

# Harmonising format and style requirements for scientific and medical publications: Time to address a long-pending dream

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## Abstract

Scientific and medical publications are the pulse of the clinical world and play a key role in disseminating data to healthcare providers, scientists, and researchers. However, the process of publishing is hampered by the lack of harmonisation in structure, format, and style of manuscripts across journals. The authors/writers are challenged by this variability, which dilutes their ability to focus on science and medicine. The key challenges of structure, format, and style, including word count, referencing, and citation, are discussed here. We also provide a framework for a possible solution. We urge key stakeholders to come together and harmonise the formatting and technical requirements of scientific and medical publications with consensus from pharmaceutical industry, academics, publishers, and relevant organisations with expertise in medical writing and publication planning. It would take considerable effort from all stakeholders, but the end result of harmonised specifications represents a “blue sky” that is worth striving toward.



## Introduction

Scientific publications have long shown great variability in presentation styles, and readers have thoroughly enjoyed it. Nevertheless, as the number of publications increases year after year, this variability now can seem tormenting to researchers, authors, writers, and editors who frequently find themselves revising text and figures to meet the requirements of different journals or research conferences. As a major reform, we have harmonised the structure and content of regulatory documents used in clinical research. Scientific publications, however, have not received the same attention. Publications lag behind largely due to the lack of consensus and wide variation in audience. We

understand that journals have different missions and that there is considerable variability in the points of view of editors regarding how to present information. Nonetheless, we would like to assert that such variability drains time and resources and imposes a barrier to the timely presentation of data.

Thus, we propose that it would be worthwhile to harmonise scientific publications similar to what has been done for clinical study reports (CSRs) through the International Council for Harmonisation of Technical Requirements for Pharmaceuticals for Human Use (ICH).

Manuscripts often must be submitted to multiple journals before being accepted, resulting in the need to follow different guidelines. Many times good data gets rejected because of formatting, styling, and structure.

and formatting styles. The International Committee of Medical Journal Editors (ICMJE) has been working hard to improve the quality of reporting and publishing the clinical trial results. Keeping this in view, we urge the ICMJE, perhaps in collaboration with ICH and the International Society for Medical Publication Professionals (ISMPP), to consider, implement, and mandate the harmonisation across scientific publications, at least the style and the format.

The current article discusses the emergent need of harmonising scientific publications in journals and conference presentations. This article additionally discusses the existing publication guidelines and suggests amendments that might help in harmonisation of publications. This might help writers, researchers, and authors focus on science rather than editing, formatting, and styling aspects. This would also address the gap in time between a novel finding and the dissemination of this information, which is often critical for patient health and the public's good faith in clinical research. Many times good data gets rejected because of formatting, styling, and structure.<sup>1</sup> This clearly indicates the emergent need of harmonising the scientific publications.

### Guidelines, recommendations, and lacunae

Currently, no guidelines exist that ensure harmony within journal publications and conference presentations across the globe.

Guidelines issued by the ICMJE and American Medical Association (AMA Manual of Style) are the most followed ones, but these do not cover aspects such as harmonised structure and format, though they have made some recommendations. To add to it, ICMJE does not mandate that these recommendations be followed. Consequently, the authors and writers are often challenged with these petty issues, which heavily affect time, cost, and resources, especially when a publication is being resubmitted or re-purposed. This section provides an overview of recommendations by ICMJE and AMA Manual of Style.

#### ICMJE

The ICMJE is a non-profit group comprising general medical journal editors and representatives from selected organisations and aims to improve the quality of publications while complying with publication ethics. The ICMJE has developed recommendations that cover best practice and ethical standards for conducting studies and reporting results.

Regarding manuscripts, the ICMJE has recommended the use of a document format commonly referred to as IMRAD for the major sections within the manuscript structure – for Introduction, Methods, Results, and Discussion. It is a de facto standard for most manuscripts and even abstracts.<sup>2</sup> The ICMJE has also provided recommendations for title page, abstract, and

references.<sup>3</sup> The ICMJE journals follow these guidelines, which creates harmony within this group of journals. Furthermore, there is also a standard format for reporting conflict of interest (COI). However, it should be noted that many other journals do not abide by these recommendations.

#### AMA Manual of Style

The *American Medical Association Manual of Style* aims to guide writers regarding manuscript preparation, referencing, and data presentation, and it also serves as an editorial style guide. The content is very helpful, but as with the limitation with ICMJE, some journals do not follow the AMA style guide and have their own formatting and styling guidelines.

In the following sections, we will discuss the challenges, and we offer solutions that may help to streamline the publication process.

### The array of challenges in publications

Before taking a plunge into the solutions, it would be helpful to understand the array of challenges while developing and resubmitting scientific publications. With a goal of setting priorities and providing a framework for creating solutions, we rank the challenges by the extent of their impact. The key challenges in authoring and re-purposing publications are presented in Figure 1.

1. Referencing and citation	2. Word count	3. Illustrations	4. Structure and style
<ul style="list-style-type: none"> <li>● Limit on the number of authors</li> <li>● Bold or italic letters</li> <li>● Placement of year – after authors or journal</li> <li>● Requirements to use or omit commas and periods when listing author names</li> <li>● In-text citation using superscripted numbers, in-bracket numbers, or author, year, etc.</li> </ul>	<ul style="list-style-type: none"> <li>● Number of words in abstract, manuscript by type, e.g. systematic review, meta-analysis, etc.</li> <li>● Words/character count across congresses for the abstracts</li> <li>● Acknowledgements, disclosures, and other such sections should not be included in allowed word count.</li> </ul>	<ul style="list-style-type: none"> <li>● Differences in numbers of tables and figures permitted</li> <li>● Supplementary illustrations not always permitted</li> <li>● Colour illustrations not always permitted or affordable, sometimes resulting in need to redraft figures to avoid difficult-to-read greyscale images</li> <li>● Technical challenges in creating figures/images according to journal format</li> </ul>	<ul style="list-style-type: none"> <li>● Lack of harmonisation in overall manuscript structure requirements (IMRAD or not; varying specifications about review)</li> <li>● Differences in headings/sections to include in abstracts</li> <li>● Presentation style for conference abstracts, e.g., landscape or portrait</li> </ul>

Figure 1. The top four challenges in authoring and repurposing publications

**Challenge 1: References and citation**

On the top in the list is referencing, which has the maximum impact, not only in terms of formatting and styling but also for citation in text. This variability in reference format and style might be found in journals belonging to same publisher as well. This is one of the dreariest tasks that authors and writers face, especially while resubmitting. The style variation is huge, e.g., how many author names to list before using *et al.*, where to place the year of publication, whether or not to italicise or abbreviate the journal name, whether or not to place the volume number in bold, how many references may be included, etc. Similarly, citation within the text is also highly variable – whether to use superscripted numbers, author-year, and bracketed, etc. Redoing citation style and renumbering the references is a marathon task, prone to errors, and becomes challenging with each resubmission of a manuscript to a new journal.

Software such as EndNote, Reference Manager, and Zotero are available for referencing, and work as fast as a click of the mouse, but full and efficient versions can cost somewhere around US\$200, though student and institutional discounts may be available. License renewals and upgrades result in additional costs.

**Challenge 2: Word count**

A second important challenge is word count limits. It can be especially annoying to have to reduce the word count in a draft that has already been approved by the author team. Word limits can affect both the abstract and the text as a whole. For the abstract, a limit of 250 to 300 words seems to be appropriate because a lower limit may be inadequate for conveying a comprehensive summary of the study, especially for complicated studies. Similarly, a 1,500 word count for the manuscript could be constraining

– at least until we adopt the idea of “lean publications” and limit the introduction and discussion to the essential points, the methods to provide enough reproducibility, and results to the key findings and described in a tabular format. In a previous article, we suggested a framework to keep publications “lean and mean”, i.e., short and to-the-point.<sup>4</sup> If implemented, this would keep many of the word count challenges at bay.

Another point of discussion that comes to mind is whether journals and conferences should use word count or character count as the preferred method of restricting length. The character count may seem attractive because it would force the use of shorter words instead of longer/fuzzy words, but it may complicate scientific writing. Limiting by character count introduces the need for engaging in extra shortening efforts, such as creating unfamiliar and difficult to remember abbreviations/short forms, which might reduce the readability of the text. Character count limits are often found in requirements for conference abstract submissions; these limits become particularly problematic when authors are uploading their abstracts to submission websites. There is often a mismatch between how software programs such as Microsoft Word count characters and how conference websites count them. Authors/writers then must struggle with last-minute adjustments to text.

Another factor that needs discussion here is whether the word/character limits include acknowledgements, disclosure statements, and other non-technical sections. Standardisation in this regard also needs to be addressed.

It can take arduous efforts to modify a manuscript to reduce the word count. For industry publications, multiple stakeholders are involved in the review process, making the process of re-drafting, re-reviewing, and re-

approving quite sluggish. This ultimately undermines the whole purpose of publications, i.e., disseminating results to the healthcare and research professionals at the earliest to extend the treatment benefit.

**Challenge 3: Number of illustrations**

Illustrations (figures, tables, and images) are the backbone of any scientific publication. They efficiently convey the results to the intended audience. Figures often take considerable effort to generate. Journals often recommend six illustrations, but there is a large variability. Resubmitting a manuscript to another journal that allows fewer illustrations can be overwhelming, especially if journals do not permit supplementary illustrations. The authors and writers need to brainstorm how to eliminate some figures or revise others. This adversely affects the turnaround-time of the manuscript while figures are redrawn, reviewed, and approved. Additionally, there could be figure formatting challenges involving the use of colour or grey-scale, which typefaces to use, etc.

**Challenge 4: Structure, format, and style**

The overall structure of the manuscript is currently the aspect most in sync across journals, as most publications use an IMRAD format. This is also the format recommended by the ICMJE, and it is religiously followed by member journals. Nevertheless, there is variability. Some journals require that results and discussion be merged, while others have a non-IMRAD structure. For abstracts also, sections vary across journals, and some ask for even minor details such as setting, design, etc., to be included under separate headings while others would group these under methods. Review articles, however, may not strictly follow this structure, and requirements about which headings to use vary.

**Table 1. The current publication environment and "blue sky" future**

Aspects	Current	Future
Structure	Variable, exhaustive, and comprehensive	Harmonised, template based, and lean
Format and style	variable	Harmonised, guideline based
Publication	Online as well as in print	Online only, cloud-based
Accessibility	Open and closed access, infrequent use of QR codes	Open access only, mandated use of QR codes
Storage and archival	Individual journal/publication house sites	Common cloud-based storage
Circulation	Infrequent use of digital methods	Use of mobile applications and social media
Publication houses	Multiple speciality journals	Unify by speciality and mergers like pharmaceutical companies

Proposed Manuscript Structure (Template)		Proposed Format and Style	
<p><b>Abstract</b></p> <ul style="list-style-type: none"> <li>● Background, methods, results, and conclusion</li> </ul> <p><b>Introduction</b></p> <ul style="list-style-type: none"> <li>● Background, lacunae, and hypotheses</li> <li>● Study objectives</li> </ul> <p><b>Methods</b></p> <ul style="list-style-type: none"> <li>● Include study design, participants (eligibility, sample size), study endpoints and their assessment</li> <li>● Statistical analysis</li> <li>● Ethical considerations and NCT number</li> </ul>	<p><b>Results</b></p> <ul style="list-style-type: none"> <li>● Primary and secondary efficacy analysis data</li> <li>● Safety data</li> </ul> <p><b>Discussion</b></p> <ul style="list-style-type: none"> <li>● Key findings and discussion vis-à-vis other studies</li> </ul> <p><b>Take home message</b></p> <ul style="list-style-type: none"> <li>● Key points for professionals</li> <li>● Key points for patients and public</li> </ul>	<p><b>Word count limit</b></p> <ul style="list-style-type: none"> <li>● Manuscript body, IMRAD, 2500 to 3000 words</li> <li>● Abstract, 250–300 words</li> <li>● Illustrations, up to 8</li> <li>● Supplementary material, up to 5 files</li> </ul> <p><b>Referencing</b></p> <ul style="list-style-type: none"> <li>● References, up to 45</li> <li>● Citation in text: Author, date or use only PubMed ID, which shows the author, year when mouse is hovered over the ID; use of hyperlinks</li> <li>● Reference format: Vancouver</li> <li>● Reference list: alphabetically or by PubMed ID, as appropriate</li> </ul>	<p><b>Style and formatting</b></p> <ul style="list-style-type: none"> <li>● Follow AMA style</li> <li>● Times New Roman, 12 points, left aligned, double spaced, numbered pages and line numbers</li> <li>● Illustrations cited using Roman numerals</li> </ul>

Figure 2. A framework for harmonising manuscript structure, format, and style

Regarding format and style, again there is tremendous variability. There may be different recommendations for font, line spacing, page setup, page numbering, raised (midline) periods to denote decimals, and number of places after decimals. The list is unending. Illustrations are also affected with formatting and styling issues, and the desired submission file format may be EPS, JPEG, TIFF, or PDF. These varying requirements confuse and overwhelm the authors/writers, and inadvertently choke the publication process. In addition, some journals have started asking for social media messages while some also require take-home message for the patients in simple language. Interestingly, many such requirements are not clearly mentioned in the instructions for the authors provided by the journals, and come as surprise while submitting the manuscripts.

Often, copyeditors are deployed to address these styling and editorial requirements, which is a time, cost, and resource sapping activity. Though it is less likely that manuscript is rejected due to non-compliance with the recommended style guide, it still hampers the publication process and delays publications. This clearly underlines the need of harmonisation, especially

in terms of formatting and styling.

## Solutions

### Harmonised template

Creating a harmonised template would be a milestone in the domain and would help in streamlining the publication writing process. It is important and also worthwhile to harmonise the structure of manuscripts and implement this globally. This would help authors and writers focus on technical scientific/medical content rather than struggle with the formatting and styling issues. We strongly urge ICMJE, AMA, ISMPP, EMWA, AMWA, and publishers to come together and have a consensus on the template. This would also help authors because they could choose a relevant journal based on technical content rather than the allowed amount of text and illustrations. We propose a framework as in Figure 2. The template with guidance or sample text can be issued, though flexibility should be given as with ICH E3 template for CSRs. Regarding the formatting and styling, these too can be recommended/mandated so that manuscripts can be submitted to any journals without any hassles to reduce word count or change format and style.

Another very important effort would be to harmonise the structure and especially the layout of posters. Presenters at conferences print their posters and present at conferences. They might often present this data at another conference with a different audience and might need to print another poster as the conference specifications may differ. Harmonising the poster structure, format, and layout may help in using and reusing the same poster, which may also help in conserving natural resources. In situations where a change is needed to the sequence of authors and title based upon conference region, audience, and presenting author, this information can be added as a sticky note, rather than reprinting the poster again.

### Uniformity in format and styling

Until we reach a consensus on the template, it will be of utmost importance to harmonise format and style, particularly the reference citation, as proposed in Figure 2. We see this as the most important issue and view it as a bottleneck in the already complicated and sluggish publication process that sometimes takes up to a year to print.

Journals and publication houses should come to a consensus with using superscripted numbers,

number in brackets, or author, year styles for citation in text. For the reference list, a consensus of Harvard or Vancouver style may be reached. In summary, whatever is the chosen format and style, it should be implemented globally. We would recommend using an author-year format because it eliminates the challenges encountered with numbering.

### “Your paper, your way”

One very attractive option that we have come across is the “Your Paper, Your Way” initiative of Elsevier journals.<sup>5</sup> Authors can submit the paper as one combined PDF file then apply style and formatting later upon acceptance. Such initiatives are very welcome and will accelerate the publications on one hand and provide relief to the authors who would not have to fear rejection due to failing on these criteria. The only challenge here is the effort in formatting of the manuscript post-acceptance, which may involve adhering to word and illustration limits, changes to reference style, etc.

### Auto-transfer of content from one journal to another

The ability to automatically transfer of manuscripts from one journal to another is another nice initiative by publishers. The journals published by the same publication house have harmony within, and the manuscripts can be transferred using a single click from one journal to another belonging to the same publication house. However, the journals are not essentially the specialty-specific, and may not be the preferred choice/option for the authors or lack a region-specific circulation. Nevertheless, it does address the challenges in formatting and restyling.

### The way forward

In our opinion, the best way forward would be to “lean” publications, and to provide a template format with specifications that is used globally. The “blue sky” is to link the already available information in the public domain, and present the interpretation. For example, the publication could link to the methods disclosed in the protocol, to tables/figures to data in clinical trial registries, and in disclosed CSRs.

Furthermore, template-based writing seems promising in publications, and a benefit similar to that in regulatory writing is expected from this

change. Similarly, for referencing, the recommendation could be to use PubMed IDs, where hovering of the mouse indicates the author, journal, and year. This option is available for most free-full text online papers in an HTML format.

We firmly believe that the printed paper journals will soon become obsolete. Digital is in, and it reduces space constraints of the printed page. We, as authors/writers and publishers should welcome cloud-based publishing with an open mind, and lead the change rather than follow the change. Harmonising publication specifications and moving toward lean publications is the need of the time and in the best interest of dissemination of scientific and clinical data/information. Taken together, there is a lot to implement in future vs. current and reach the blue sky (Table 1), which would help us to realise the long-pending dream of harmonising publications.

### Take-home message

In summary, harmonisation and lean writing is going to be the backbone of publications and will only be realised with efforts from all the stakeholders, including authors, writers, sponsors, and journal publishers, as well as organisations including EMWA, ICH, ICMJE, AMA, the International Society for Medical Publication Professionals, and the American Medical Writers Association. The authors and writers should embrace this idea and journals and publisher should be willing to implement these changes while keeping common interests in mind. In addition, further digitising the publication industry will open new avenues for science and medicine by ensuring wider and more timely and cost-effective reach to the desired audience.

### Conflicts of interest

The authors declare no conflicts of the interest.

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