WHAT RESEARCH ADMINISTRATIONS NEED TO KNOW ABOUT RECOGNIZING PREDATORY PUBLISHING: GUIDANCE AND BEST PRACTICES

William L. Gannon
University of New Mexico
Graduate Studies and Department of Biology

John Barnes
University of New Mexico
Department of Health, Exercise & Sport Science

ABSTRACT

Purposefully publishing a fraudulent scholarly paper is considered research misconduct and never tolerated in academia. True scholars work hard to create and publish work in legitimate ways. However, fraudulent publishers—companies that solicit and quickly publish research papers without review or quality assurances that evaluate, judge, and validate research—are increasing sharply in numbers with few checks. Deceptive practices in research have the potential to undermine credibility and legitimacy of honest academic work and the products of research. Here, we describe the growth of these ethically questionable publication practices, characteristics that are typical of them, and provide suggestions for best practices that should be utilized by research administrators, researchers, and their students to reduce negative impacts on research.

Keywords:

Fake publishing, deceptive publication practices, administrative guidelines

INTRODUCTION

The term *fake news* is something we hear frequently of late, particularly when news outlets broadcast or publish something that makes a politician unhappy. Logically, one would think *news* was *news* and could easily be distinguished between what is false and what is a true account. But for various reasons, in today's world that distinction can be blurred. Likewise, in academia and research, determining what is *real,* describing the natural world, or generating honest results is the basis of research, scholarly activities, and academic training. Publishing the truth—or as close to truth as research can get—is vital to the process of generating new knowledge. Failure to follow proper ethical standards of discovery is considered research misconduct, leading to loss of professional reputations, diminished research funding, disservice to student training, and other impacts such as the loss of public confidence in scientific findings.

Considering the increase in challenges to creating and disseminating research appropriately, Gabriele (2011) wrote that research administrators should provide leadership that enriches and promotes "the character of persons and/or institutions" (p. 91). But while previous initiatives in creating and fostering best practices have proven worthwhile, over the last decade several other issues have emerged that are of concern to research administrators and directors of research ethics and integrity offices on many college campuses. These areas include financial management (misuse of grant funds), issues of equity and inclusion within research, sexual harassment in research, and study reproducibility, one of the strengths of the research knowledge-generation process.

Those who examine whether or not study results are reproducible (for example, Baker, 2016) report that there has been an alarming increase in data, studies, and publications that have either been outright fabricated or falsified (the federal definition of research misconduct) or published without adequate (or any) peer review. Some publications even consist entirely of gibberish (LeBrain & Welles, 2017; Segran, 2015). These illegitimate publications are often

referred to as predatory journals and the issue of falsified publication (also referred to as predatory publication) is explored in the present paper.

Predatory publication is an important topic for any university or research administrator to consider and address because the ramifications of such have the potential to damage a university by costing an institution research funding, marring the school's scholarly reputation, and potentially harming individual careers of scholars if not properly addressed. For instance, the authors of the current paper were motivated to do a thorough exploration of this issue to provide some guidance to research administrators after first being asked by our university's College of Education to develop a policy describing predatory publishing, provide insight on how to recognize it, and what can be done to protect both faculty and graduate students from being harmed by predatory practices.

All researchers are potential victims if they lack awareness of predatory publishing activities. It is frightening to think that, as Sarfraz et al. (2020) wrote, the "majority of authors are unfamiliar with practices in pseudo journals despite publishing manuscripts" (p. 49). Even the most seasoned researcher would benefit from gaining a basic understanding of the potential dangers that exist as they develop and disseminate their research. But it is important to note that student researchers and early career faculty may be particularly at risk of falling prey to predatory publication practices.

Several national research ethics and administration groups such as the *Association for Professional and Practical Ethics* (APPE, 2024) have recognized and addressed this issue by dedicating symposia on the responsible conduct of research with talks that included the subject of predatory publishing. At a meeting in Atlanta in 2020, a speaker for the Centers for Disease Control (CDC) talked about predatory publishing and included the phenomenon of predatory or fake conferences. She related a story where even a higher administrator in the CDC fell victim to subscribing to a fake conference, paying the fees, the travel, only to appear at a conference in Singapore that didn't exist. We don't think other administrators, faculty, or graduate students should succumb to fake or possibly illegal publication activities or fall victim to a fictitious conference simply because they are not aware of these temptations. Here, we focus on predatory publications and publishers without expanding the discussion into conference scams, but refer to Campbell (2023), Chartier (2022), or Ibrahim and Saw (2020) for details on such.

In this paper, we review the phenomenon of predatory publishing and illegitimate journals and provide information for research administrators, other institutional officials, and researchers to use in their quest to ensure the institution does not diminish credibility and that research is published appropriately. Moreover, the rate of defrauding authors has not slowed and is complicated with the increasing trend of legitimate journals moving to open-access platforms (Linacre, 2024). The goal is to inspire research administrators to encourage their administrations to produce their own institutional publication guidelines and policies that would include a description of predatory practices, provide guidance on recognizing them, educate all researchers especially students, and avoid the consequences of publishing false or faked reports—despite an author's intent to publish appropriately.

RELEVANT TERMS

Predatory publishing – Here we consider *predatory* or *deceptive* in the context of publishing research reports into established literature. Other authors prefer *unethical* as a broader term where the writer engages in "fraudulent or unprofessional behavior" (Beaubien & Eckard, 2014, p. 2). First introduced by Bealle (2012a, p. 2) as businesses who, "publish counterfeit journals to exploit the open-access model in which the author pays. These predatory publishers are (deceitful), lack transparency, and aim to dupe researchers, especially those inexperienced in scholarly communication. They set up websites that

closely resemble those of legitimate online publishers and publish journals of questionable and downright low quality." These journals and publishers actively solicit manuscripts and charge publication fees without delivering the services or benefits offered by legitimate journals. Some misrepresent peer review, impact factors, editor involvement, or set up misleading journal names. One caveat: As noted in several research administration sites, defining predatory publishing is not black and white (Texas Tech University, 2024), so we urge diligence in the exploration of predatory practices and how they may affect researchers and institutions.

Legitimate journals – Typically, these are established journals where the publisher is registered with a number of professional organizations. These organizations include the Open Access Scholarly Publishing Association (OASPA), Committee on Publication Ethics (COPE), and others. The Directory of Open Access Journals (DOAJ) is an index of open access journals that works to establish that journals who are listed with them publish quality content. Because of the shift to open-access publishing, many new journals and publishers have emerged, creating a startling increase in publication options for authors from about 10,000 journals in 2010 to more than 16,000 in 2018; it is estimated that another 13,000 journals are open-access predatory (The Economist, 2020). The majority of increases in both legitimate and predatory journals are in the fields of health and chemical or physical sciences (Cabells, 2024).

Open-access publications – Open access journals provide researcher's work openly available on the Internet. Papers are freely available for most uses including to copy, print, and distribute and usually data are available. Legitimate open access journals may charge fees to process, archive, and/or publish research. These journals provide standard peer review, appropriate editorial oversight, disclose genuine impact ratings, and are listed in DOAJ (DOAJ, 2024). These listings include 13,631 journals who do not charge processing fees out of the more than 20,333 journals that they cite (DOAJ, 2024).

Predatory Practices in Research Publication

Predatory journals typically solicit authors through junk or spam emails, asking researchers to submit their manuscripts to them via email instead of an established web portal. Manuscripts are accepted quickly and then the author is charged an article publishing charge (APC) or fee. Xia (2015) reported that these APCs can range from $8 to $950 per page. This is not necessarily a clue that a journal is produced by a predatory publisher, as legitimate journals charge publication fees, and some can be substantial. For instance, publishing an article in many of the journals under *Springer Nature* is free, while journals such as *Science Advances* has an article processing charge of $4,950. However, deceptive publishers send unsolicited emails that provide information claiming peer review, indexing, archiving, and even editing, however, that is not done on the submitted manuscript. The caveat here is that predatory journals do not adhere to industry norms and standards typical of professional scientific publications (Richtig et al., 2018). New scholars who are just learning about publication processes may be especially vulnerable (Kearney, 2015).

Ivan Oransky, the founder of the online blog, *Retraction Watch* offers a bit of a different perspective on predatory publishing and what it is. Oransky states,

> First of all, I don't like the name 'predatory' journal, I respect the intent of the term, but I think it is much more useful to think about whether or not any journal is doing what it says it is going to do. The difference between a journal you can have confidence in and one you shouldn't have any confidence in, is far less clear than a lot of people, particularly those in large publishing houses, would like you to think. A lot of these large publishers like to talk about how awful predatory publishing is, yet at the same time some of their journals are having hundreds of papers retracted because they don't stand up to scrutiny. I'm not quite sure how such papers are different from those published in the so-called 'predatory' journals. (Flight, 2022, p. 1)

For researchers in higher education, and particularly in graduate programs and untenured faculty positions, there is an expectation to publish original, peer-reviewed research as a measure of academic and professional achievement. The practice of soliciting research manuscripts to publish for profit that uses these deceptive practices does not just present a problem for researchers, scholars, and students, but also for research administrators in colleges and universities (Beall, 2012a, 2012b). In the last few decades, legitimate open access publishers have experienced a dramatic increase in the number of journals available for researchers and scholars to distribute their work. Likewise, the number of publishers of predatory journals has also increased dramatically, growing from 18 in 2011, to 11,800 (2015), to 15,059 (2023), to 18,000 in 2024 (Cabells, 2024; Freedman & Kurambayev, 2023; Gupta, 2015, Laine & Winkler, 2017; Linacre, 2024). The flood of both legitimate as well as deceptive opportunities to publish potentially create confusion on the part of researchers looking to publish their work (Kolata, 2017).

Jeffrey Beall, a researcher and librarian at the University of Colorado-Denver coined the term *predatory journal.* "Beall's List" as it became known, was constructed by Beall in mid-2000's identifying just 18 journals that he identified as predatory based on a number of criteria (https://beallslist.net/; accessed September 9, 2024). Unfortunately, he shut his list and website down because of threats from predatory publishers[1] and also some confusion regarding his selection criteria on what constituted "predatory" (Beall 2012a; Beall, 2017). Also, Beall eventually had to halt his efforts to expose and maintain his reference list of predatory journals because of a lack of support from his own institution.

Legitimate publishers will list names of reviewers in the journal acknowledging the reviewer's service (for instance see Editor, 2023, *Acta Chiropterologica*). But to appear legitimate, predatory journals may list names, editors, scientists and their affiliations of purported reviewers on an editorial page without those named having served as a reviewer or even knowledge that they were being named (Sorokowski et al., 2017). Sorokowski et al. (2017, p. 483) provided examples of responses that they received when they solicited both fake and legitimate journals asking to serve in an editorial role in the journal (p. 483). Journals that were determined to be predatory responded with, "… as an editor, you have to publish some of your research articles with the Journal"; "If you want to start a new journal…you will get 30% of the revenue earned thru (sic) you"; and "It's our pleasure to add your name as our editor-in-chief for this journal with no responsibilities". Legitimate journals responded differently with, "One does not become an editor by sending in the CV; these positions are filled because a person has a high research profile and a solid research record"; "The typical progression … involves developing a track record of excellent service as an *ad hoc* reviewer which results in an invitation to join [*journal name redacted*] Editorial Board"; and "… your field of research is not exactly fitting with the goals of [*journal name redacted*]".

Some predatory journals do conduct peer reviews (although that process may differ from standard peer-review practices) but those reviews can turn out to be contrived (Rivera & Teixeira da Silva, 2021). In other cases, legitimate reviews are provided, but reviewers themselves are unaware of the status of the predatory journal for which they were reviewing (Van Noorden, 2020). Additionally, these so-called publishers may buy out reputable journals then subsequently continue publication using exploitative business practices under a name that had been previously considered legitimate (Langdorf, 2018).

[1] For security reasons, "Beall's List" provides the following disclaimer: "I am not Jeffrey Beall. I prefer my identity to be anonymous, largely for the reasons that Beall mentioned in his recent article (Bealle 2017). However, I can tell you that I am a postdoctoral researcher in one of the European universities and have hands-on experience with predatory journals. I will keep the list updated as much as possible, although I suspect I simply won't have time to do as thorough job as Beall."

Efforts to hold predatory publishers accountable for their actions have been made by the federal government. One such effort was a ruling by the US Federal Trade Commission (FTC) in April 2019 determining that a publishing company from Hyderabad, India was to pay a $50 million settlement to authors and others who were deceived by the company, a settlement upheld by the US Court of Appeals 9th Circuit Court (Edelstein, 2020; Kolata, 2019). The company, OMICS International (https://www.omicsonline.org/; accessed September 9, 2024) publishes about 780 journals (782 journals reported by Jain & Singh (2019); 774 reported by OMICS (2023) https://www.omicsgroup.org/) and sponsors hundreds of annual conferences and workshops each year, many by using predatory practices (Brainard, 2019, 2020; Manley, 2019; Masic 2017). Typical of predatory journals, OMICS journals approved many articles for publication in a matter of days, with half, at best, receiving some form of peer review. Researchers who were listed as reviewers by OMICS and asked to be removed from reviewer lists were not removed by OMICS editors. The FTC claim stated that OMICS provided false or fictitious impact factors, and

Table 1
Positive and negative indicators of legitimate (positive) and predatory (negative) journals and publishers as presented by Beaubien and Eckard (2014) and available online (Grand Valley State University, 2024).
All links accessed September 9, 2024.

Positive Indicators	Negative Indicators
• Scope of the journal is well-defined and clearly stated • Journal's primary audience is researchers/practitioners • Editor, editorial board are recognized experts in the field • Journal is affiliated with or sponsored by an established scholarly society or academic institution • Articles are within the scope of the journal and meet the standards of the discipline • Any fees or charges for publishing in the journal are easily found on the journal website and clearly explained • Articles have DOIs (Digital Object Identifier, e.g., doi:10.1111/j.1742-9544.2011.00054.x) • Journal clearly indicates rights for use and re-use of content at article level (e.g., Creative Commons CC BY license) • Journal has an ISSN (International Standard Serial Number, e.g., 1234-5678) • Publisher is a member of Open Access Scholarly Publishers Association • Journal is registered in Ulrichsweb.com, Global Serials Directory • Journal is listed in the Directory of Open Access Journals • Journal is included in subject databases and/or indexes	• Journal website is difficult to locate or identify • Publisher "About" information is absent on the journal's website • Publisher direct marketing (i.e., spamming) or other advertising is obtrusive • Instructions to authors information is not available • Information on peer review and copyright is absent or unclear on the journal website • Journal scope statement is absent or extremely vague • No information is provided about the publisher, or the information provided does not clearly indicate a relationship to a mission to disseminate research content • Repeat lead authors in same issue • Publisher has a negative reputation (e.g., documented examples in *Chronicle of Higher Education*, listservs, etc.)

Open access journal: All journal content available to read, print, download, distribute, or link to without fees.

Hybrid journal: Some content is open access, typically via publication or author fees.

Embargoed open access: Also called delayed open access. This is a subscription model that provides open access to content after an embargo period expires. For example, the most current content may only be available to subscribers, while the archived issues are open access.

Note. Table 1 is based on Beaubien and Eckard (2014). This is an open access article distributed under a Creative Commons Attribution License, which allows unrestricted use, distribution, and reproduction in any medium, providing the original author and source (Beaubien & Eckard, 2014) are credited (http://dx.doi.org/10.7710/2162-3309.1133; accessed September 9, 2024).

organized suspect scholarly conferences to which less than half of those listed as featured speakers had agreed to attend. Jain and Singh (2019) quantified Beall's criteria for determining a predatory journal and compared the performance of OMICS with that of BioMedical Central (BMC), a highly respected publisher.

Guidance in Identifying and Selecting Legitimate Journals

Recommendations and best practices are provided from the literature, our experience, and discussions with other research ethicists to recognize predatory or deceptive publishers. Also provided is a list of current resources that can be accessed when selecting a journal to submit a manuscript. These guidelines are not exhaustive and thankfully this topic is getting much more attention from the scientific and academic communities so we can hope to see more resources allowing for updates on reporting and listing of predatory practices. **Table 1** contains indicators of both legitimate and predatory journals. These may be used when seeking an appropriate journal to submit manuscripts. **Table 2** provides ten university predatory publishing or publication ethics guidelines and a link to

Table 2
Predatory publication guidelines and institutional policy on authorship for US universities

Institution	Guidance
Old Dominion University	Libguide
University of Pittsburgh	Libguide
Princeton University	Libguide
University of Nevada, Las Vegas	Libguide
Idaho State University	Libguide
University of Florida	Libguide
University of Notre Dame	Libguide
University of Minnesota	Libguide
Texas Tech University	Libguide
University of Arizona	Libguide

Institution	Authorship or Publication Policy
University of New Mexico	https://hsc.unm.edu/research/_docs/unm-authorship-and-dispute-resolution-procedure.pdf
Harvard University	https://hms.harvard.edu/sites/default/files/ assets/Sites/Ombuds/files/AUTHORSHIP%20GUIDELINES.pdf
University of Pittsburgh	https://medfaculty.pitt.edu/authorship-policy
Boston University	https://www.bu.edu/research/forms-policies/guidelines-for-authorship/
University of Utah	https://regulations.utah.edu/research/7-020.php
The Ohio State University	https://research.osu.edu/sites/default/files/2024-06/ORC_Authorship-Guidelines_Aug2021_508.pdf
Duke University	https://academiccouncil.duke.edu/sites/default/files/3-20-08FinalAuthorshipGuidelines.pdf
University of California	https://copyright.universityofcalifornia.edu/ownership/scholarly-publishing.html also, https://www.ucop.edu/research-policy-analysis-coordination/resources-tools/contract-and-grant-manual/chapter1/chapter-1-400.html
Stanford University	https://doresearch.stanford.edu/policies/research-policy-handbook/conduct-research/academic-authorship
University of North Carolina	https://graduateschool.charlotte.edu/responsible-research/authorship also, https://legal.charlotte.edu/policies/up-318

those documents, that, along with the comments below will assist research administrators in encouraging institutions in constructing their own resource.

In **Table 2**, Predatory publication guidelines and institutional policy on authorship are provided for ten US universities. Universities are not ranked in any particular order. The active URL is provided in links highlighted by Libguide or policy. For instance, the University of New Mexico has guidance on a Health Science website (Libguide) as well as an administrative policy for authorship. Institutional policies varied depending on search terms "publications" or "authorship". Rasmussen et al. (2020) provided an informed template for authorship policy and provides a working example from The University of North Carolina (link in second table below; all links last accessed September 9, 2024).

Table 3
University-based library resources to assist authors on awareness of predatory publishing
(last accessed September 9, 2024)

George Washington University	https://guides.himmelfarb.gwu.edu/PredatoryPublishing/
Iowa State University	https://instr.iastate.libguides.com/predatory
Sam Houston State Univ	https://shsulibraryguides.org/publish
Texas Tech University	https://guides.library.ttu.edu/c.php?g=543301#:~:text=%20Predatory%20Book%20Publishers,unedited%20and%20%20without%20peer%20review
University of Arizona	https://libguides.library.arizona.edu/predatory-publishers#s-lg-box-21657708
University of Cambridge	https://osc.cam.ac.uk/about-scholarly-communication/author-tools/considerations-when-choosing-journal/predatory-publishers
The University of Texas at San Antonio	https://libguides.utsa.edu/predatory_publishing/what
University Grants Commission (India)	https://journosdiary.com/2017/09/05/india-ugc-white-list-predatory-journals/

While there is no failsafe method for determining the status of a journal there are core practices and policies developed by reputable organizations such as *The Committee on Publication Ethics* (COPE), the *World Association of Medical Editors* (WAME), and the *Council of Science Editors* (CSE) that can increase the likelihood of identifying a legitimate journal or publisher. *The Directory of Open Access Journals* or DOAJ (https://doaj.org) is a website that hosts a community-curated list of open access journals, maintained by Infrastructure Services for Open Access. DOAJ's mission is *to increase visibility, accessibility, reputation, usage and impact of quality, peer-reviewed, open access scholarly research journals globally, regardless of discipline, geography or language. DOAJ will work with editors, publishers and journal owners to help them understand the value of best practice publishing and standards and apply those to their own operations. DOAJ is committed to being 100% independent and maintaining all of its services and metadata as free to use or reuse for everyone* (https://doaj.org/about)[2].

If a fraudulent journal is encountered and reported, a number of websites take and evaluate those reports. In particular, *Stop Predatory Journals* (https://predatoryjournals.com/about/) compiles such reports and is an appropriate place to start when trying to separate "real" from "phony" in academic publishing. Additionally, Eriksson and Helgesson (2016) provide a list of 25 indicators that a journal may be predatory. Likewise, Beall (2015, 2016) has listed characteristics of predatory journals. Without replicating these comprehensive lists, we provide the following highlights:

- Invitation to publish typically comes in an unsolicited email message; discipline often does not match the target.
- Such email invitations contain flowery language, misspellings, and inappropriate references ("Good day!" "Are you happy?" "It's a new year, come publish your paper!", "You have ignored previous requests to publish").

- The scope of interest tends to be broad and vague. For example, it may include non-biomedical subjects alongside biomedical topics, etc.
- If the web link is pasted into a browser, the associated website may contain spelling and grammar errors.
- Images on website are distorted/fuzzy, intended to look like something they are not, and may be used without authorization from the real owners of the content.
- The impact factor of the journal[3] is incorrect, illegitimate, or cannot validly be calculated because the journal is new.
- No description of the manuscript handling process.
- Authors submit manuscripts by email and not a web portal.
- Papers are published astoundingly quickly; peer review is unlikely.
- There is no retraction policy.
- Information on whether and how journal content will be digitally preserved is absent.
- The initial article processing/publication charge is often very low (e.g., < $150 USD), however these journals can charge authors anywhere from $500 to $3,000 to publish once accepted.
- Journals claiming to be open access fail to mention copyright or other legal details.
- Bogus publications use names similar to legitimate journals or have names that are exceptionally broad and vague. Some predatory journal names are unlikely, ridiculous or non-sensical (for example, *Advance Research Journal of Multidisciplinary Discoveries, Clocks & Sleep*, and *Columban Journal of Life Sciences* (Predatory Reports, 2024))
- The contact email address is non-professional and non-journal affiliated (e.g., editor@gmail.com or coeditor@yahoo.com).

Although Jeffrey Beall's website of predatory publishers went dark in 2017, others have attempted to continue documenting journal publishers who have proven to be illegitimate. It is highly suggested that prospective authors seek out these lists and determine where to publish, based upon reliable information such as senior faculty or talking to publishers who provide information at discipline-specific meetings. If the author is submitting a manuscript to a journal they have not had experience with previously or not heard of, then check it out using the resources in this paper.

As a guide to deciding if a journal is legitimate or not, Laine and Winker (2017) presented a flow chart to assist in that decision. It consisted of a series of binary choices based on criteria posted in Beall's list and others. For instance, it first asks if the journal has "problematic" features as described by Beall (2016), and at the same time asks if there is an absence of predatory characters listed by *ThinkCheckSubmit* (2024). If it does ("yes") and if it doesn't ("no") the figure then points to the DOAJ list. If the journal is listed on the DOAJ list ("yes") or if a journal is not listed ("no") then the recommendation is that the journal is probably legitimate but needs further investigation. If not on the DOAJ list then it is possibly predatory but the journal web site should be inspected to review its practices and policies for other "warning signs". "Probably legitimate" is a determination if the journal in question meets DOAJ "seal criteria" (Table 2 of Laine & Winker, 2017). Although possibly confusing, this decision chart is important by asking that Beall's list be considered together with online information from *ThinkCheckSubmit* and DOAJ. Many of the Libguides listed in **Table 2** above refer to the *ThinkCheckSubmit* site as a reliable resource. Unfortunately, the bottom line is that with all these current resources, the legitimacy of a journal for publishing a research paper cannot be easily determined, and deceptive practices/predatory journals thrive!

[2] Accessed 5 September 2024.

[3] https://thelogicofscience.com/2015/08/03/10-steps-for-evaluating-scientific-papers/ for scientific papers in general; Copernicus value is an example https://www.indexcopernicus.com/index.php/en/parametryzacja-menu-2/journals-master-list-2. Both sites last accessed 9 September 2024.

Best Practice Considerations for Researchers & Administrators

As a research administrator, a good starting point for confronting predatory publishing practices is to think about what impact fraudulent publishing could have on the institution, its faculty and leadership. Once discovered, fraudulent publication results in diminished funding success initially and granting agencies will pull funds once fraud is discovered. Increased research misconduct reporting will stress research compliance and misconduct investigation activities. Administrators will be challenged to determine if a particular researcher (or perhaps an entire program or center) has fallen victim to fraudulent publishing solicitations or that these individuals actively sought out the fraud to enhance their own promotion/tenure files or ranking within the institution.

After defining the problem and its impacts, proactive administrative initiatives such as sponsoring informational workshops and directing principle investigators to double check the journals they are considering for manuscript submission may go a long way in helping the university avoid the negative outcomes discussed throughout this paper. Awareness of a problem by the practitioners can usually go a long way towards resolving it. Additionally, using the guidelines provided above, faculty mentors should work with students and colleagues in their discipline to identify scams for protecting the processes of knowledge generation. In some cases, the relationship between the researchers and the ethically compromised journal may not be predatory but symbiotic. This means that some researchers may be as unscrupulous as some journal editors and look for quick, easy, un-peer-reviewed outlets for their work. In this case neither party is acting with integrity. Basically, research administrators should lead, be positive, promote actively good behavior, listen and seek advice from active researchers and graduate students, and support revision of the "publish or perish" mentality criteria for faculty hiring and promotion.

Because of the rapid increase in fraudulent publishers and because of the potential to confuse a fraudulent publisher from a legitimate open-source journal, administrators should provide faculty and students guidance for them to be able to appropriately scrutinize journals that promise quick turnaround in the peer review and publication processes. Likewise, faculty who teach research or discipline-specific methods courses should initiate discussions about predatory publishing, and to explore ways to differentiate between predatory and legitimate publishers using appropriate criteria. Tables 1, 2, and 3 would be helpful in this action. Furthermore, lab directors and program managers should also raise these discussions and be critical of all unsolicited invitations that arrive electronically inviting scholars to publish. After all, given current information on these fraudulent practices, investigators must do self-policing within a discipline or department or college and university. It does not help projecting ethical practices if the university president commits plagiarism or turns a blind eye to other instances of research misconduct! Those who consider predatory journals an easy outlet to send their work will eventually be noticed for their lack of integrity, but also low incidents of citation (Brainard, 2020).

As mentioned previously, *Beall's List* (https://beallslist.weebly.com/) and *Stop Predatory Journals* (https://predatoryjournals.com/) are resources that may be used in publication decisions; *Cabell's List* (http://www2.cabells.com/) is another basic reference list to determine if a journal of interest is likely predatory or legitimate. Since Jeffrey Beall stopped maintaining his list, others have tried to fill in the gap or come up with alternative lists (Basken, 2017; Karlsson 2017). There are *bad-actor* lists and *good-actor* lists. But be forewarned, any of these lists of predatory journals/conferences may have their own issues. The researcher's job is to review and summarize as much information from as many sources as possible to find the appropriate journal for submitting work.

Another important resource to identify legitimate journals is ThinkCheckSubmit.org—a site that, "...helps

researchers identify trusted journals for their research," and, "...through a range of tools and practical resources ... aims to educate researchers, promote integrity, and build trust in credible research and publications."[4] It is a way to check that a journal is reputable and trustworthy (ThinkCheckSubmit, 2024, p. 1).

Public Library of Science (PLOS), "...was founded as a nonprofit Open Access publisher, innovator and advocacy organization with a mission to advance progress in science and medicine by leading a transformation in research communication"[5]. PLOS runs on the idea that open and transparent is the best way to communicate science. Researchers work openly and quickly, therefore promoting knowledge generation and advances in science at a quicker, more efficient rate. PLOS also publishes *PLOS ONE*, probably the largest multidisciplinary peer-reviewed journal in the world (PLOS, 2024, p. 1).

Esfe et al. (2015) provided some criteria for determining if a journal is legitimate or not and list features for deceptive journals as well as advertisement techniques for such journals. Furthermore, Shamseer et al. (2017) provide an analysis of predatory and legitimate biomedical journals. Beall (2012a, 2012b, 2014, 2015), Eriksson and Helgesson (2016), and Stratford (2012) have all provided some sort of criteria or identified "signs" for determining predatory publishers. Many of these have been summarized here into the best practices guideline below. The National Academies of Sciences, Engineering, and Medicine (NASEM, 2017) offered best practices considerations for researchers, institutions, journals, sponsors, and disciplines. Although not listing specific attributes concerning predatory practices, best practices are implicit in excluding fake journals. In other words, if best practices are followed, an author is unlikely to fall prey to unethical publication practices (chapter 9, section on "journals and other scholarly communications," NASEM, 2017).

Finally, a number of university libraries have taken on the issue of predatory publishing, even ahead of research administrators. Expanding their services, library websites may provide resources to help authors identify legitimate publishing sources. Some of these libraries include: George Washington University, Iowa State University, Sam Houston State University, Texas Tech University, University of Arizona, University of Cambridge, the University of Texas at San Antonio, and University Grants Commission - Indian Higher Education Governing Body (TTU, 2024). Table 2 provides links to "libguides" for resources from 10 university libraries.

Best Practices for Authors

When seeking to publish academic work, or when confronted with solicitations from suspicious sources, the following are some steps academic professionals and students should consider:

- Do not respond to SPAM or suspicious email requests; one could investigate suspected journals by searching separately for a web site or other information on the journal validity.
- Select journals early in consultation with mentors and trusted colleagues.
- Select three options for potential publications to which to submit. Perhaps a *pie in the sky*, or top-tier journal, a mid-level journal, and safety journal to fall back on if others reject your submission.
- Check Medline indexing, DOAJ, and *ThinkCheckSubmit* before submitting the manuscript.
- The publisher should be a member of COPE, PLOS or some other professionally recognized organization.
- Inform and involve co-authors so they are able to investigate suspected outlets, as well.
- Carefully review any legal matters related to a particular journal with university counsel. This includes issues such as written agreements, copyrights, usage limits, and citations.

[4] https://thinkchecksubmit.org/about/ ; accessed 9 September 2024

[5] https://plos.org/about/ ; accessed 9 September 2024

- Check if the journal has a long-term, established history and publication archive.
- Graduate students can safeguard their theses or dissertations through an institutional embargo. This information may be found at an institutional library or graduate studies office at most universities (for an example, visit University of New Mexico Graduate Studies[6]).
- To ensure academic integrity, run any manuscript through an anti-plagiarism checker (e.g., iThenticate, 2024) prior to submission to journal or grant funding source.

Accountability & The Culture of Ethics: Cautionary Tale for Research Administrators

A case involving Duke University researchers Joseph Nevins and Anil Potti has been reported and used as a case study in classes on research ethics as an example of poor responses by research administrators and peer-reviewed journals (NASEM, 2017). Potti and Nevins published work in 2006 that claimed gene activity in cancer tumor cells could help direct physicians on the appropriate chemotherapy to attack the cancer. Once published, others attempted to replicate the results but could not. Duke University even applied for patents to try to monetize/commercialize the discovery. Potti had a conflict of interest as he was a director in one of the involved companies. Moreover, a student had questioned the research in a memo in 2008 to the research administration and had asked to be removed from any reference to the work. Research administrators ignored the request and left it to Nevins and Potti to fend for themselves. However, in 2010, Potti was suspended at Duke because National Cancer Institute analyses did not support the work and Potti had also lied on his resume about being a Rhodes scholar. Papers were retracted, Potti was prevented from receiving Public Health Service funding for five years, and he was dismissed from his position at Duke University (NASEM, 2017).

What does this case have to do with research administration or with predatory publications? What was the responsibility of the research administrator? In this case, just about all the proper practices in research (fabricated data, human subjects' protections, publication ethics) were ignored. Even though a research administrator noted Potti's conflict of interest, compliance management was not maintained. Certainly, the individual researcher was at fault in an attempt to subvert honest research. But research administrators failed by allowing these researchers to elude the standard oversight pathway and for clear conflicts of interest (eventually discovered) that were not managed properly. Further, based on research administrator oversight, Duke's administration denied any misconduct and convinced the student who notified them in 2008 not to report his experiences to the funding agency. They also denied a later claim of a whistleblower complaint. The administration has the responsibility to model an organizational structure and climate of research integrity. NASEM (2017, p. 279) put it as, ethical "… culture starts with the dean, senior leaders, and members of the team stating how research is to be conducted, with integrity and transparency…". At Duke, the leadership failed at most of its responsibilities. The administration failed to pursue internal investigations, withheld external critiques of the work done by Potti and Nevins, did not support rechecking Potti's experimental work, and a number of other flaws. A vigilant research administrator, especially one responsible for contractual and compliance obligations, would not have allowed this to occur (NASEM, 2017).

One of the biggest failings, however, was not just in Duke's disastrous attempt to manage a complex case, it was in the peer-reviewed journal publications that accepted Potti's manuscripts. Potti had 162 co-authors spread among 40 published papers. From the very first paper in 2006, Potti's manuscripts

[6] University of New Mexico thesis embargo information https://grad.unm.edu/degree-completion/thesis-dissertations/thesisdissert-embargo.html (accessed 9 September 2024).

were peer-reviewed and evaluated as legitimate. As of 2018, 11 papers co-authored by Potti have been retracted, and seven others have been corrected. Although unclear if any of these were predatory journals, many journals who had Potti's papers as either "in review" or "accepted" did not respond to other researchers who had voiced concerns in rebuttals and critiques, but instead, publishers went ahead and published Potti's paper anyway.

Better communication between funding agencies, journal editors, and research administrators who manage grant contracts may be key to promoting the publication and distribution of legitimate knowledge. Administrators must not be hesitant to review and encourage only the best research and to decline research that is flawed and shown to be fraudulent. These predatory practices end up exploiting academics by charging money to publish or attend sham conferences. Moreover, by publishing in low-grade journals researchers promote anything from harmful junk science to flat out dangerous ideas which end up reflecting on the institution of its origin. In addition, the sheer numbers of publications published in the last few years—a mix of high-quality, inciteful, and paradigm-shifting science to low-value, poor-data, side notes—researchers must find efficient ways to access truthful, high-information, and relevant work of which they can apply to their projects. Considering the number of papers being published has grown from, in 2016, 1.92 million papers to 2.82 million in 2022 as reported by *Scopus* and *Web of Science* publication database[7] (Wilcox, 2023). Researchers must be able to effectively search for relevant work. One study reported recently (Scholastica, 2021) that Google Scholar is the top academic search engine but that researchers also stumble upon articles on social media[8]. With the flood of predatory papers, the haystack from which a needle must be found is getting considerably bigger!

As a final consideration for research administrators and considering the emergence of phenomena such as ChatGPT and other artificial intelligence applications applied to college courses, both by students and faculty instructors: Administrations need to direct more attention to the role of the research administrator in honest reporting and guidance. Input from active, practicing faculty, including graduate students and researchers at other levels would be valuable to inform and advise on best practices, teaching research ethics, emerging issues, and marketing guidance for future students. This will protect both the university (or other institutions) and individual reputations from deleterious practices. It is assumed that most scholars try to do their best to comply with appropriate research and publication procedures, but then there will always be those who take shortcuts and look for quick successes or profit. Professional incentives should be based on ethical and moral norms and not just competitive means for advancement (Mcquarrie et al., 2020). An institution can foster initiatives that discourage researchers from publishing in fraudulent journals or with unethical publishers. There are even recommendations on how to fund increased compliance activities of research administrators (Kalichman, 2006). Do not take shortcuts; the future of knowledge and even truth, depends on our institutions leading and not just reacting to federal mandates or donor pressures.

CONCLUSION

Publishing and presenting research are high-stakes enterprises. Finding and submitting to the appropriate journal should be done with the utmost of care, to protect the academic professional and her/his work, as well as to provide students with the best chances of advancing their own work and careers appropriately. For research administrators whose

[7] https://www.science.org/content/article/scienceadviser-scientists-are-publishing-too-many-papers-and-s-bad-science (accessed 9 September 2024).
[8] https://blog.scholasticahq.com/post/how-readers-are-finding-scholarly-journals-survey-2021/ (accessed 9 September 2024).

main purpose is to provide services and act as a conduit or catalyst for student success and knowledge generation, high levels of successful funding and a strong reputation for success can only be reinforced through conducting research ethically and with the highest level of integrity.

As the ultimate product of grant writing, agency awards, conducting and reporting results of research, the publication is the Gold Medal prize. Being proactive in determining what journal to submit manuscripts for publication to may save time, headaches, hassles, and money for academic researchers by providing awareness and resources that will allow them to make the right choice in their submission. Research administrators must foster an institutional environment that promotes honest reporting of research in legitimate peer-reviewed journals. A sober, objective, and honest examination of options available for publications will give researchers the ability to make the best decisions for them and their work. It may also be the best way to avoid having research adulterated, deemed improperly reviewed, and the knowledge it contains woefully diminished.

AUTHORS' NOTE

No potential conflict of interest was reported by the authors. Resources for the project were made available through institutional support. We would like to thank the many faculty and students who took part in our discussions or classroom sessions discussing the impacts of predatory behaviors in publishing.

William L. Gannon, PhD
Research Professor,
Department of Biology and Office of Graduate Studies
220 Dane Smith Hall, MSC03 2180
University of New Mexico,
Albuquerque, New Mexico, 87131, USA
505-277-2711
wgannon@unm.edu

John C. Barnes, PhD
Professor Emeritus,
Department of Health, Exercise, and Sport Sciences
Johnson Center, MSC04 2610
University of New Mexico,
Albuquerque, New Mexico, 87131, USA
jbarnes@unm.edu

REFERENCES

Association for Practical and Professional Ethics. (APPE). 2024. Retrieved September 6, 2024, from https://www.appe-ethics.org/about-us/

Baker, M. (2016). 1,500 scientists lift the lid on reproducibility. *Nature, 533,* 452–454. https://doi.org/10.1038/533452a

Basken, P. (2017, September 12). Why Beall's list died – and what it left unresolved about open access. *The Chronicle of Higher Education.* Retrieved September 6, 2024, from https://www.chronicle.com/article/Why-Beall_s_List-Died_/241171

Beall, J. (2012a, August 1). Predatory publishing. *The Scientist.* Retrieved September 6, 2024, from https://www.the-scientist.com/critic-at-large/predatory-publishing-40671

Beall, J. (2012b, September 12). Predatory publishers are corrupting open access. *Nature, 489,* 149. https://doi.org/10.1038/489179a

Beall, J. (2015). Misleading metrics; a new list contained in 2015 updated list of predatory publishers (Beall's list). Retrieved September 9, 2024, from https://scholarlyoa.com/bealls-list-of-predatory-publishers-2015/

Beall, J. (2016). Beall's list of predatory publishers. Scholarly Open Access. Retrieved September 9, 2024, from https://web.archive.org/web/20170113114519/https://scholarlyoa.com/2016/01/05/bealls-list-of-predatory-publishers-2016/

Beall, J. (2017). What I learned from predatory publishers. *Biochemica Medica, 27,* 273-278. https://doi.org/10.11613/bm.2017.029

Beaubien, S., & Eckard, M. (2014). Addressing faculty publishing concerns with open access journal quality indicators. *Journal of Librarianship and Scholarly Communication 2*(2), eP1133. http://dx.doi.org/10.7710/2162-3309.1133

Brainard, J. (2019, April 3). US judge rules deceptive publisher should pay $50 million in damages. *Science.* https://doi.org/10.1126/science.aax5720

Brainard, J. (2020). Articles in 'predatory' journals receive few or no citations. *Science, 367* (6474), 129. https://doi.org/10.1126/science.367.6474.129

Cabells. (2024). Publication information subscriptions service. Retrieved September 9, 2024, from https://cabells.com/

Campbell, B. (2023, December 17). Can you spot a fake conference? It seems many researchers can't. So here are 9 ways to spot a fake. *Ex Ordo.* Retrieved September 9, 2024, from https://www.exordo.com/blog/9-signs-this-is-a-fake-conference/

Chartier, M. (2022). How to spot a fake conference in 2023. Retrieved September 9, 2024, from https://fourwaves.com/blog/fake-conferences/Directory of Open Access Journals (DOAJ). (2024). Retrieved September 9, 2024, from https://doaj.org/

The Economist. (2020, May 30). How to spot dodgy academic journals. Retrieved September 9, 2024, from https://www.economist.com/graphic-detail/2020/05/30/how-to-spot-dodgy-academic-journals

Edelstein, J. (2020). Split Ninth Circuit upholds $50M FTC victory against online publisher. *JD Supra.* Retrieved February 12, 2025, from https://www.manatt.com/insights/newsletters/advertising-law/split-ninth-circuit-upholds-50m-ftc-victory-again

Editor. (2023). Reviewers of articles submitted to Volume 24. *Acta Chiropterologica, 24*(2), 483. https://doi.org/10.3161/1508-1109-24.2.483

Eriksson, S., & Helgesson, G. (2016). The false academy: Predatory publishing in science and bioethics. *Medicine, Health Care and Philosophy, 20*(2), 163–170. https://doi.org/10.1007/s11019-016-9740-3

Esfe, M. H., Wongwises, S., Asadi, A., & Akbari, M. (2015). Fake journals: Their features and some viable ways to distinguish them. *Journal of Science and Engineering Ethics, 21,* 821-824. https://doi.org/10.1007/s11948-014-9595-z

Flight, M. H. (2022, May 11). An expert's opinion: Interview with Ivan Oransky on the perils of scientific publishing. European Science-Media Hub. https://sciencemediahub.eu/2022/05/11/an-experts-opinion-interview-with-ivan-oransky-on-the-perils-of-scientific-publishing/

Freedman, E., & Kurambayev, B. (2023). Rising number of 'predatory' academic journals undermines research and public trust in scholarship. *The Conversation.* Retrieved September 9, 2024, from https://theconversation.com/rising-number-of-predatory-academic-journals-undermines-research-and-public-trust-in-scholarship-213107

Gabriele, E. F. (2011). Ethical leadership in research, healthcare, and organizational systems: Commentary and critical reflections. *Journal of Research Administration, 42,* 88-102. https://files.eric.ed.gov/fulltext/EJ955014.pdf

Grand Valley State University. (2024). Open access journal quality indicators. Retrieved September 9, 2024, from https://www.gvsu.edu/library/sc/open-access-journal-quality-indicators-5.htm

Gupta, K. (2015, September 3). Opinion: Pay-to-Play Publishing, online scientific journals are sacrificing the quality of research articles to make a buck. *The Scientist.* Retrieved September 9, 2024, from https://www.the-scientist.com/opinion/opinion-pay-to-play-publishing-34875

Ibrahim, S., & Saw. A. (2020, July). The perils of predatory journals and conferences. *Malaysian Orthopaedic Journal, 14*(2), 1–6. https://doi.org/10.5704/MOJ.2007.003

iThenticate. (2024). Publish with confidence (plagiarism checker). Retrieved September 9, 2024, from https://www.ithenticate.com/

Jain, N., & Singh, M. (2019). The evolving ecosystem of predatory journals: A case study in Indian perspective. Retrieved September 9, 2024, from https://arxiv.org/pdf/1906.06856.pdf

Kalichman, M. (2006). Ethics and science: A 0.1% solution. *Issues in Science and Technology, 23*(1), 34–36. https://meded.ucsd.edu/neu232/secure_docs/docs2007/ kalichman_paper2.pdf

Karlsson, E. (2017). We now know why Jeffrey Beall removed list of (allegedly) predatory publishers. *Debunking Denialism.* Retrieved September 9, 2024, from https://debunkingdenialism.com/2017/06/15/we-now-know-why-jeffrey-beall-removed-list-of-allegedly-predatory-publishers/

Kearney, M. H. (2015). Predatory publishing: What authors need to know. *Research in Nursing & Health, 38*(1), 1–3. https://doi.org/10.1002/nur.21640

Kolata, G. (2017, October 30). Many academics are eager to publish in worthless journals. *New York Times.* Retrieved September 9, 2024, from https://www.nytimes.com/2017/10/30/science/predatory-journals-academics.html

Kolata, G. (2019, April 3). The price for "predatory' publishing? $50 million. *The New York Times.* Retrieved September 9, 2024, from https://www.nytimes.com/2019/04/03/science/ predatory-journals-ftc-omics.html

Laine, C., & Winker, M. A. (2017). Identifying predatory or pseudo-journals. *Biochemia Medica, 27*(2), 285-291. https://dx.doi.org/10.11613/BM.2017.031

Langdorf, M. (2018). Predatory publisher attempts to compromise WestJEM's integrity. *Western Journal of Emerging Medicine, 19*(5), 767. https://dx.doi.org/10.5811/westjem.2018.7.39918

LeBrain, P., & Welles, O. G. (2017). Cuckoo for Cocoa Puffs? The surgical and neoplastic role of cacao extract in breakfast cereals. Retrieved September 9, 2024, from https://juniperpublishers.com/gjo/GJO.MS.ID.555794.php

Linacre, S. (2024). Simon Linacre assesses the state of predatory publishing, 15 years since the term was first coined. *Research Information* 9 December 2024. https://www.researchinformation.info/analysis-opinion/predatory-publishing-in-2025/

Manley, S. (2019). Predatory journals on trial: Allegations, responses, and lessons for scholarly publishing from FTC v. OMICS. *Journal of Scholarly Publishing, 50*(3). http://dx.doi.org/10.3138/jsp.50.3.02

Masic, I. (2017). Predatory publishing – experience with OMICS International. *Medical Archives, 71*(5), 304–307. https://doi.org/10.5455/medarh.2017.71.304-307

Mcquarrie, A. E., Kondra, A. Z., & Lamertz, K. (2020). Do tenure and promotion policies discourage publications in predatory journals? *Journal of Scholarly Publishing, 51*(3), 165-181. http://dx.doi.org/10.3138/jsp.51.3.01

National Academies of Sciences, Engineering, and Medicine (NASEM). (2017). *Fostering integrity in research.* National Academies Press. https://doi.org/10.17226/21896

OMICS International Publisher. (2023). https://www.omicsgroup.org/

Public Library of Science (PLOS). 2024. Empowering researchers to transform science. Pp 1-3, https://plos.org/about/ (accessed 9 September 2024)

Predatory Reports. (2024). Predatory journals list 2024. Retrieved September 9, 2024, from https://predatoryjournals.org/the-list

Rasmussen, L. M., Williams, C. E., Hausfield, M. M., Banks, G. C., & Davis, B. C. (2020, November 19). Authorship policies at U.S. doctoral universities: A review and recommendations for future policies. *Science and Engineering Ethics, 26*(6), 3393–3413. Retrieved September 9, 2024, from https://link.springer.com/article/10.1007/s11948-020-00273-7

Richtig, G., Berger, M., Lange-Asschenfeldt, B., Aberer, W., & Richtig, E. (2018). Problems and challenges of predatory journals. *Journal of the European Academy of Dermatology and Venereology, 32*(9), 1441–1449. https://doi.org/10.1111/jdv.15039

Rivera, H., & Teixeira da Silva, J. A. (2021, June 21). Retractions, fake peer reviews, and paper mills. *Journal of Korean Medical Science, 36*(24), e165. https://doi.org/10.3346/jkms.2021.36.e165

Sarfraz, Z., Sarfraz, A., Anwer, A., Nadeem, Z., Bano, S., & Tareen, S. (2020). Predatory journals: A literature review. *Pakistan Journal of Surgical Medicine, 1*(1), 42-51. http://dx.doi.org/10.37978/pjsm.v1i1.102

Segran, E. (2015). Why a fake article titled "Cuckoo for Cocoa Puffs?" was accepted by 17 medical journals. Retrieved September 9, 2024, from https://www.fastcompany.com/3041493/why-a-fake-article-cuckoo-for-cocoa-puffs-was-accepted-by-17-medical-journals

Scholastica. (2021). How readers are finding scholarly journals: New survey results and what publishers need to know. Retrieved September 9, 2024, from https://blog.scholasticahq.com/post/how-readers-are-finding-scholarly-journals-survey-2021/

Shamseer, L., Moher, D., Maduekwe, O., Turner, L., Barbour, V., Burch, R., Clark, J., Galipeau, J., Roberts, J., & Shea, B. J. (2017). Potential predatory and legitimate biomedical journals: Can you tell the difference? A cross-sectional comparison. *BioMed Central Medicine, 15,* 28. https://doi.org/10.1186/s12916-017-0785-9

Sorokowski, P., Kulczycki, E., Sorokowska, A., & Pisanski, K. (2017, March 23). Predatory journals recruit fake editor. *Nature, 543,* 481-483 https://doi.org/10.1038/543481a

Stratford, M. (2012, March 4). Predatory online journals lure scholars who are eager to publish. *The Chronicle of Higher Education.* Retrieved September 9, 2024, from https://www.chronicle.com/article/Predatory-Online-Journals/131047

Texas Tech University. (2024). College of Media and Communication. Retrieved September 9, 2024, from https://www.depts.ttu.edu/comc/research/grants/stepp/defining-predatory-publishing.php

ThinkCheckSubmit. (2024). About Think. Check. Submit. Retrieved September 10, 2024, from https://thinkchecksubmit.org/about/

Van Noorden, R. (2020, March 11). Hundreds of scientists have peer-reviewed for predatory journals. *Nature.* https://doi.org/10.1038/d41586-020-00709-x

Wilcox, C. (2023, November 16). Science Advisor: Scientists are publishing too many papers – and that's bad for science. Retrieved September 9, 2024, from https://www.science.org/content/article/scienceadviser-scientists-are-publishing-too-many-papers-and-s-bad-science

Xia, J. (2015). Predatory journals and their article publishing charges. *Learned Publishing, 28*(1), 69 –74. https://onlinelibrary.wiley.com/doi/pdf/10.1087/20150111