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ARTICLE WRITING FOR **THE MEDICAL SCIENCES**

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for scientists by scientists

INTRODUCTION

This short guide covers some of the important aspects of writing for the medical sciences. The topics included in the guide are:

1. KNOW YOUR AUDIENCE

2. WRITING A PERSUASIVE ACADEMIC ARGUMENT

3. WRITING CLEAR CONCISE SENTENCES

4. EDITING AND PROOF READING FOR NON-NATIVE ENGLISH SPEAKERS

5. AVOIDING PLAGIARISM

ABOUT THE AUTHOR

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Chris Duncombe holds a medical degree from Sydney University and a PhD from the University of Amsterdam. He currently advises on the delivery of HIV services in resource limited settings in care and treatment programs in Sub Saharan Africa. He was a Senior Program Officer at the Bill and Melinda Gates Foundation, where he managed the portfolio of grants on the optimization of antiretroviral drugs, diagnostics and the delivery of HIV treatment and prevention services. Prior to that, he worked with the HIV Department, World Health Organization in Geneva and was the writer of the 2006 and 2010 adult treatment guidelines. He was a clinical trialist with the HIV Netherlands Australia Thailand Research Collaboration (HIV-NAT) in Bangkok for 12 years.

1. KNOW
YOUR AUDIENCE

If you are reporting original research in the medical sciences, such as cardiac imaging, typically your audience will be your peers, who are working in the same or a related field.

They know the topic and are seeking to expand their knowledge. Why do they read your article? Because they want to know how other researchers are making original contributions to the knowledge base. They want to see peer reviewed data, with robust and ethical study conduct, accurate data, sound statistical analysis, conclusions supported by evidence and acknowledgement of weaknesses.

Your audience may be your institution or supervisor as you climb the academic ladder through publications or it may be your funder. There are wider audiences, including normative agencies such as the World Health Organization and national professional associations which use data for guideline development and to change practice at local and international levels.

There are also potential audiences in the lay community and media, which take special interest in advances in management of conditions such as breast cancer and dementia. Whoever you audience is, they will expect quality work, free from spelling and grammatical errs, and free from plagiarism.

2. WRITING A PERSUASIVE ACADEMIC ARGUMENT

Writing a medical science article may involve the presentation of data in the form of an academic argument, which outlines the writer's evidence-based position on a particular topic.

An academic argument is an opportunity for the writer to contribute to current knowledge by providing expert opinion based on the available evidence.

An academic argument is not a negative confrontation or a personal opinion which is not supported by the facts. In structuring a persuasive academic argument, the writer first outlines a set of statements around the topic of interest, describes the supporting evidence, and then seeks to draw conclusions from the statements and evidence. Statements may be obtained from a review of the peer literature or from the original research being presented in the article. Often, statements will come from both sources.

A persuasive argument should commence with a topic sentence which sets the stage for presentation of the evidence which then supports a logical conclusion. The topic sentence should outline the problem or research question that the article is seeking to address. Next, the writer should present available evidence to the reader which is then used to draw the conclusions.

Critical readers will analyze the strengths and weaknesses of the argument in drawing their own conclusions. Ideally, the writer should aim to draw strong conclusions from the evidence base. This may not always be possible and the link between the conclusion and the evidence may be suggestive, probable or strongly supportive. It can also be inconclusive and a statement that further research is needed may be appropriate. Drawing a strong conclusion and strong evidence is lacking will be criticized by reviewers.

Finally, writers should always acknowledge any weaknesses, deficiencies or evidence gaps in their research. The recent real world example of gaps in evidence is that of the antiretroviral drug dolutegravir used to treat HIV infection. Based on evidence from randomized clinical trials that dolutegravir had superior efficacy and was less prone to the development of drug resistance compared to other antiretrovirals, dolutegravir was recommended in 2018 by the World Health Organization as a preferred first-line treatment for HIV infection.

However, there were limited data on the use of dolutegravir in pregnancy until the drug was rolled out in the national HIV program of Botswana and surveillance studies reported neural tube defects in infants born to women taking it. National and global treatment guidelines are in the process of being amended.

3. WRITING CLEAR CONCISE SENTENCES

Writing clear, concise sentences maximizes the ability of writer to convey knowledge to the reader.

Conversely, complex, long or poorly constructed sentences can significantly reduce clarity and detract from the messages that the writer is communicating. Where possible, use the active voice and not the passive voice. Instead of saying *'It has been reported that heart attacks can be caused by stress'* which is the passive voice, it is better to say *'Previous research reported that stress can cause heart attacks'* which is the active voice.

Wordiness reduces the ability of the writer to convey key messages. Here is an example of a wordy sentence.

> *'As your supervisor, I will provide you with suggestions on your performance so you can overcome the challenges you encounter every day while conducting your research, so you can feel less stressed.'*

Instead, a less wordy and easier to read sentence would look like this. It conveys the same meaning in in a much more concise sentence.

> *'As your supervisor, I will help you overcome the daily challenges of conducting your research, so you feel less stressed.'*

Also, avoid wordy phrases such as *owing to the fact that* and, instead, simply use *because*. Keep verbs concise and simple, for example, use *suggest* and not *are suggestive of*.

The correct use of commas is essential for a clear easy to read sentence. Commas may be omitted or overused, both of which reduce readability. Avoid the use of phrases with many consecutive nouns. Instead of *'the institution has a hospital employee relations improvement program', is better to say, 'the institution has a program to improve relations among employees.'*

Transitional or connecting words link thoughts and ideas from one sentence or paragraph to the next.

Transitional words can be used to add, compare, emphasize, show exception to, or conclude ideas. They improve the flow of a paper by helping the reader to interpret the key messages as the writer moves from information that is known (literature review) to the new information (original research) presented in the paper. Some examples of connecting words are *furthermore, equally important, however, concisely, in summary*.

4. EDITING AND PROOFREADING FOR NON-NATIVE ENGLISH SPEAKERS

Editing occurs at the levels of content, structure, clarity and style. A paper should commence with an abstract followed by the main text commencing with the introduction, followed by materials and methods, results, discussion and conclusion.

Paragraphs should have a clear flow of ideas that are related to each other. For optimum readability, paragraphs should be connected by transitional word or phrases. Some examples are *however, similarly, supporting our research findings*.

Clarity of meaning will be improved if sentences are short and concise with a simple subject-verb-object construct. The temptation of many non-native English speakers is to write long, complex sentences making the reader search of the main idea.

The writing style of a scientific paper should be professional, non-colloquial English, usually in the third person, although some authors use the second person, such as in this example 'Our research has demonstrated that surgical closure of the atrial septum improves survival.' Do not just describe the results, but interpret the important results for the reader. Use words such as 'unexpectedly' or 'interestingly'. In the discussion, authors commonly and incorrectly just repeat the results. The discussion should elaborate on the significant findings, how they are supported or not by other research and how the evidence may change practice.
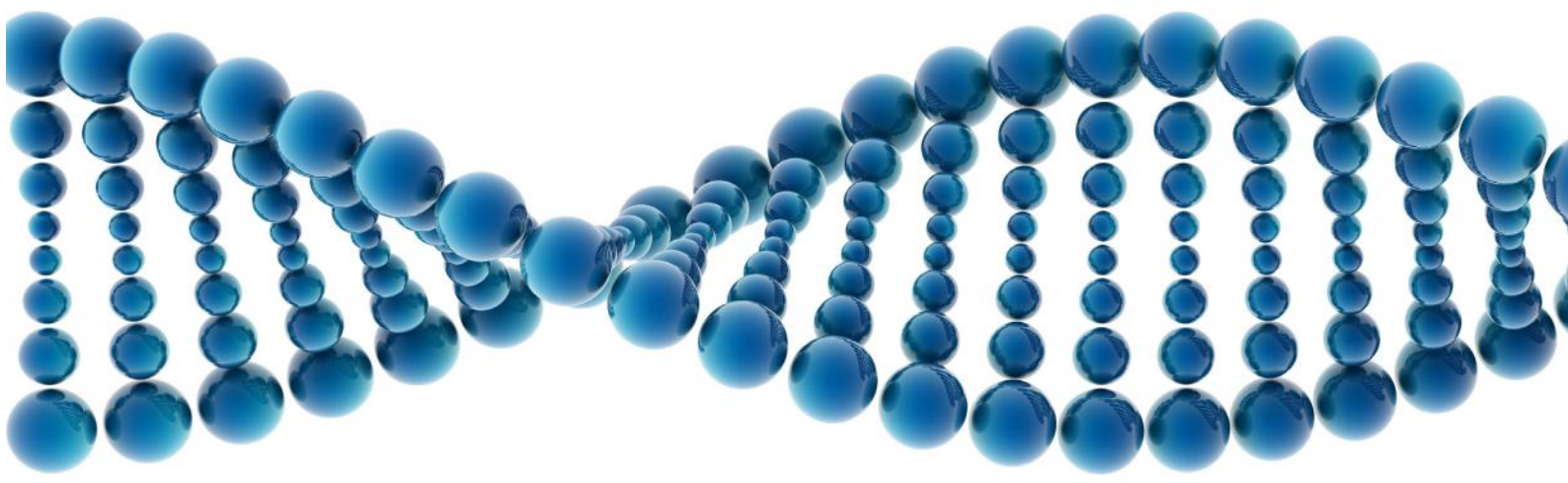
Most international peer review journals accept papers in English and expect high standards of English usage. Proof reading checks the fine detail of the paper, such as correct punctuation and tense. It can be challenging for non-English speakers. If possible, it is always a good idea to have your work proof-read by a native speaker, if English is your second language. Here is an example of incorrect and proof-read, corrected English. There are multiple issues with the use of English in this sentence:

'Main scientific problem to be solved by this innovatory project is evaluating the influence of the presence of the leakage to the brain after surgery to correct aneurism.'

It should read like this:

'The main scientific problem to be explored by this innovative project is the evaluation of the influence of leakage into the brain following surgery to correct aneurism.'

While the following sentence correctly attributes improved patient outcomes to evidence-based decision making, it has lost its meaning due to incorrect sentence structure, confusion of ideas and verbosity:

'Making evidence-based therapeutic decisions in Alzheimer's disease, a critical event that is the chronic disease and its somatic symptoms do have an effect on the quality of life because they are essential to improving patient outcomes.'

A better sentence would be:

'Making evidence-based therapeutic decisions in the management of Alzheimer's disease, a chronic debilitating illness, will have a significant impact on improving patient outcomes, including quality of life.'
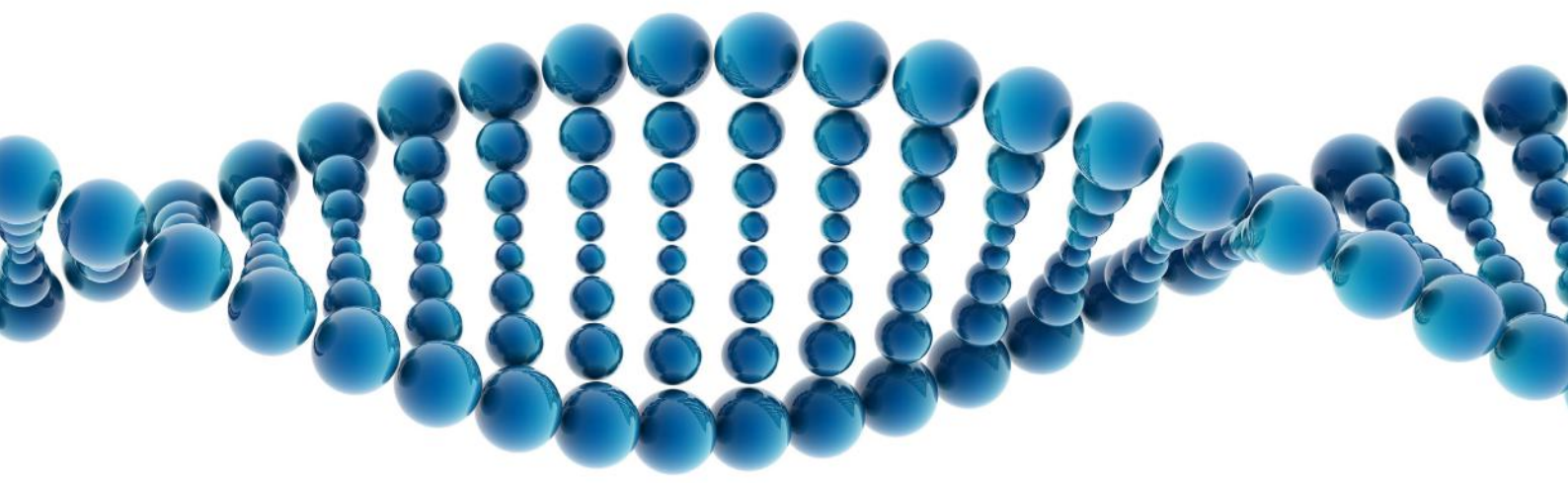
5. AVOIDING PLAGIARISM

Plagiarism is taking the work of others whether it be text, images or ideas and passing them off as your own. It is derived from the Latin plagiarius which means kidnapper. Plagiarism is a form of theft and the consequences to academic life and career can be severe.

There are many forms of plagiarism, including copying the text of others without citation, reordering words and paraphrasing the text of others without citation, not putting quotations in quotation marks, and using text which is not common knowledge without citation. Common knowledge describes that which is known to everyone such as that there are four seasons in the year. In academic writing, the basic rule in avoiding plagiarism is that, if text is not completely your own, it must be cited. It is acceptable to write about work and ideas of others, especially if the writer is attempting to show knowledge of the field or compare research findings with those of other researchers as long as the source is acknowledged. Many academic institutions and publishers use plagiarism checkers and these will detect even a few words which have been stolen from other works. Writers should always check their text using plagiarism checker, such as the free one provided by Grammarly, before submitting their articles. Here is a short example of the most common form of plagiarism, that of paraphrasing.

> **ORIGINAL TEXT:**
>
> 'Atrial fibrillation is one of the most common cardiac conditions affecting elderly people in Europe. While there have been reports of atrial fibrillation in young people the incidence rises with age as do the complications, including thrombosis. The increased risk of atrial fibrillation and its complications in the elderly makes its accurate diagnosis and management critical in people over the age of 60.'

> **PLAGIARIZED TEXT:**
>
> 'Many people in Europe suffer from atrial fibrillation. While the condition does occur in young people, it is more common in the elderly. Complications of atrial fibrillation, such as thrombosis, are also more common as people get older. It is important to treat atrial fibrillation in people over 60 years of age to avoid complications.'

While the text has been substantially rewritten, the concepts are identical to the original text and a citation acknowledging the original text is required. Otherwise this is plagiarism.

ABOUT
ECORRECTOR

eCORRECTOR was founded by Dr Mark J Hunt in 2013 to address the language needs of academics intending to submit their manuscripts for publication.

Over the years, we have built a solid reputation and have provided PhD level editing in all academic areas for most of the major universities and research centres in Poland. We have recently expanded our service to include academic translations.

eCORRECTOR is a specialised proofreading service for academics intending to submit their work to international peer-reviewed journals. Our expert proofreaders are all native speakers of English, hold a PhD (or equivalent, e.g. Doctor of Medicine) and the majority are actively publishing scientists.

We are well aware of the rigorous standards placed on language during the publication process, which can be a key factor when reviewers evaluate texts. We provide journal editors and scientists with PhD level proofreading in all major areas of science. We have substantial experience proofreading in the following areas:

- ✓ **Biomedical Sciences** (molecular and cell biology, molecular therapeutics, biochemistry, pharmacology, immunology, genetics, neuroscience, microbiology)

- ✓ **Ecology** (environmental science, botany, wildlife and fisheries)

- ✓ **Chemistry** (organic, materials and chemical engineering)

- ✓ **Clinical studies** (medicine, psychology, emerging infectious diseases)

- ✓ **Engineering (industrial, civil, chemical and bioengineering)**

- ✓ **Physics and Mathematics**

- ✓ **Social sciences (management and sociology)**

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