



How clear is the story?

Krithika Muthukumar

Freelance Medical writer, Toronto, Canada

Correspondence to:

Krithika Muthukumar
mkkrithika@gmail.com

Abstract

Editing in medical writing is an important task that requires good scientific background as well as soft skills like critical thinking and attention to detail. Other than correcting typographical and grammatical errors, a medical editor has to ensure clarity and flow of articles, keeping in mind the intended function of the article and readership. The given information should carry the story forward, have a good lede, be interesting, logical and complete. What is a lede? In journalism, lede refers to the opening sentence/paragraph of an article that is designed to capture the attention of the reader and create enough interest to continuing reading the full story. The sentences and paragraphs can also be rearranged for the story to be effective. It is vital to pay attention to the specialised terminology and check if adequate explanation is given when necessary. Finally, take a step back, have the audience in mind and look at the big picture.

Introduction

Medical writing involves science, critical thinking and creativity. Good writing involves clear and effective communication of information whilst keeping in mind the target audience and purpose of the article. The target audience could be regulators, patients, caregivers, general audience, or health professionals.¹ Once the writing is done, it is the editor's role to check whether the content is tailored to the target audience and recognise any errors or missing information. An editor has to do much more than just eliminating spelling and grammatical errors. Similar to the writer, the editor should also possess the ability to understand the purpose of the given article, the target audience, a thorough knowledge of the subject and scientific accuracy.

As an editor, first read the article entirely without making any corrections even when you notice any obvious error. Then take a step back and think if the article overall has a clear structure and meaning.

The beginning and the end

In academia, when we communicate, we are taught to start with the background information. However, when writing news articles and blog posts, we have to follow a classic newspaper style, also known as the inverted pyramid style. The most important point and its implications should be the opening paragraph. It draws attention to the article and creates enough interest in the reader to finish reading the article. The lede can be a summary of the main ideas, introduction of

a character, a story, a quote, or what is new.

For example, in this blog post² I submitted last year, I start with a story in order to create curiosity and get the attention of the reader.

The neighbours describe how anxious they would get whenever they heard Mrs Amutha, a 70-year-old-lady, as she banged her head on the walls of her apartment and screamed. She suffered from severe headache and facial pain caused by advanced stages of oral cancer, and this is how she dealt with it. Unfortunately, Amutha suffering in pain would be the memory her family would have of her for years to come. This is the state for millions of patients and families across India, as less than 1% of the patients have access to prescription opioids to treat pain even in advanced stages of cancer.

This is the reality I was aware of, growing up in Chennai, India. Through my mother, who is a palliative care physician, along with her colleagues and teachers, I have known of the various challenges faced by them with regards to increasing awareness about palliative care among the medical fraternity, availability of opioids for pain relief, and associated healthcare policies.

As an editor, check to see if the lede is the first sentence/paragraph and not buried in the text.

The last paragraph is remembered most often and hence it is as important as the lede. Ensure it is impactful and contains the idea of the article.

For example, in this article titled "Why is it



Check to see whether the article has enough information to support the statements made in the introduction.

taking so long to find a cure for Parkinson's disease", the concluding sentence summarises the key issues discussed.³ "Through continued collaboration, and concentration of energy and financial investment into the most promising research areas, there will ultimately be a time when Parkinson's will be a curable disease."

Facts and references

Editors are responsible for checking the validity of any data presented and should keep in mind the importance of conveying the right information to the readers. Verify that the data are represented accurately and not hyped or understated. Check the facts and make sure they are referenced adequately. Ensure that any point of view and critique is not a personal attack, and instead well researched and written responsibly.

Clarity

Complex concepts do not mean complex sentences. When explaining scientific concepts, the sentences can be simple, interesting, and enjoyable to read. The objective of the writing is to convey information to the reader and not to confuse. Poor communication fails to translate the knowledge or create an impact thereby affecting patients, researchers and clinicians. For example, a study shows that lack of clarity in clinical practice guidelines documents often leads to non-adherence of the guidelines.⁴

Suggestions to improve clarity

- Remove vague words, unnecessary jargon, abbreviations, and clichés.

Example: In the future, with optical tagging or genetic markers, it might be possible to determine whether the source of the cells is within the striatum.

Suggestion: The term *might be possible* is vague, it creates doubt and uncertainty.

Example: Retinitis pigmentosa is the most common cause of inherited blindness, which is characterised by the progressive loss of photoreceptor cells.

Suggestion: Jargon need not be very complicated words, but they make research articles inaccessible to the general public or sometimes even to researchers who do not work in a specific field. In the above example, photoreceptor is a jargon.

Example: MicroRNAs (miRs) are small, regulatory RNAs that are expressed in animals and plants.

Suggestion: Here miR is an unnecessary abbreviation for microRNA, where RNA is already an abbreviation.

Example: Scientists have created a new substance long believed to be the "holy grail" of chemistry.

Suggestion: "Holy grail" is commonly used to describe something that scientists hope to discover and it is a cliché that can be avoided.

- Use active voice as it is strong and improves clarity.

Example: Microglia responses to traumatic brain injury were analysed.

In active voice the sentence would be "The authors analysed microglia responses to traumatic brain injury".

However, in some cases, passive voice is acceptable. If you want to emphasise the experiment and not who performed the experiment, the above example need not be corrected.

- Use verbs instead of nouns.

We learn to use nouns instead of verbs in

academia to sound more formal. But nouns slow down the sentence. Verbs carry the sentence forward, have more impact, and give sentences energy. With verbs, sentences are less complex and more engaging.

Example: This is the first study to examine the distribution of oligodendrocyte-lineage cells, and their proliferation and maturation after traumatic brain injury.

Suggestion: The above sentence contains the nouns *distribution*, *proliferation*, and *maturation* that could take verb form and be written as "This is the first study to examine oligodendrocyte-lineage cells and how they distribute, proliferate and mature after traumatic brain injury".

- Putting the subject close to the verb also helps simplify the sentence.

Example: Our results of attempting to force the brain into an anti-inflammatory state soon after traumatic brain injury (including sustained effects observed at 3 days after a single IL-4 injection) warrant further study of other IL-4 treatment regimes, and of long-term cellular and behavioural outcomes.

Following "results", we have to read through many words and a parenthetical interruption to learn that further study is warranted. This sentence was presented at the very end of a research paper after the methodology and results were already described. Describing future studies would be sufficient, thus removing all the words between "results" and "warrant" further study.

Flow enhances clarity

Article flow is achieved when you proceed logically from one idea to another. This happens both within the paragraph and between paragraphs. When you see that there is missing clarity, it could simply mean that the logic is missing. See if each sentence carries you to the next sentence, include transition sentences that help connect different ideas. One way to make it easier to explain complex science concepts is by using analogies. For example, when explaining the function of the mitochondria in layman's terms, it can be called as the power house of the cell. Words can also be used repetitively to bring clarity.

As an editor, ask yourself the following:⁵

- Does the first sentence of the paragraph describe the main idea?
- Do the following sentences expand on the

main idea and provide more information?

- Is it well researched and with references?
- Is the last sentence a summary of the main idea and/or does it lead on to the next paragraph?

Conclusion

Now go back to the introduction. Check to see whether the article has enough information to support the statements made in the introduction, whether the article is complete, whether there are any holes or unanswered questions, and whether the overall structure of the article makes sense and meets the guidelines.

Conflicts of interest

The author declares no conflict of interest related to this article.

References

1. Sharma S. How to become a competent medical writer? *Perspect Clin Res.* 2010;1(1):33–7.
2. The Mental Health Innovation Network. 2017 [cited 2017 Nov 30]. Available from: <http://www.mhinnovation.net/blog/2017/nov/30/opioid-crisis-global-rethinking>.
3. Mathur S. Why is it taking so long to find a cure for Parkinson's disease? *Huffington Post.* 2016 Apr 21.
4. Codish S, Shiffman R. A model of ambiguity and vagueness in clinical practice guideline recommendations. *AMIA Annu Symp Proc* 2005:146–50.
5. The University of Sheffield. Paragraphs, flow and continuity. 2018 [cited 2018 Jul 17]. Available from: <https://www.sheffield.ac.uk/ssid/301/study-skills/writing/academic-writing/paragraph-flow-connectivity>.

Author information

Krithika Muthukumaran, PhD, is a neuroscientist by training. Her area of research interest is age-related neurodegenerative diseases and neuro-inflammation. She enjoys different types of writing and storytelling. She is a freelance medical writer with experience in science editing, and writing manuscripts, grants, and newsletters.

Exercise: Marco-editing

1. Question: In other words, the drug is able to halt disease progression.

Answer: The drug is able to halt disease progression.

Reason: “In other words” is a cliché, conveys no meaning and can be deleted.

2. Question: Heavy metals contamination of soil is a cause of serious concern due to the potential health impacts of consuming contaminated produce.

Answer: Heavy metals (copper, zinc, lead, manganese, nickel) contamination of soil is a cause of serious concern due to the potential health impacts of consuming contaminated produce.

Reason: Heavy metal is a jargon as all readers might not know what metals come under this classification and not all heavy metals are toxic. In which case the editor should ask the writer to include the heavy metals that are part of the study and commonly found to contaminate the soil.

3. Question: In order to show that the drug can halt disease progression, an environmental toxin rat model of Parkinson's disease was used.

Answer: We used an environment toxin rat model of Parkinson's disease to show that the drug can halt disease progression.

Reason: Changing the sentence from passive to active voice enhances the clarity and makes the statement more impactful.

4. Question: The highest percentage of astrocytes was seen in Group A (32%) followed by Group C (28%) and then Group B.

Answer: The highest percentage of astrocytes was seen in Group A (32%) followed by Group C (28%) and then Group B(?).

Reason: There is missing information and the data for Group B is not reported.

5. Question: Out of the 200 Trial A participants, 10 (10%) reported side effects.

Answer: Out of the 200 Trial A participants, 10 (5%) reported side effects.

Reason: There is an incorrect percentage calculation that needs to be rectified.

6. Question: The phospholipid bilayer allows for bidirectional flow of metabolites.

Answer: The cell membrane allows for bidirectional flow of metabolites.

Reason: The term phospholipid bilayer is jargon and it can be modified to cell membrane as it is simpler and still conveys most of the meaning.

7. Identify the lede: In India, more than 1 million new cases of cancer, most of them in advanced stages, is diagnosed every year. It is suggested that up to 80% of patients suffering from advanced cancer could live with pain. “Having morphine in the cupboard is not enough” says Dr M.R. Rajagopal, India's father of pain and palliative care.

Answer: “Having morphine in the cupboard is not enough” says Dr M.R. Rajagopal, India's father of pain and palliative care. In India, more than 1

million new cases of cancer, most of them in advanced stages, is diagnosed every year. It is suggested that up to 80% of patients suffering from advanced cancer could live with pain.

Reason: The lede was buried and the quote that highlights the root cause of the problem should be the opening sentence instead.

8. Check the flow of the paragraph:

Parkinson's disease is the second most common progressive age-related neurodegenerative disorder. The symptoms include motor symptoms such as resting tremor, bradykinesia, and rigidity, as well as non-motor symptoms such as depression and anxiety. We still lack a disease modifying therapy. Parkinson's disease is characterised by the loss of dopaminergic neurons in the substantia nigra region of the brain and the development of neuronal Lewy bodies.

Answer: Parkinson's disease is the second most common progressive age-related neurodegenerative disorder. It is characterised by the loss of dopaminergic neurons in the substantia nigra region of the brain and development of neuronal Lewy bodies. The symptoms include motor symptoms such as resting tremor, bradykinesia, and rigidity, as well as non-motor symptoms such as depression and anxiety. We still lack a disease modifying therapy.

Reason: The paragraph was rearranged in such a way that following the introductory first sentence, there is explanation on what happens in the disease thereby leading to the symptoms. The last sentence is about the available treatment.