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ChatGPT: when artificial intelligence replaces the rheumatologist in medical writing

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ABSTRACT

In this editorial we discuss the place of artificial intelligence (AI) in the writing of scientific articles and especially editorials. We asked chatGPT « to write an editorial for *Annals of Rheumatic Diseases* about how AI may replace the rheumatologist in editorial writing ». chatGPT's response is diplomatic and describes AI as a tool to help the rheumatologist but not replace him. AI is already used in medicine, especially in image analysis, but the domains are infinite and it is possible that AI could quickly help or replace rheumatologists in the writing of scientific articles. We discuss the ethical aspects and the future role of rheumatologists.

THE PLACE OF ARTIFICIAL INTELLIGENCE IN MEDICAL PUBLICATION

'Artificial intelligence (AI) has made tremendous advancements in the medical field over the past few years, with applications in diagnosis, treatment planning and even in drug development. In recent years, there has been a growing interest in the use of AI in rheumatology and the possibility that it may eventually replace rheumatologists in certain aspects of their work.

While this notion may be unsettling for some in the medical community, it is important to acknowledge that AI has the potential to greatly enhance the field of rheumatology. The ability of AI to process vast amounts of data, analyse complex patterns and make accurate predictions could revolutionise the way rheumatologists diagnose and treat their patients.

In terms of editorial writing, AI has the potential to assist rheumatologists in the production of high-quality, well-researched articles that are free from bias and errors. AI algorithms can analyse large amounts of data and identify patterns and trends that may not be immediately apparent to human writers. This information could then be used to inform the content of editorials, providing readers with a more accurate and up-to-date picture of the state of the field.

However, it is important to note that AI will not be able to replace the critical thinking, expertise and experience of rheumatologists. While AI may be able to provide a wealth of information, it is the rheumatologists who must interpret this data and use it to inform their writing.

In conclusion, the use of AI in editorial writing has the potential to greatly enhance the quality of content produced in the field of rheumatology. However, it is important to recognise that AI will not replace rheumatologists, but rather serve as a tool to assist them in their work. As the field of AI continues to evolve, it will be exciting to see how it will impact the way we practice rheumatology and produce high-quality, informative content'.

AN ETHICAL ISSUE

We have all dreamed of having a clone to do certain tasks for us, or of having software to write articles or reports for us, but in our own style. The science fiction of the 1990s and 2000s concerning AI is starting to become a reality in 2023, and it is just around the corner in medical publication. Indeed, the first part of this editorial (in quotation marks above) was obtained using AI software (namely, ChatGPT developed by openAI). To date, AI has been used in rheumatology to interpret imaging, for example, to search for erosions in RA[1] or vertebral fractures,[2] to identify sacroiliitis[3 4] and to predict the progression of osteoarthritis.[5] AI provides valuable clinical support[6] in predicting response to therapeutics, identifying inflammatory diseases earlier[7] and using Big Data.[8 9] Now, with ChatGPT, AI is becoming a viable competitor in medical writing. ChatGPT stands for 'Generative Pretrained Transformer', which is a type of language model used to predict text based on input data. ChatGPT uses machine learning techniques to improve its prediction based on the training data it has received. Thus, the more the model has been trained on a large corpus of texts, the more it will be able to generate text autonomously and consistently. It is far from perfect, but AI managed to write an original, conventional and simple text on this subject. We are still in the infancy of this writing technology, but things are moving fast and this tool has the potential to evolve very rapidly. We gave ChatGPT the following instructions: 'Write an editorial for *Annals of Rheumatic Diseases* about how artificial intelligence may replace the rheumatologist in editorial writing'. Indeed, we did two tests to investigate, first, whether the resulting texts were different after doing the same request tw times (to avoid plagiarism); and second, whether a slight change to the request (we further specified in the instructions: 'for the medical journal') could improve the resulting text (figures 1 and 2). And this was indeed the case, highlighting the programme's capacity to improve. It is already possible to ask the AI tool to write a poem in the style of the greatest French poets such as Verlaine, so it seems likely that we will be able to ask it to write an editorial in the style of an opinion leader, once AI has invaded PubMed.

In the field of education, cases of AI being used to produce homework have been reported, and the question of identifying such cases has been raised and studied.[10] In the field of medical publication, the use of AI would represent a formidable tool, particularly for conducting systematic reviews of

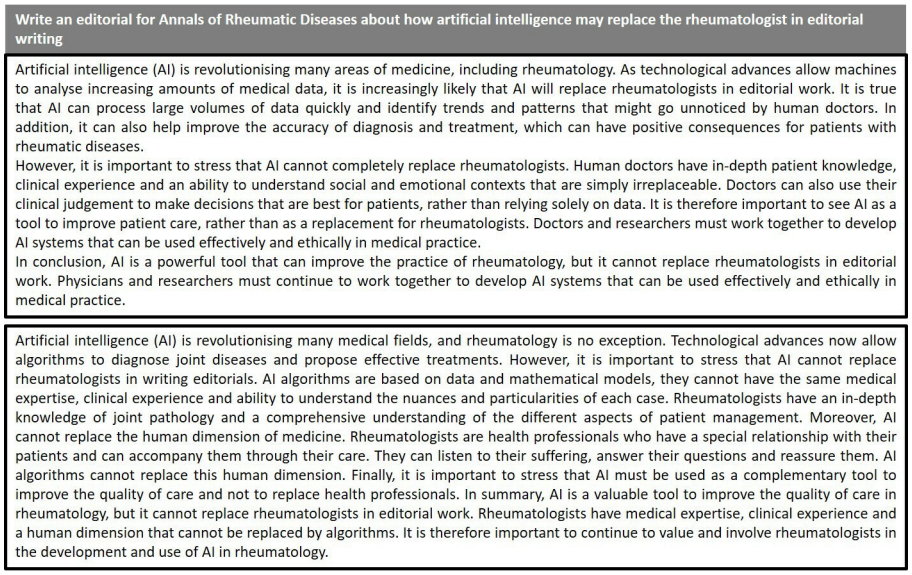

Figure 1 ChatGPT's answers to the same question at two different times.

the literature. This technology could greatly reduce the time needed to carry out such work. Thus, for researchers who are already prolific now, one can imagine that with AI, their output could be doubled or even tripled. It is easy to imagine the writing of abstracts by AI, such as a ghost writer, as has already been demonstrated.[11] Nevertheless, we have no visibility about AI architectures, and the sources it uses are never cited, thus limiting its use in the writing of reliable scientific articles.

However, there is also the issue of using AI to write editorials, and in this particular situation, the problem is more ethical and philosophical than when AI is used as a tool to assist in performing systematic reviews. Indeed, the first issue is one of authorship. Reaping the rewards of an editorial that has been produced by a third party (in this case, ChatGPT) is a questionable work ethic for any author. The second issue is plagiarism. Although the AI programme enables the production of original texts, asking it to write a text in the style of a well-known person could be considered as plagiarism of that person. Finally, the last question that emerges is that of critical thinking. AI could produce editorials that would be robust in terms of scientific sources, as decided by the different algorithms, but there would be little, if any critical analysis of the data. Just like in the film 'Matrix', our medicine will be dictated by AI. We could thus imagine that in the near future, 'AI journals' would publish

Figure 2 ChatGPT's answers after a slight modification (underlined) of the question, to be closer to what was expected, at two different times.

editorials, reviews and even meta-analyses autonomously, with editors whose only role would be to provide themes. This could lead to an impoverishment of medical thinking, if we were to rely solely on the data rendered by AI. Yet, it is precisely this personal interpretation and the author's personal view that renders editorials interesting. These caveats notwithstanding, AI is a powerful tool that could be of invaluable help in writing editorials, with the ability to do fast and comprehensive bibliographic searches. It could be used as a source of inspiration, and, if used sensibly, as a writing aid.

In conclusion, AI represents a major step forward in helping to produce original scientific work. In his time, Einstein said that 'The problem of our time is not the atomic bomb, but the human heart'. We can paraphrase his words today as follows: 'The problem of our time is not artificial intelligence, but what humans do with it'. There are two major pitfalls that need to be avoided: first, taking the easy way out, and letting AI write articles without real prospects and critical thinking; and second, impoverishing our education and stifling our thirst for research.

If we push our imaginations even further, in a decade or so, AI could perhaps claim authorship of these articles, and we might yet witness an "uprising of the machines".

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REFERENCES

1 Bird A, Oakden-Rayner L, McMaster C, *et al*. Artificial intelligence and the future of radiographic scoring in rheumatoid arthritis: a viewpoint. *Arthritis Res Ther* 2022;24:268:268.:.
2 Smets J, Shevroja E, Hügle T, *et al*. Machine learning solutions for osteoporosis-a review. *J Bone Miner Res* 2021;36:833–51.
3 Poddubnyy D, Proft F, Hermann K-GA, *et al*. Detection of radiographic sacroiliitis with an artificial neural network in patients with suspicion of axial spondyloarthritis. *Rheumatology (Oxford)* 2021;60:5868–9.
4 Lin KYY, Peng C, Lee KH, *et al*. Deep learning algorithms for magnetic resonance imaging of inflammatory sacroiliitis in axial spondyloarthritis. *Rheumatology (Oxford)* 2022;61:4198–206.
5 Jansen MP, Salzlechner C, Barnes E, *et al*. Artificial intelligence in osteoarthritis: repair by knee joint distraction shows association of pain, radiographic and immunologic outcomes. *Rheumatology (Oxford)* 2022:keac723.
6 Bouget V, Duquesne J, Hassler S, *et al*. Machine learning predicts response to TNF inhibitors in rheumatoid arthritis: results on the espoir and abirisk cohorts. *RMD Open* 2022;8:e002442.
7 Kataria S, Ravindran V. Emerging role of ehealth in the identification of very early inflammatory rheumatic diseases. *Best Pract Res Clin Rheumatol* 2019;33:101429.
8 Kedra J, Gossec L. Big data and artificial intelligence: will they change our practice? *Joint Bone Spine* 2020;87:107–9.
9 Kedra J, Radstake T, Pandit A, *et al*. Current status of use of big data and artificial intelligence in rmds: a systematic literature review informing eular recommendations. *RMD Open* 2019;5:e001004.
10 Graham F. Daily briefing: will chatGPT kill the essay assignment? *Nature* 12, 2022.
11 Else H. Abstracts written by chatGPT fool scientists. *Nature* 2023;613:423.