

Junk science for sale

Sham journals proliferating online

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ABSTRACT

A new danger threatens the integrity of scholarly publishing: predatory journals. Internet-only, “open-access” publishing is a valid way for researchers to reach the public without a paywall separating them. But, of thousands of open-access scientific journals today, as many as twenty-five percent are believed to be fake, existing only to make money by charging authors high processing fees.

In sham journals, peer review is cursory or absent: as many as eighty to ninety percent of submitted manuscripts are accepted, many within days, without any editorial comment. Predatory journalism can be remarkably good at mimicking reputable publishers. Sham journals use names and logos that closely resemble those of legitimate journals, intentionally confusing site visitors.

Untrustworthy publications have not received the widespread, damning publicity they deserve. If junk science is not confronted and eliminated, it will continue to tarnish and undermine ethical, open-access scholarly publishing.

KEYWORDS: open-access publishing, predatory journalism, misrepresentation, junk science

Are you and your patients unwittingly reading junk science or making personal or professional health decisions based on shoddy, substandard research? Have you been duped into publishing research in a phony, only for-profit journal? If so, you are not alone.

The vast majority who read scholarly literature do not know that hundreds of thousands of legitimate-appearing articles are published by unscrupulous journals with minimal scientific validity.^{1,2} Unsuspecting readers may be unable to distinguish between credible research and junk science. Thus, they may make personal medical decisions based on promising sounding research, such as “An Advance in Therapy for Lung Cancer,” that was actually published by a predatory journal, motivated only by the high publication fees paid by authors. Also, as health professionals, we use search engines such as PubMed or Google Scholar to research investigative studies and clinical topics in patient care. As a result, we may reference and use seemingly relevant material published in these sham journals.

Most academic physicians are familiar with the almost daily bombardment of spam emails from questionable journals to submit a manuscript, join an editorial board, or

present at a bogus scientific conference. Some small fraction then go on to submit manuscripts. Desktop publishing now allows anyone to create a “virtual journal,” masquerading as a legitimate business.³

Ethical, established journals, such as the *New England Journal of Medicine*, accept less than ten percent of all submissions which have undergone rigorous pre-acceptance feedback and review by peers – a crucial staple of scholarship. In sham journals, peer review is cursory or absent: as many as eighty to ninety percent of submitted manuscripts are accepted, many within days, without any editorial comment (See Table). Editorial boards tend to be fabricated or composed of American, Canadian, or British academics who have been solicited and then duped to be members of editorial

Table. Common characteristics of predatory journals^{1,4-7}

Active pursuit of prospective authors by frequent spam email invitations, such as to join editorial boards or a “Call for Submissions” to submit manuscripts, on research topics that may be outside an author’s expertise
Unrealistic promises of rapid peer review and publication
Absent peer review or minimal, useless feedback
Attempt to confuse prospective authors by creating journal and publisher names or logos very similar to legitimate, established ones
Provide no academic information such as institutional affiliation of editors or editorial board members
False claim to be indexed, or are not indexed in legitimate electronic databases, such as PubMed
Contact information does not include verifiable data, including addresses of editor, editorial board; contact is Internet-only without telephone or fax listed
Peer-review process is not described clearly
Review of published papers reveals shoddy, substandard manuscripts
Journal is not indexed in the Directory of Open Access Journals (DOAJ, www.doaj.org)
Journal publisher is not a member of the Open Access Scholarly Publishers’ Association (OASPA, www.oaspa.org) or the Committee on Publication Ethics (COPE)
Impact Factor claims are fictitious; may use fabricated impact factors, using non-existent ratings such as “Universal Impact Factor” or “Global Impact Factor”
Unsuccessful search for the journal online

boards, chair conferences, or submit journal articles.⁴

Predatory publishing has exploded in recent years. Between 2005 and 2010, the number of dishonest, online-only journals had increased from 18 to more than 900, many sporting deceptive names that mimic legitimate journals.⁵ A later investigation identified as many as 8,000 predatory journals that published 420,000 articles in 2014.⁶

Medicine is not the only victim. A broad spectrum of shady, predatory publishers exists in fields as diverse as metallurgy, quantum mechanics, molecular biology, engineering, political science, and ornithology. Medicine is unique, however. It is the only science that is read by the lay public to inform personal health choices.

Internet-only, “open-access” publishing is a valid way for researchers to reach the public without a paywall standing between them. But, of the thousands of open-access scientific journals online, as many as 25% are believed to be fake, existing only to make money for their publishers by charging authors high processing fees.⁷ There are two broad types of predatory journals. The first is an easily recognized shoddy sham, replete with grammatical errors and nonsense. This type is primarily designed for inexperienced authors in underdeveloped countries for whom any publication is important for maintaining their position or helping with promotion.⁸

The second, more pernicious type of phony journal may be difficult to detect because it mimics reputable publications. An example, well-documented by John Bohannon, a respected journalist at *Science*, is the bogus *American Journal of Polymer Science*, a sound-alike and look-alike publication that intentionally mimics the respected *Journal of Polymer Science*, published by Wiley since 1946.⁹

Why are authors and readers fooled? To quote a famous cartoon, “On the Internet, nobody knows you’re a dog.” Predatory journalism can be remarkably good at mimicking reputable publishers. Sham journals use names and logos that closely resemble those of legitimate journals, intentionally confusing site visitors. Some bogus journals have professional-, legitimate-looking websites, despite their dubious origins. Many will adopt names with “American” in the title. But their only connection to the United States is often a rented mailbox somewhere. The vast majority of sham publishers and authors are from underdeveloped nations without rigorous academic enterprises. Yet many submissions are from authors in respected American medical institutions. Experienced scholars have been fooled into submitting manuscripts and joining editorial boards.¹⁰

One large study comparing potential predatory and legitimate journals found that one-third of predatory journals promoted bogus, non-existent impact metrics, one measure of an individual journal’s quality. This investigation reported that as many as half of phony journals had names similar to other existing journals.¹

In a 2013 exposé, Bohannon used a fake name to submit a fabricated manuscript “so hopelessly flawed as to be

meaningless” to 300 suspicious open-access publishers.⁹ More than half accepted the article, failing to respond even to blatant, glaring mistakes.

How do experienced academics get hooked? We speculate that one explanation may be that many of us have experienced the problem of our own borderline acceptable manuscript rejected two or three times by reputable journals, the last submission rejected in a few days without being sent for external peer review. The manuscript may be a case report with low publication priority, or a hypothesis-driven paper with study design problems without a robust sample size or marginal clinical outcomes. One of the authors, commonly a junior author, finds a seemingly satisfactory candidate publication; the manuscript is submitted. A few days later, without peer review, the manuscript is accepted along with a hefty authors’ publication charge.

Now, a new scam bedevils the universe of scholarly publication: hijacked journals. A hijacked journal differs from a predatory one. A hijacked journal appropriates an inactive or careless website or uses a fake website that mimics the look, title and International Standard Serial Numbers (ISSNs) of a reputable journal. The distinction is that a predatory journal establishes a new brand.

Hijacked journals may be more likely to receive manuscripts from authors, because they mimic known publications, frequently appropriating the impact factor that ethical journals have earned from Thomson Reuters, the industry standard.¹¹ Both predatory and hijacked journals commonly claim to have impact factors, but they usually have phony metrics such as the non-existent Universal Impact Factor or Global Impact Factor.^{11,12} Efforts by predatory publishers to enter the Thomson Reuters Impact factor database, through ploys such as purchasing journals already indexed in PubMed, must be thwarted.

Bohannon used the following example to illustrate construction of a fake website: build a convincing version of a website at a similar address – <http://www.sciencemag.org/> rather than www.sciencemag.org – then drive Web visitors to the phony site. Hijacking the official domain is a devious twist because unsuspecting visitors still will log on to the hijacked journal site.¹³ Because the co-opted site retains the official Web domain of the legitimate publication, it is difficult to tell that it is fake. This new ploy of journal hijacking can flourish when journals are careless in maintaining website administration and security features. In the current system, publishers must pay periodically to re-register their journals’ legitimate Web domains. Failure to re-register allows a waiting hacker to snatch a domain to create a fake journal site. As Bohannon states, there is no simple way to identify a journal that has lost control of its own Web domain.

Why does junk science thrive? For the unsuspecting, sham journals can present an easy path to success. Pressure to publish is another major reason for novice researchers and doctoral students in developing countries who are the major

victims of predatory journals.⁸ Employers and scholars in government and business organizations as well as university research institutions frequently use publishing as a standard of productivity. An unknown percentage of submitting authors, some American, are complicit, knowingly choosing a dubious journal to advance their careers.

Reputable algorithmic search engines, including Google Scholar, Scopus, and Thomson Reuters, despite active detection and deletion efforts, index some sham journals in their efforts to be comprehensive. As a result, these databases unwittingly preserve pseudoscience to be accessed later by unwary readers.

Systematic identification of potential junk publishers is challenging. Recognition of their existence among physicians and the public is not widespread. The reality of thousands of deceptive journals makes vetting difficult and time consuming. A current standard of credible journals is the Directory of Open Access Journals (www.doaj.org), which keeps a changing list of legitimate open-access publishers. Still, lines can be blurred, as not all journals are clearly identified as junk. Thus, the designations above may be subjective for some entries.⁴ Two long-term, widely publicized lists have been developed by Jeffrey Beall, an academic librarian at the University of Colorado: publishers of single phony journals (<http://scholarlyoa.com/individual-journals>) and publishers of multiple journals (<http://scholarlyoa.com/publishers>).⁵ However, Beall's lists have been removed and were unavailable when we attempted to access the sites on April 14, 2017, reportedly due to legal threats from publishers.¹⁴

To stamp out fake science, we must publicize vetted, authoritative lists separating ethical journals from sleazy ones. Reputable search engines must be vigilant by removing phony journal sites when discovered. However, piecemeal removal of individual journals is woefully inadequate, given the enormous reach and drive of these publishers.¹⁵ A vigorous, coordinated international effort from all stakeholders is needed to disseminate validated criteria separating ethical, credible science from worthless, dangerous, irresponsible publications.^{4,11}

All physicians, including trainees and medical students, have a responsibility to self-police their own work. The best strategy to avoid submitting or publishing in a phony journal is self-assessment. Use the "smell" test to determine whether your target journal is fake. Be self-critical about the deficiencies in content, study design, and other methodological flaws in your own manuscript. Read and assess articles in the journal before submitting your work.¹⁶

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