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Emerging concepts in high-impact publishing: insights from the First Brazilian Colloquium on High Impact Research and Publishing

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Summary. Reports of scientific research are published by selective journals only when they meet stringent criteria, first and foremost of which are the quality and importance of the research. Even when the research is excellent, other elements come into play to determine if the manuscript will be accepted for publication. Many of these factors are under direct control of the researcher-author, but not all authors are aware of the elements of high-impact scientific writing. At the First Brazilian Colloquium on High Impact Research and Publishing, editors of leading biomedical journals provided insight on the aspects of scientific reporting that favor acceptance (or immediate rejection). This commentary summarizes the editors' advice and uses the debate that followed as the basis for analyzing emerging concepts in high-impact publishing. Lessons learned from this meeting are relevant to researcher-authors in other non-anglophone countries as well as to their educators and administrators who wish to improve the impact of the research that they support and finance.

Key words: publishing, periodicals as topic, peer review, graduate education.

Riassunto *(Concetti emergenti di pubblicazione ad alto impatto: idee dal Primo Colloquio Brasiliano sulla Ricerca e sulle Pubblicazioni ad Alto Impatto).* Gli articoli di ricerca biomedica sono pubblicati da riviste selettive solo quando rispettano criteri rigorosi, prima di tutto la qualità e l'importanza della ricerca. Anche quando la ricerca è eccellente, altri elementi determinano se il manoscritto verrà accettato. Molti di questi fattori possono essere controllati dal ricercatore-autore, ma non tutti gli autori conoscono gli elementi di scrittura scientifica ad alto impatto. Al Primo Colloquio Brasiliano sulla Ricerca e sulle Pubblicazioni ad Alto Impatto, editor di riviste biomediche hanno discusso aspetti di comunicazione scientifica che risultano in accettazione (o rifiuto immediato). Questa nota riassume i consigli degli editor e prende spunto dal dibattito successivo per analizzare i concetti emergenti della pubblicazione ad alto impatto. Le proposte emerse da questo incontro sono pertinenti ai ricercatore-autori in altri paesi non anglofoni come l'Italia nonché ai docenti e amministratori che desiderano migliorare l'impatto della ricerca che sostengono e finanziano.

Parole chiave: editoria, periodici come argomento, peer review, istruzione successiva al diploma di laurea.

INTRODUCTION

The vast majority of research manuscripts submitted to leading biomedical journals is rejected immediately without entering the peer review process. Of those selected for peer review, still only a fraction is finally published. That a manuscript be accepted for publication depends not on chance but on a series of factors, many of which can be controlled by the author – if she is aware of the characteristics that make a paper attractive to selective journals. At the First Brazilian Colloquium on High Impact Research and Publishing, held on 14-16 April 2010 at the Albert Einstein Jewish Hospital in Morumbi (São Paulo), editors of leading biomedical journals discussed aspects of scientific reporting that favor acceptance or lead to immediate rejection.

The Colloquium, organized by Luiz Vicente Rizzo, Director of the Albert Einstein Jewish Institute for Education and Research, aimed to understand which policies and strategies should be adopted to improve the impact of Brazilian publications. Concern about a nation's impact, *i.e.* the ability of its researchers to publish highly cited papers in selective journals, is an important element of reflection on the national investment in research. Since the tangible effects of this investment, *e.g.* improved healthcare, better environment and novel industrial applications, are realized over many years, publishing impact is accepted as a measure of the immediate outcome. It is therefore a useful exercise for researchers, educators, editors and administrators to come together to discuss a nation's publishing performance and to identify the factors that hinder researchers from

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publishing well; this was the scope of this unique meeting in Brazil. To have an international perspective, the organizers invited journal editors Pamela J. Hines *(Science)*, Robert M. Golub *(JAMA)*, John McConnell *(Lancet Infectious Diseases)* and Ushma S. Neill *(Journal of Clinical Investigation)* to talk about their editorial review procedures and to indicate the aspects of research and reporting that make manuscripts publishable in their journals. Also speaking at the Colloquium were several author's editors (including myself) who described the publishing challenges faced by researchers as well as the writing support services that they can rely on, in the USA, Europe and Brazil. In addition, select Brazilian researchers presented what they thought were the obstacles − and keys to success − to high-impact publishing.

Many of the issues raised at this first Brazilian meeting are relevant to researcher-authors in non-anglophone Europe as well. This commentary summarizes the journal editors' advice and uses the discussion that followed at the Colloquium as the basis for analyzing emerging concepts in high-impact publishing relevant to Italian researchers who aspire to publish in selective journals.

EDITORS' INSIGHTS INTO HIGH-IMPACT PUBLISHING

Science is a general science journal published by the American Association for the Advancement of Science. According to senior editor Pamela J. Hines, *Science* receives over 15 000 manuscripts per year, each of which is reviewed by members of the editorial staff. The Board of Reviewing Editors also delivers opinions on many of the papers. Approximately 75% of manuscripts are immediately rejected, while the remaining 25% are sent for in-depth review; only for some of these are the authors invited to submit a revised version for further consideration. Finally, about 900 papers are published each year; the acceptance rate for research papers is about 6%. Hines noted that *Science* publishes research articles that "shine with quality", stand out from the pack (*i.e.* are not similar to already published reports), and can be recognized as "outliers, closers, and leaders". As she explained, an *outlier* is a research paper on a fresh, unexpected topic; a *closer* is one that presents unequivocal evidence to resolve a scientific debate; and a *leader* is one that moves science forward by "defining new questions". Manuscripts that are immediately rejected by *Science* are not of broad interest, report a minor scientific advance, draw conclusions not sufficiently supported by the evidence, are lacking in mechanistic insight, or report "permutations of known phenomena" (*i.e.* research repeated in a new biological model system); these latter papers are more suitable to publication by specialty journals. Hines' suggestion for new authors is to focus on the "logic of thought flow", as this aspect of good writing has a strong influence on the editorial decision. The quality of the English becomes important when poor use of language impedes the communication of the results.

JAMA is a general medical journal published by the American Medical Association. According to senior editor Robert M. Golub, in 2009 *JAMA* received about 6000 manuscripts and immediately rejected 64% of them based on in-house editorial evaluation. The remaining 36% underwent peer review: each paper was seen by 3-5 reviewers, including a statistician and other "content reviewers" chosen on the basis of their publishing records. About 500 manuscripts were finally accepted for publication after discussion among all *JAMA* editors during "manuscript meetings". The 2009 acceptance rate was 8.6%. Golub noted that when he sees each submitted manuscript, he asks four questions (described long ago by Ed Huth, former editor of the *Annals of Internal Medicine*): "Is it new? Is it true? Who cares? So what?" His advice to authors includes: give special attention to preparing an effective cover letter, write a great abstract (which is read first), and provide complete methods.

The *Journal of Clinical Investigation (JCI)* is the official publication of the American Society of Clinical Investigation, an "honor society of physician-scientists". According to executive editor Ushma S. Neill, in 2009 *JCI* received 3500 submitted manuscripts, of which 69% were immediately rejected and only 7.7% were finally accepted for publication. Authors wishing to publish in *JCI* (and in other journals) should read Neill's paper entitled "How to write a scientific masterpiece" [1]. Her first recommendation to authors is to give special attention to writing the cover letter, which should contain no more than 4 or 5 paragraphs that introduce the study, explain why it is important and novel, declare conflicts of interest, and indicate if the work had been presented at scientific meetings. In terms of manuscript preparation, Neill emphasized the importance of providing an explicit statement naming the institutional body that approved the animal experimentation protocols. Regarding data quality, *JCI* is alert to the possibility that a submitted figure may have been manipulated (*e.g.* control and experimental lanes of blots pasted together in a single image) or fabricated (*e.g.* the same photomicrograph used in two papers to document two different experiments); given this reality, the journal does not hesitate to use image analysis tools to avoid accepting papers with dubious data presentation. Finally, she recommended that the first paragraph of the Discussion section contain a clear summary of key results.

The *Lancet* is an independent, general medical journal published in the UK. In the early 2000s, the *Lancet* launched three specialty journals, dedicated to infectious diseases, neurology and oncology. John McConnell is founding editor of *Lancet Infectious Diseases*; prior to taking on this new challenge, he held various editorial roles at the *Lancet*. According to McConnell, the group of *Lancet* journals receives about 11 000 manuscripts each year, of which only

10%-20% are sent for peer review. Papers are reviewed by at least 3 clinical reviewers and 1 statistician, with as many as 8 reviewers per paper; one reviewer from the authors' country may be included to provide a local viewpoint. After peer review, a team of editors meets to discuss the manuscripts; on average, 5% of all submitted papers are published. As indicated by McConnell, the *Lancet* publishes research papers that "change thinking" and are the "first and last" on a topic, *i.e.* they report definitive studies. Moreover, accepted papers are interesting to a wide audience and report research that involved robust methods and adhered to international standards for ethical research practice. Papers reporting "incremental knowledge" (*i.e.* small research advances) are not accepted. Authors interested in publishing in *Lancet* group journals should not underestimate the importance of the cover letter, which must explain why the paper is important to readers, describe the context of the research and hint at the major findings.

From these four presentations, several recurring themes emerged that may be valid for most highly selective biomedical journals (*i.e.* those with an acceptance rate < 10%). First, these journals have thorough editorial review practices that involve numerous persons, both editorial staff and external reviewers. They have mechanisms in place to assess the quality of both quantitative and qualitative data and to screen manuscripts for falsified data (thus, authors should make every effort to prepare figures and tables that do not arouse unwarranted suspicion). Their review processes are designed to select papers that report major advances in scientific knowledge, substantiated by a solid evidence base derived from methodologically excellent research. Several editors noted that authors should give greater attention to writing cover letters and abstracts that effectively communicate why submitted manuscripts should be published: apparently, even among top researchers, this is a neglected area of scientific writing.

One issue raised by the audience was the fear that researchers without institutional or personal contacts with selective biomedical journals are disadvantaged in their attempts to publish. Editors of the journals represented at this Colloquium responded that manuscripts from non-anglophone countries receive the same treatment as those from the US and UK, where these journals are published (although this may not be true at all journals). They emphasized, however, that authors should learn to feel comfortable "endorsing their science" by contacting editorial offices to inquire about a possible submission or a manuscript under evaluation. In the case that a manuscript receives disputable criticisms from peer reviewers, authors should "express a willingness to negotiate" with the editorial office as a means to resolve issues and favor chances of acceptance. Although authors may consider journals as black boxes whose inner workings are inscrutable, these editors make every effort to be approachable.

HIGH-IMPACT PUBLISHING TODAY: EMPHASIS ON CITATIONS, NOT ONLY IF

It is worth reflecting on what "high-impact publishing" means and why it is important. The expression *high impact* comes from the impact factor (IF), a descriptive statistic giving the mean frequency that articles in a particular journal are cited in a 2-year period. Thus, high-impact publishing literally means publishing a paper in a journal with a high IF. For many years, the scientific community has taken this achievement as a sign of quality of the research and of the researcher-author, even though IF was purposed as a tool for evaluating journals. Moreover, since citations to articles in any one journal are not normally distributed [2], a mean value is a poor descriptor of the impact of individual articles. Thus, there is increasing interest in single-article impact data, now becoming available from online journals that provide citation and download data (called "article metrics"). So, today, high-impact publishing can be defined as publishing a paper that is then highly cited. Publishing in a high-IF journal will positively influence the number of citations, but this is no longer the only measure of quality.

Many factors besides the journal's IF (and the size of its readership) contribute to a paper's citation success. The novelty and quality of the reported research have major roles, as do the field of study and its particular citation practices. However, other factors not directly related to research quality or subject area also affect citation rates, as discussed at the Colloquium. Martha M. Sorenson, associate professor at the Federal University of Rio de Janeiro, described data which showed that Brazilian researchers with good English writing skills had more total citations and higher h-index values (*i.e.* more highly cited papers) than those with reasonable or poor skills [3]. She therefore argued that language is an important but overlooked factor in a nation's scientific production and that science policies should give greater emphasis to improving researchers' writing competences.

The citation success of a paper is also influenced by the author's geographical location. Rogério Meneghini, scientific coordinator of the SciELO Program on Scientific Publications, described his research which found that, in a set of seven high-impact journals, papers with authors exclusively from Brazil were substantially less cited than average [4]. He expressed concern that editors aware of this phenomenon might reject papers from certain countries to avoid a negative effect on the journal's IF. Although this research did not investigate the causes of the lower citation rate (could Brazilian-authored papers be of lower quality than other papers in the same journal?), it did raise the possibility of a geopolitical bias in citation habits: authors worldwide may prefer to cite research produced in leading scientific nations or involving international collaborations, hoping to improve their own publication success. However, as the editors at the Colloquium

argued, it is also possible that authors prefer to cite papers written by persons they know, personally or professionally. It was therefore argued that getting known, by attending international conferences and having an online presence (by networking or participating in webinars), as well as getting involved in multinational studies are good strategies for improving one's own impact; this is true for researchers in any country.

THE ROLE OF ENGLISH WRITING AND READING SKILLS

For non-anglophone authors, inadequate English proficiency is often considered the main obstacle to getting published in internationally read journals, but whether this is really true and, if so, how this problem should be overcome are subjects of debate. Should graduate students be offered courses in scientific English? Although such courses may be well received by students, it is questionable to spend resources on what should be a prerequisite for entering any advanced biomedical degree program, as I have argued [5]. Here, in fact, there is confusion between teaching scientific English and teaching how to write about science in English; in my view, the latter (but not the former) would be appropriately taught at graduate level. The ever increasing requirement for clarity, rigor and transparency in scientific writing means that researcher-authors must be familiar with the latest international guidelines on reporting and research ethics, and must be able to understand and adhere to often complex instructions to authors that, unfortunately, vary from journal to journal. Formal coursework in publishing skills should therefore be a standard part of any graduate school curriculum in biomedical and clinical sciences.

Assuming that entering graduate students have adequate, scholastic proficiency in English, they can develop confidence in spoken English (necessary for getting known at conferences) and improve their reading and writing skills through a number of science-related activities suggested by speakers at the Colloquium. An effective way of encouraging every-day use of English is to foster an international environment in laboratories and clinics by hosting foreign researchers; in Italy, the relative lack of foreigners among graduate students and employed researchers [6, 7] is a disadvantage for Italian-born researchers working at home. Even more effectively, graduate schools can require that degree-program applications, annual research reports and doctoral theses be written in English, as this would promote thinking – and publishing – in English. Finally, weekly English-language journal club is considered by many to be the best means of promoting a culture of reading and critical appraisal that positively impacts on a researcher's publishing success.

The importance of a regular reading habit was emphasized by Martin Cammarota, associate professor in neuroscience at the Pontifical Catholic University of Rio Grande do Sul. Cammarota's presence at the Colloquium was requested because of his excellent publishing record, which includes two papers in *Science*. He attributes his publishing success to several factors, including his habit of reading five research papers per day, but also his focus on quality rather than quantity of published papers, his determination to plan experiments publishable in journals like *Science*, and his choice to run a small laboratory so that he can dedicate sufficient time to each collaborator – all factors under his direct control.

Given the complexity of scientific reporting today, it is clear that researchers can benefit from editorial guidance and writing support provided by skilled author's editors (*i.e.* editors who help researchers develop and write manuscripts). Such services are not necessarily limited to non-native English speakers. In fact, probably the largest institutional body providing writing support is the Department of Scientific Publications at the M.D. Anderson Cancer Center in Houston, Texas: at the Colloquium, the department's director Walter J. Pagel illustrated the various types of writing support and training that his 25-member staff provides to physician-researchers, both native and non-native speakers of English [8]. Institutional language support departments do exist at some other universities across the globe but, in their absence, researchers in need of writing support seek out the help of author's editors, who may be independently employed (like myself) or work for global editing firms. In my own presentation at the Colloquium, I described how my editing services adapt to the particular needs of each author: inexperienced authors are guided on how to organize an IMRAD (Introduction, Methods, Results And Discussion) research paper, disoriented authors (with a rejected manuscript) are helped to straighten out their information, and skilled authors are offered strategic editing and a "test run" peer review for high-impact publishing success.

CONCLUSIONS

The first criterion for successful, high-impact publishing is the execution of a study that exudes quality, changes thinking, and makes a major step forward in advancing scientific knowledge. This quality in research, however, must be accompanied by quality in reporting if a manuscript is to meet the stringent requirements of leading journals. Speakers and attendees at the Colloquium offered numerous suggestions on how researcher-authors, especially non-native speakers of English, can improve the impact of their own scientific writings. In particular, authors should overcome difficulties with English by speaking and reading it every day; seek the help of skilled author's editors for linguistic and strategic editing; get known on the international scientific scene; learn to effectively endorse their science in cover letters, abstracts and con-

tacts with the editorial office; and, especially, draft manuscripts that are rigorous and information-rich and that can withstand editorial review by internationally recognized subject experts, local peers, and statisticians. Although researchers may perceive journals as holding career-determining power, they can take control of this power by learning effective publishing skills and unveiling the black box. The training of researchers has always focused on preparing them to perform excellent research; now is the moment to start training researchers to produce excellent reporting as well.

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Conflict of interest statement

I offer biomedical editing, writing and information research services as well as seminars in scientific writing.

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