstone	1998	Wolters Kluwer buys Thomson Science
1998	Harcourt buys Mosby	2001	Reed Elsevier buys Harcourt

- Eliminates competition
- Currently one company (Reed Elsevier) has 30% market share (level at which competition is adversely affected)

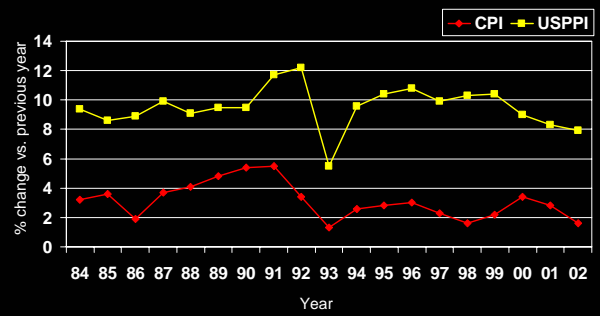
Wellcome Trust. *Economic Analysis of Scientific Research Publishing*, 2003.
Vergano D. *USA Today*, November 19, 2003.
Information Access Alliance. www.informationaccess.org/WhitePaperV2Final.pdf

Trends in Scientific Publishing Price Escalation



Albee B, Dingley B. American Library Association. http://www.ala.org/Content/NavigationMenu/Products_and_Publications/Periodicals/American_Libraries/Selected_articles/U_S_Periodical_Prices_2002.htm

Trends in Scientific Publishing Price Escalation



Albee B, Dingley B. American Library Association. http://www.ala.org/Content/NavigationMenu/Products_and_Publications/Periodicals/American_Libraries/Selected_articles/U_S_Periodical_Prices_2002.htm

Trends in Scientific Publishing Price Escalation

- Reed Elsevier raised prices 226% from 1986 to 2000 (Consumer Price Index rose 62% in the same period)

Vergano D. *USA Today*. November 19, 2003.

Journal Profitability: Reed Elsevier

	Operating Profit Margin (%)	
	Science & Medicine	All journals
1998	36%	26%
1999	35%	23%
2000	36%	21%

UK Office of Fair Trading. *The Market for Scientific, Technical and Medical Journals*. 2002.

Trends in Scientific Publishing Journal Prices

Publisher	Average price		Factor of Increase	
	1975	1995	Current \$	Constant \$
Commercial	\$55	\$487	8.9	3.1
Society	\$28	\$229	8.2	2.9
University	\$15	\$81	5.4	1.9

Tenopir C, King DW. SLA Publishing.

Trends in Scientific Publishing Journal Prices

- Comparison of for-profit & non-profit journals
 - Price per page: for-profit journals 5.5 times more expensive
 - Price per citation: for-profit journals 10 times more expensive

Bergstrom CT, Bergstrom TC. <http://octavia.zoology.washington.edu/publishing/>

Trends in Scientific Publishing Journal Prices

- An analysis of journal pricing by the UK Office of Fair Trading found that the price differential between for-profit and non-profit journals could not be accounted for by:
 - Quality
 - Short-print runs (small circulation volumes)
 - Cross-subsidization (using more profitable journals to support less profitable ones)
 - Risk (failure of new journals)

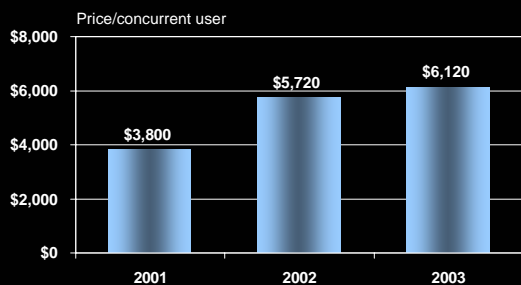
UK Office of Fair Trading. *The Market for Scientific, Technical and Medical Journals*. 2002.

Journal Subscription Prices for VCU Libraries

	1991	1998	2003	% increase 91-03
<i>AIDS</i>	\$255	\$990	\$1,540	504%
<i>Am Journal of Hematology</i>	\$480	\$1,675	\$3,010	527%
<i>Brain Research</i>	\$6,843	\$15,428	\$21,269	211%
<i>Clinical Infectious Diseases</i>	\$195	\$314	\$551	183%
<i>J of Comparative Neurology</i>	\$4,290	\$11,590	\$18,737	337%
<i>New England J of Medicine</i>	\$189	\$210	\$549	190%
<i>Annals of Internal Medicine</i>	\$125	\$253	\$297	138%

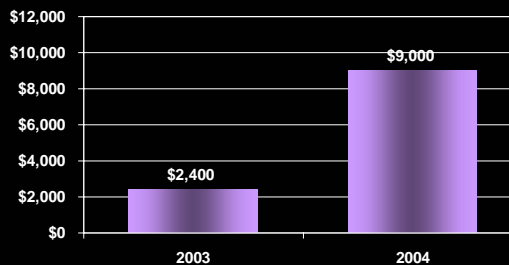
Tompkins-McCaw Library.

VCU Subscription Price for MDConsult



Tompkins-McCaw Library.

VCU Subscription Price for JAMA / AMA Titles Online



Tompkins-McCaw Library.

Trends in Scientific Publishing Use of Information Technology

- Online peer review & manuscript management
 - Increases speed to publication
 - Decreases cost (20-30%)
- Online journals replacing print editions
 - 2/3 of academic journals are now online, although many continue hard copies as well

Vergano D. *USA Today*, November 19, 2003.
Morgan Stanley Equity Research, 2002.

Publishers Profits Increase with Online Publishing

	Paper & Online	Online Only	Increase in profitability
Revenues	100	90	16%
Staff	20	20	
Print/paper	13	0	
Distribution	5	2	
Property/overhead	5	5	
IT	15	15	
New launches	5	5	
Operating profit	37	43	

Morgan Stanley Equity Research, 2002.

Trends in Scientific Publishing Bundling

- Publisher sells subscriptions to a collection of online journals (e.g., Reed Elsevier's ScienceDirect)
 - Replaces subscriptions to individual journals
- Package contains many specialized journals of use to few; institutions cannot alter the bundle
 - Cornell U. pays \$1.7 million for Science Direct (20% of serials budget for 2% of its journal subscriptions)
- Eliminates choice of journals by libraries & forces them into a fixed, escalating price
- Forces duplicate access to some journals
- Eliminates competition
- Uncouples price from demand

Carnevale D. *Chronicle of Higher Education*, December 19, 2003;50(17):A33.
 UK Office of Fair Trading. *The Market for Scientific, Technical and Medical Journals*. 2002.
 Goldsmith C. *Wall Street Journal*, January 19, 2004:B1.

Profit Motive & Academic Societies

- Increased appetite for publicity
- Reluctance to account for profits & how they are spent
 - NEJM profit thought to be >\$20 million in 1999
- Transformed medical societies into big businesses
- Pharmaceutical companies' gain influence via advertising revenue
 - In 1992, *Annals of IM* published a study showing that journal ads were often misleading → companies withdrew ads causing \$1-1.5 million revenue loss

Altman LK. *The New York Times*, August 24, 1999.

The Dilemma for Academic Societies

- Academic societies often use journal revenues to pay for infrastructure
- Open Access forces academic societies to critically examine their primary reason for publishing a journal:
 - Is it more important to make profit from the journal or to advance knowledge by allowing the content of their journal to be open access?

Sources of Conflict

	Scholar	Commercial Publisher
Goal	Wide distribution of work	Maximize shareholder value
Strategy	Publish	Control information access & price
Reward	Reputation, promotion, tenure	Increased financial return

Association of Research Libraries. www.arl.org/sparc

Market Problems: Scientific Journals

- Inelastic demand
 - Price competition not a dominant feature of this market (i.e., inability to substitute a cheaper journal)
 - “If a very well-regarded but expensive journal increases its price further, it is the cheaper, but less-well regarded journals in the same field that are cancelled, so that the subscription to the leading journal can be maintained. This means that a publisher sometimes has the potential to increase market share by raising prices.”

UK Office of Fair Trading. *The Market for Scientific, Technical and Medical Journals*. 2002.

Market Problems: Scientific Journals

- Barriers to new journals entering the market
 - Limited library budgets; a new journal can only be successful if it is able to displace an existing journal
 - Journals that attract the best authors, editors & referees have the most prestige → more frequently read & cited → enhances their status → new journals rarely able to challenge established journals

UK Office of Fair Trading. *The Market for Scientific, Technical and Medical Journals*. 2002.

Market Problems: Scientific Journals

- Coordination game
 - An outcome can be at equilibrium even though there is another equilibrium that would be better for everyone
 - To switch to another equilibrium, however, requires a large critical mass of players to change simultaneously to a common alternative action
 - In the case of scientific journals, not only may the leading experts & their readers be looking at the quality rather than the price of such journals, but the required *en masse* transfer of leading experts & their readership to an alternative journal may be difficult to achieve

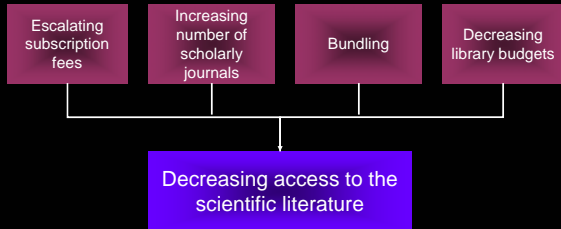
UK Office of Fair Trading. *The Market for Scientific, Technical and Medical Journals*. 2002.

Pro-competitive Forces

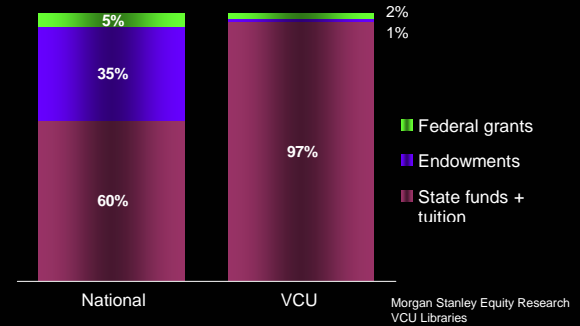
- Price restraint by commercial publishers
 - Reed Elsevier has committed to annual single digit % price increases (although still higher than the CPI)
- Buyer power (buying cartel)
 - Library consortia negotiating better pricing
- Academics exerting power
 - Editorial boards of 2 commercial journals resigned en masse to form competing journals
 - Scientists uniting to publish in, edit, review & subscribe to open access journals
 - Advocacy by professional library associations
- Information technology
 - Easier to produce competing journals

UK Office of Fair Trading. *The Market for Scientific, Technical and Medical Journals*. 2002.

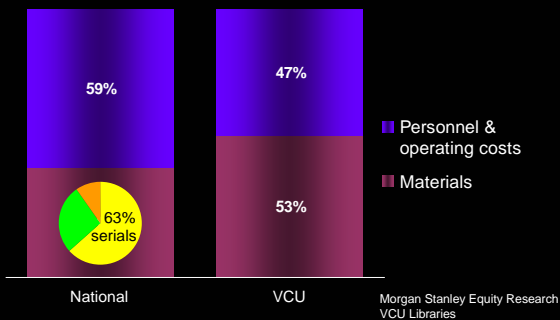
The Crisis for Academic Libraries



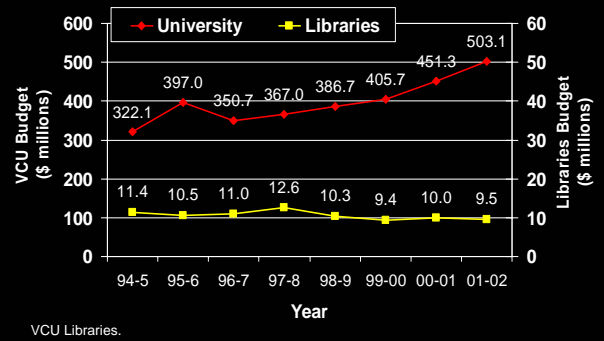
Academic Library Budgets: Revenue



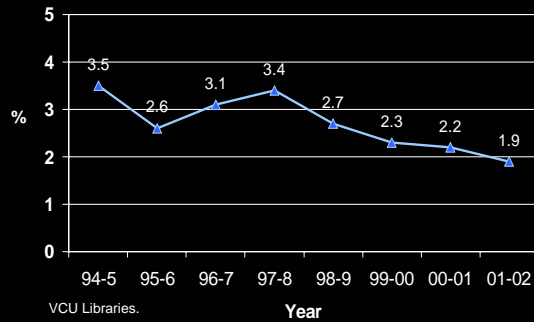
Academic Library Budgets: Expenditures



VCU & Libraries E&G Budget



Virginia Commonwealth University Library Budget as Percentage of University Budget



Institutional Library Expenditures

Southeastern Research Libraries, FY 01-02, n=37

Rank	Institution	Expenditures
1	Emory University	\$42.9 million
2	Duke University*	\$30.6 million
3	University of Virginia	\$28.6 million
17	Virginia Tech	\$12.8 million
29	VCU	\$9.5 million

*Duke's medical library cancelled 30% of its journal titles this year
(Guterman L. *Chronicle of Higher Education*, January 30, 2004;50:A10).

Association of Southeastern Research Libraries.

VCU Libraries Budget Reductions

	FY 2002-03	FY 2003-04
Budget reduction (total)	\$520,000	\$453,000
Collections reductions	\$440,000	\$373,000
Journal cost increases	\$235,000	\$200,000
Purchasing power reduction	\$675,000	\$573,000
Journals cancelled	447	2,231

*projected 406 journals to be cancelled in FY 2004-05

John Ulmschneider, VCU Libraries.

An Issue of Social Justice

Health care is a right



Medical knowledge is a public good



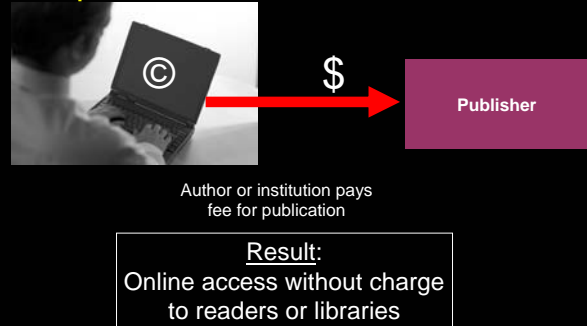
Open access

Medical Knowledge is a Public Good




- The benefits of research are derived principally from access to its results. When the dissemination of research results is less than it might be, then the benefit to society is suboptimal
 - Characteristics of public goods
 - Nonrivalrous in consumption
 - More than one person can derive consumption benefits from a given level of supply at the same time
- AND/OR
- Nonexcludable
 - Impractical for one person to maintain exclusive control over its use

Weimer DL, Vining AR. *Policy Analysis: Concepts and Practice*, 3rd ed;1999:75.

Open Access Model



Publishing Models

	Traditional	Open Access
 Author		\$ ©
 Publisher	©	
 Reader	\$	

Principles of Open Access

- Works are created with no expectation of direct monetary return & made available at no cost to the reader on the public Internet for purposes of education & research
- Anyone, anywhere, with a connection to the Internet can find & read published research articles online, & use their contents in the course of scholarship, teaching, & personal inquiry (www.plos.org)
- Based on an ethos of sharing
- Unhindered access to research is essential to the rapid & efficient communication of science

Open Access Preserves the Advantages of Traditional Journals

- Peer review: all major OA initiatives agree on need for peer review
- Professional quality (real excellence)
- Prestige (reputed excellence)
- Preservation
- Profit: author's fees, add-ons, auxiliary services
- Print

Suber P. *Journal of Biology* 2002;1:3.

Direct Benefits of Open Access

- Makes peer-reviewed research more widely accessible
- Increases the impact of scholarship for authors
 - Open access papers have 336% more research impact than those that have toll access
- Places the literature in a single information space (Internet)
- Helps libraries to control costs
- Makes knowledge available to those unable to afford subscriptions to journals
- Allows perpetual access

Modified from: Public Library of Science. www.plos.org/downloads/oa_background.pdf

Indirect Benefits of Open Access

- Avoids duplication of research effort, & the resulting financial & time waste
- Increases the public accountability of science
- Speeds up understanding of outstanding scientific questions
- Enables the building of databases & knowledge bases, effectively & efficiently reusing published results
- Makes meta-analyses of results easier
- Takes science out of its ivory tower by letting non-scientists in
- Stimulates wider understanding of, & respect for, science

Veterop J. *Learned Publishing* 2003;16:167-169.

Noneconomic Arguments for Open Access

- Rise of evidence based medicine
- Information paradox: doctors are overwhelmed with information, but can't find the information they need when they need it
- Patients expectations for access to the same information as doctors
- Proliferation of hand-held technology

Abbasi K et al. *Brit Med J*;2002;325:1472.

Potential Disadvantages of Open Access

- May encourage quantity at the expense of quality
- May be unable to compete for the best papers
- May not be suitable for all disciplines (e.g., humanities, social sciences)

Richardson M. www.alpsp.org/events/previous/ric130902.ppt

Paying for Open Access

- Publication charges to authors
- Institutional memberships (allows waiving of authors' fees)
- Membership dues to scholarly societies
- Decreased publication costs
- Support from research sponsors (cost of publication in open access is <1% of funding for research*)
- Continuing revenues from existing sources (e.g., print subscriptions, advertising, corporate sponsorship)
- New revenue streams (e.g., sale of value-added content or services)

Public Library of Science. www.plos.org/downloads/oa_background.pdf
 *Kotzin S. dx.doi.org/10.1371/journal.pbio.0000036.sd001

Open Access is Not "Napster for Science"



	Music Industry (Napster)	Science (Open Access)
Intent of writer	Sell work	Give away work
Purpose of publication	Revenue	Impact or influence
Consent to free access	No	Yes
Copyright infringement with free access	Yes	No

Suber P. <http://listserv.sigmaxi.org/sc/wa.exe?A2=ind03&L=september98-forum&F=l&S=&P=64508>

Open Access Initiatives Budapest Open Access Initiative

- Met in December 2001
- Recommended:
 - Self-archiving: deposition of refereed journal articles in open electronic archives (publicly accessible web sites); these articles can be viewed via search engines
 - Open access journals
- Open Society Institute (Soros Foundation) committed \$1 million/year for 3 years to support open access projects



George Soros

<http://www.soros.org/openaccess/index.shtml>

Open Access Initiatives SPARC

Scholarly Publishing & Academic Resources Coalition



- Alliance of 300 universities, research libraries, & organizations responding to market dysfunctions in the scholarly communication system
- Goal is to stimulate expansion of the non-profit sector's share of overall scholarly publishing activity
- Helps stimulate competition in the market by nurturing high-quality, low-cost journals published by researchers, societies or publishers with scientist- and library-friendly values and practices
- Supports open access publishing models
- VCU is a founding member

<http://www.soros.org/openaccess/index.shtml>

Open Access Initiatives PLoS



- "Immediate unrestricted access to scientific ideas, methods, results, & conclusions will speed the progress of science & medicine, & will more directly bring the benefits of research to the public."
- Initially encouraged publishers to deposit their journals in central archives (e.g., PubMed Central)

Public Library of Science. <http://www.publiclibraryofscience.org/>

Open Access Initiatives PLoS



- Developed open access journals
 - *PLoS Biology* launched October 2003
 - 500,000 hits in the first 8 hours
 - Accepts 22% of submissions
 - *PLoS Medicine* to launch in 2004
- Non-profit; board of directors chaired by Harold Varmus
- Supported by \$9 million grant from the Gordon & Betty Moore Foundation
- Author's fees are \$1500 per published manuscript
 - Waivers available if authors cannot pay
 - Institutional memberships now being offered

Public Library of Science. <http://www.publiclibraryofscience.org/>
Guterman L. *Chronicle of Higher Education*, January 30, 2004:50:A10.

Open Access Initiatives Public Access to Science Act (HR 2613)

- Sponsored by Martin Sabo (D-MN)
- Tenets:
 - US Government funds research with the intention that new discoveries will improve the lives & welfare of its people
 - Works of the US Government are beyond the reach of copyright protection
 - US Government spends \$45 billion yearly to support scientific & medical research whose product is new knowledge for the public benefit
 - The Internet makes it possible for this information to be promptly available to every person with access to the Internet
 - The US Government funded research belongs to, & should be freely available to, every person in the US

<http://thomas.loc.gov/cgi-bin/query/z?c108:H.R.2613>

Open Access Initiatives UK Inquiry

- House of Commons Science & Technology Committee to investigate scientific publishing in February-March 2004
 - High subscription prices
 - Backlash of academics
 - Government support for open access

Quint B. *Information Technology Today*, December 30, 2003.
<http://www.infotoday.com/newsbreaks/nb031229-1.shtml>

Open Access Implementation

- Institutional repositories
- Disciplinary repositories
- PubMed Central
 - Digital archive managed by the NLM (a full-text version of PubMed)
 - Free & unrestricted access
 - Publishers can deposit journal articles at any time
 - Currently has full-text archiving of >80 journals + all BMC journals



Open Access Implementation:



- Independent, for-profit publisher committed to providing immediate free access to peer-reviewed biomedical research
- >100 online, peer-reviewed journals in biology & medicine
- Uses authors' fees & institutional memberships to fund open access journals
 - \$500 for published manuscripts
 - Authors' fees waived if institution is a member (VCU is a member), author is from a developing country, or author is unable to pay
- Authors who publish in BMC journals retain copyright
- Articles indexed by PubMed

Transitional Models to Open Access

- Mixed-access journals
 - Author can pay publication fees in order to make the paper open access
 - *Physiological Genomics* charges a \$1500 fee for the option of open access: 15-20% of authors have opted to pay
- Subsidize cost of open access electronic publications with subscriptions to hard copy
- Grant funding or commercial sponsorship to support transition

Public Library of Science. www.plos.org/downloads/oa_background.pdf
Guterman L. *Chronicle of Higher Education*, January 30, 2004:50:A10.

Open Access: Making the Lists

- 10 Vital Health Stories of '03
 - SARS
 - Medicare overhaul
 - Drug reimportation
 - Over-the-counter meds
 - Plight of the uninsured
 - Underground market in prescription drugs
 - Targeted health research
 - Obesity
 - Offshore outsourcing
 - **Open access**
- Where Researchers Might Soar in 2004:
Areas to Watch
 - MARS landings
 - Microbiology & genomics for biodefense
 - More human genome insights
 - **Open access scientific journals**
 - Soils' impact on climate change & agriculture
 - Cost/benefit of security & anti-terror measures
 - Heavy bottom quark

Wall Street Journal, 12/22/03

Science 302:2040, 12/19/03

Reed Elsevier Update

- Performance over past 12 months:
 - Shares have fallen 11%
 - Underperformed the FTSE All-Share index by 24%
- High profile executive departures from the American arm
- “Loyal investors & analysts are now beginning to conclude that in a market that looks like it is picking up again, maybe they can no longer afford to stick with Reed.”

Porter A. The Sunday Times (London), January 11, 2004.

An Analogy Test

journal : publishing company :: healthcare : ?

- Dispensable intermediaries
- Provide a business model for *delivery* of a product
- Commodify public goods
- Represent market failures
- Produce financial gains by limiting access
- Extract capital & shift to shareholders
- Ultimately, do not contribute to the public good

M. Edmond, 2004.

Conclusions

- Electronic journals have many advantages over print journals
- Traditional journal publishing model represents a market failure
- Access to scientific research is decreasing due to academic libraries' inability to pay escalating subscription fees
- Open access represents an alternative business model for publishing that holds great potential

Ultimate Goals of Open Access

- The entire full-text, refereed, research corpus online
- On every researcher's desktop, everywhere
- 24 hours a day
- All papers citation-interlinked
- Fully searchable, navigable, retrievable, impact-rankable
- For free, for all, forever

Harnad S. J Postgrad Med 2003;49:337-342.

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Jean Shipman, MSLS
Director, Tompkins-McCaw Library

John Ulmschneider, MS
University Librarian

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assistance in
preparation of this
presentation

