

The bioethical dimension of artificial intelligence in rheumatological practice

Abstract

Introduction: Artificial Intelligence (AI), a crucial technology in today's world, has greatly enhanced the Communication Revolution that began after the creation of the World Wide Web (WWW) in the early 1990s.

Content: The aim of this review was to study the impact of the practical implementation of AI in the contemporary world, radically transforming interpersonal relationships, and to assess the importance of AI in medical practice as a whole and particularly in the field of rheumatology—through the critical and reflective lens of Bioethics.

Discussion: The enormous significance of the advent of AI for professional medical practice in general, and also in rheumatology, cannot be denied. However, the ethical risks and shortcomings of this new technology must also not be overlooked. These aspects are discussed from the perspective of Hans Jonas's "Ethics of Fear," which emphatically reminds us of the need to act with caution and responsibility, under the risk of a true catastrophe in the future.

Keywords: artificial intelligence, rheumatology, medicine, bioethics

Volume 17 Issue 5 - 2025

José Marques Filho

PhD in Bioethics, Medical Scholl Unisalesiano, Brazil

Correspondence: José Marques Filho, Rheumatology, Medical Scholl Unisalesiano, Araçatuba, SP, Brazil

Received: August 20, 2025 | **Published:** September 04, 2025

Introduction

Medical practice has undergone enormous changes in recent decades. One of the most impactful factors stemmed from the so-called Communication Revolution, whose starting point was the creation of a project in 1990 called the World Wide Web (WWW), developed by Tim Berners-Lee. This project created an interconnected network of information, universally accessible via an internet connection. It did not take long for the internet to have a fundamental influence on medical practice, particularly on the doctor-patient relationship. More recently, the rapid development of telemedicine has decisively contributed to new and fast-paced changes, requiring increasingly complex adaptation from healthcare professionals.

Artificial Intelligence (AI) had been evolving slowly over the past five decades, but as of 2022, it has ushered in a new era in medical practice its full impact still to be studied and observed in the coming years. AI, when used as a support tool, holds unlimited potential to assist professionals in the pursuit of medical excellence. However, like all technological advances, AI must necessarily be the subject of extensive and urgent reflection through the lens of Bioethics, due to its existential risk potential, referred to as the destructive power of AI.

Rheumatology is one of the newer medical specialties and, due to the characteristics of rheumatologic diseases, has many opportunities to benefit from this extraordinary technological advancement. However, the literature shows that studies and publications on Ethics and Bioethics specifically related to rheumatology are relatively rare.¹

Brief history of AI

Artificial Intelligence (AI) is a scientific field aimed at developing machines capable of performing human tasks autonomously. Countess Ada Byron (1815–1852), better known as Ada Lovelace, was an English writer and mathematician considered the first computer programmer in history and the creator of the first known algorithm.

However, Alan Turing (1912–1954), a British physicist and mathematician, is regarded as the "father of Artificial Intelligence."²

The brilliant mathematician published the article "*Computing Machinery and Intelligence*" in 1950, in which he introduced the Turing Test. At the beginning of the paper, he poses the now-famous question: "*Can machines think?*"

A key historical milestone was the Dartmouth Conference, held in 1956 and organized by John McCarthy, Marvin Minsky, Nathaniel Rochester, and Claude Shannon. This event is historically significant as it was the first time the term "Artificial Intelligence" was officially used and it laid the groundwork for future research in the field.

AI experienced slow but steady progress starting in the 1950s. A major and paradigm-shifting advancement occurred at the end of 2022, when a revolutionary program was developed by the company OpenAI, introducing a new way of interacting with users through conversation. ChatGPT is,³ in fact, a conversational chatbot powered by artificial intelligence a text generator. The acronym stands for "Generative Pre-Trained Transformer," describing a language model based on deep learning, a branch of AI.

By processing vast amounts of data, the platform utilizes an algorithm based on neural networks. Today, an increasing number of platforms offer similar tools on the market, challenging academia to keep up by conducting well-designed studies to evaluate their quality and usefulness.

AI as a tool to support medical decision-making

Several innovative AI tools have been developed to support medical practice. Studies have shown that the use of these tools not only saves time but also improves diagnostic and therapeutic accuracy, always aiming to achieve excellence in healthcare. An increasing number of platforms have become available on the market, each with its own specific features for example, platforms designed to optimize knowledge bases, build chatbots and assistants, develop generative AI models and applications, simulate human conversation, extract valuable insights from datasets and documents, build, train, validate,

and deploy AI models, create next-generation assistants, automate AI processes, and manage data and analytics deployment.

Specifically in the medical field, numerous platforms are being developed to support all areas of medical practice from daily clinical care and scientific research to administrative processes in healthcare institutions and clinics.

There is no doubt that AI is currently revolutionizing the healthcare sector by improving diagnostics, prognostics, and even the treatment of many medical conditions. Major, high-impact medical journals are now publishing AI-focused content. A notable example is the New England Journal of Medicine AI (NEJM AI),⁴ which launched its first issue in January 2024 with the editorial titled: “*Injecting Artificial Intelligence into Medicine*.”⁴

Ethics, rheumatology, and AI

The literature addressing Ethics and Bioethics in the context of rheumatology practice is relatively scarce.^{3,5,6,7} However, over the past decade, there has been a gradual increase in studies, regulations, and bioethical reflections on the subject. Pioneering this movement, the American College of Rheumatology (ACR) published its *Code of Ethics* in 2017.⁶ Similarly, the Brazilian Society of Rheumatology (SBR) released its own *Code of Ethics* in 2018, aiming to guide ethical actions and procedures for all its members.

At a broader level, the United Nations Educational, Scientific and Cultural Organization (UNESCO),⁸ in 2022, published ethical guidelines for AI systems. These guidelines were grounded in core principles such as transparency and fairness, emphasizing the essential role of human oversight in AI systems. In line with these international efforts, Brazil’s National Academy of Medicine⁹ recently published a Code of Conduct aimed at aligning future ethical actions with the responsible use of AI technologies in healthcare. The rationale for this publication acknowledges the immense potential of AI tools in improving healthcare efficiency and effectiveness. However, it also highlights enduring challenges such as rising care costs, professional burnout, and workforce shortages issues that bring both new hope and significant concern regarding the misuse or inappropriate application of AI.

Internationally recognized Canadian professor Yoshua Bengio, a leading figure in AI ethics, convened a meeting of experts in Montreal, which led to the publication of the Montreal Declaration for a Responsible Development of Artificial Intelligence (2018).¹⁰ This document defined ten core principles to guide the ethical development and use of AI.

Nabi et al.¹¹ have emphasized that although AI development faces major technical challenges, the fundamental principles of bioethics must not be overlooked they must be integrated into the technical development process from the outset.

Along similar lines, in an editorial in *Mayo Clinic Proceedings*, Sher et al.¹² define an algorithm as:

“The current term of choice for a problem-solving procedure, commonly used today to refer to the set of rules that a machine (especially a computer) follows to achieve a specific goal.”

They also highlight critical challenges regarding the preservation of privacy and data confidentiality, calling for strong engagement from the biomedical ethics community to help shape society’s collective awareness. Their goal is to ensure that traditional bioethical standards

are upheld- and that new ethical frameworks, tailored specifically for AI, can be developed if necessary.

Other authors have published studies supporting this same perspective, reinforcing the urgent need to merge technical innovation with ethical responsibility in the age of AI.^{13–15}

Articles discussing the introduction of AI into healthcare practice have increasingly appeared in Bioethics journals.¹⁶ Current literature explores not only the impact of AI on the production of services and workflows but also its potential effects on human relationships.

Tai¹³ points out that the 18th-century Industrial Revolution led to massive social changes without directly affecting interpersonal relationships. In contrast, the current revolution often called the Fourth Industrial Revolution (Industry 4.0)—involves the development of AI, which profoundly influences how we relate to one another. This shift requires ongoing reflection and the formulation of specific bioethical principles tailored to AI. When it comes to rheumatology specifically, studies and references regarding the application of AI in daily practice are still relatively limited.^{17,18}

Seguí-Sabater and Benavente¹⁸ provide detailed guidance on the appropriate use of AI both in research and clinical rheumatology. They emphasize the ethical challenges, the need for rigorous validation, and continuous oversight.

They also highlight the importance of adopting a balanced approach one that optimizes the benefits of AI while minimizing potential drawbacks. This balance is crucial to ensure that technological advances serve the best interests of patients, professionals, and society at large.

Discussion and conclusion

At this current stage in the development of Artificial Intelligence, it seems unthinkable not to acknowledge the countless benefits it brings to human progress particularly in the field of healthcare. However, despite these undeniable advantages, the current moment calls for a necessary pause for reflection, especially through the lens of Bioethics. This reflection can and should guide future actions and the development of algorithms to ensure that the path of innovation remains aligned with ethical principles. The evolution of medical knowledge and specifically in rheumatology, the focus of this study is happening at an unprecedented pace. This rapid advancement deserves careful and critical examination, lest we risk losing sight of the vast technical and ethical knowledge that has been built over centuries in the history of Medicine.

In this context, and from the critical and reflective perspective of Bioethics, it is essential to consider the concept of the “heuristics of fear” by German philosopher Hans Jonas.¹⁹

Jonas defines this as a heuristic method (i.e., a tool for investigation and analysis) for technological ethics, where we must imagine the worst-case scenarios of any given action.

Clearly, the goal is not to prohibit technological advancement. Rather, it is to awaken responsibility and prudence, ensuring that the trajectory of technology does not lead to irreversible harm to humanity or the planet, especially when considering long-term impacts.

Jonas proposes that the development of the heuristics of fear should be guided by three key elements:

- i. Focus on negative prognoses
- ii. Anticipation of possible catastrophes

iii. A call for prudence

He makes it clear that fear should not halt progress, but rather activate ethical awareness, encouraging prudent and responsible innovation. This principle is especially crucial when dealing with transformative technologies like AI, which have the power to reshape not only medicine but the very fabric of human relationships and society.

With regard to the document titled the Montreal Declaration,¹⁰ its principles are fundamental for the ethical development of Artificial Intelligence. These include:

- i. Well-being
- ii. Respect for autonomy
- iii. Protection of privacy and private life
- iv. Solidarity
- v. Democratic participation
- vi. Equity
- vii. Inclusion of diversity
- viii. Prudence
- ix. Responsibility
- x. Sustainable development

In short, the great challenge ahead of us is to implement in the practice both in the development and implementation of AI these theoretical concepts and well-established bioethical frameworks, which are already thoughtfully laid out in our ethical codes.

In conclusion, the attitude of health professionals, particularly rheumatologists, the focus of our analysis, is to avoid feelings of technophobia and technophilia, and to prudently follow Aristotle - virtue in médium est.

Acknowledgements

None.

Conflicts of interest

The author declares that there are no conflicts of interest.

References

1. Marques Filho J, Josef H, Correia Miguel RC. Ethical aspects in rheumatology. In: Vasconcelos JTS. *Book of the Brazilian Society of Rheumatology*. 1st edn. Barueri (SP): Manole, 2019.
2. Turing M. Computing Machinery and Intelligence. *Mind*. 1950;49:433-460.
3. Russell SJ, Norvig P. *Inteligencia artificial: a modern approach*. Second Edition. Pearson Educación, SA, Madrid, 2004.
4. Kohane IS. Injecting artificial intelligence into medicine. *NEJM*. 2024;1(1).
5. Filho JM. Iatrogenesis in the rheumatological practice. *MOJ Orthop Rheumatol*. 2023;15(5):160–162.
6. American College of Rheumatology, Code of Ethics of the American College of Rheumatology, 2017.
7. Code of ethics of Brazilian Society of Rheumatology. *Advances in Rheumatology*.
8. Recommendation on the Ethics of Artificial Intelligence. UNESCO, 2022.
9. National Academies of Medicine. *An Artificial Intelligence Code of Conduct for Health and Medicine: Essential Guidance for Aligned Action*. Washington, DC: The National Academies Press. 2025.
10. Montreal declaration for the responsible development of artificial intelligence. 2018.
11. Nabi J. How bioethics can shape artificial intelligence and machine learning. *Hastings Cent Rep [Internet]*. 2018;48(5):10–13.
12. Sher T, Sharp R, Wright RS. Algorithms and bioethics. *Mayo Clin Proc [Internet]*. 2020;95(5):843–844.
13. Tai MCT. The impact of artificial intelligence on human society and bioethics. *Tzu Chi Med J*. 2020;32(4):339–343.
14. Martinho A, Kroesen M, Chorus C. A healthy debate: exploring the views of medical doctors on the ethics of artificial intelligence. *Artif Intell Med*. 2021;121.
15. Sánchez López JD, Cambil Martín J, Villegas Calvo M, et al. Artificial intelligence and robotics: reflections about the need of a new bioethics framework implementation. *J Healthc Qual Res*. 2021;36(2):113–114.
16. Elias MA, Favarsani LA, Moreira JAV, et al. Artificial intelligence in health and bioethical implications: a systematic review. *Rev Bioética*. 2023;21(3):1–12.
17. Fajardo E, Graf C. Artificial intelligence, transformation of rheumatology? - Part I [Internet]. *Global Rheumatology*. 2022;3.
18. Segui-Sabater JM, Benavent D. Artificial Intelligence in Rheumatology: What is it good for? *RMD Open*. 2025;11(1):e004309.
19. Jonas Hans. *The principle of responsibility. Essay on ethics for technological civilization*. Rio de Janeiro: Contraponto editora, 2006.