The Future Is Now: AI and Health, Where Are We Going?[1]

Associate professor **María Isabel TORRES CAZORLA**[2]

Abstract

DeepMind, the AI company of Google is using new tools that permit to identify changes in human DNA that cause disease. This research explores the connection among Artificial Intelligence and health, taking into account the information provided by Google DeepMind, AlphaFold and AlphaMissense. It seems to be a revolution: combining AI and health. There are many questions to be solved: are there any limits for science – and companies – on this field? Identification of proteins and the possibility of preventing (or why not, reduce or limiting) certain diseases seem to be the objective. There is a list of principles and objectives referred to the use of these techniques of AI described on the Google website. In particular, Google will not pursue, among others, 'technologies that gather or use information for surveillance violating internationally accepted norms' or 'technologies whose purpose contravenes widely accepted principles of international law and human rights'. What are these internationally accepted norms? What are these widely accepted principles of international law and human rights concerning AI and health? So, the debate is open and this research tries to explore some key questions about that issue.

Keywords: *artificial intelligence (AI), Google tools, health, international accepted norms.*

JEL Classification: K33

DOI: 10.62768/TBJ/2025/15/3/06

Please cite this article as:	**Article History**
Torres Cazorla, María Isabel, 'The Future Is Now: AI and Health, Where Are We Going', *Juridical Tribune – Review of Comparative and International Law* 15, no. 3 (October 2025): 525-538.	Received: 10 June 2025 Revised: 27 September 2025 Accepted: 07 October 2025

1. Introduction

The use of technology and, in particular, of some tools based on Artificial Intelligence (AI) is a global challenge nowadays. It is true that the expansion of the use of AI seems to have no limits and the possibilities to apply these technologies have been expanded in a way that the scientific community could not imagine some decades ago[3].

[1] This research has been developed in the field of the Research Project of the Spanish Ministry of Science of Innovation 'Environment, Security and Health: New Challenges of Law in the 21st Century' (PID2021-122143NB-I00).

[2] María Isabel Torres Cazorla – associate professor of public international law, University of Málaga, Spain, mtorres@uma.es, ORCID: 0000-0003-2014-7299.

[3] See Thomas Davenport and Ravi Kalakota, 'The potential for artificial intelligence in healthcare', *Future Healthcare Journal* (2019), volume 6, issue 2, June 2019, pp. 94–98, https://doi.org/10.7861/futurehosp.6-2-94. In the same way, see Barry Solaiman and I. Glenn Cohen, 'A framework for health, AI and the law',

New possibilities of AI tools are discovered every day and, as a consequence of this, lawyers must think about the limits (if they exist) and obligations that international law must establish for States, companies, persons and society as a whole in order to avoid the harmful use of these technologies. Possible abuses, together with the need to preserve human rights, are some aspects to be considered.

This contribution will explore, first of all, some tools developed by one of the leading companies in the AI sector: Google. The perspective adopted by this company in order to improve the use of AI in the field of genomics and the expansion of this sector, together with the application of these technologies will be analysed separately.

In the same way, it is crucial to study the limits (from the perspective of Google and international law) about the use of these technologies in order to prevent abuses. Are these limits clearly fixed? Are there international instruments that promote the necessary balance about the use of advanced technologies in the field of genomics and the respect of human rights?

Some years ago, in 2013, Google acquired an enterprise founded in London (United Kingdom) called DeepMind Technologies. This came to be the AI enterprise of Google and the basis for the development of this technology in the field of genomics, such as we will have the possibility to explore. The most important aspect of these AI tools is the possibility to use this technology in order to prevent diseases, and the revolutionary method is the possibility to make predictions in a fast way.

The websites of these Google tools describe with different slogans the revolution that these AI technologies provide to the scientific community. Merely as examples, we may read the following: '*This will be one of the most important datasets since the mapping of the Human Genome*'[4]. '*What took us months and years to do, AlphaFold was able to do in a weekend*'[5]. '*Millions of researchers around the world are using our AI system AlphaFold to accelerate progress in biology*[6]'.

Of course, this is a work in progress, with a fast evolution. One of the last steps is AlphaMissense, such as research published in *Science* described on its conclusions: '*Its predictions may illuminate the molecular effects of variants of protein function, contribute to the identification of pathogenic missense mutations and previously unknown disease-causing genes, and increase the diagnostic yield of rare genetic diseases*'[7].

There are many questions to be solved: are there any limits for science – and companies – on this field? Identification of proteins and the possibility of preventing (or why not, reduce or limiting) certain diseases seem to be the objective.

There is a list of principles and objectives referred to the use of these techniques

---

in *Research Handbook on Health, AI and the Law*, edited by Barry Solaiman and I. Glenn Cohen, 2024, Elgar Online, pp. 1–19, https://doi.org/10.4337/9781802205657.ch01.

[4] See 'DeepMind used to create the most complete database of predicted 3D protein structures', *Advanced Science News,* July 22, 2021, accessed 8 August 2025, https://www.advancedsciencenews.com/deepmind-used-to-create-the-most-complete-database-of-predicted-3d-protein-structures/.

[5] Accessed 8 August 2025, https://deepmind.google/science/alphafold/.

[6] Accessed 8 August 2025, https://deepmind.google/science/alphafold/.

[7] Jun Cheng, Guido Novati, Joshua Pan (*et al.*), "Accurate proteome-wide missense variant effect prediction with AlphaMissense", *Science* (19 September 2023), vol. 381, n. 6664, DOI: 10.1126/science.adg7492.

of AI described on the Google website[8]. In particular, Google will not pursue, among others, 'technologies that gather or use information for surveillance violating internationally accepted norms'[9] or 'technologies whose purpose contravenes widely accepted principles of international law and human rights'[10].

But what are these internationally accepted norms? What are these widely accepted principles of international law and human rights concerning AI and genomics? Google affirms on its website that 'as our experience in this space deepens, this list may evolve'. So, the debate is opened, and the evolution of this principle is real. The possibility of identifying disease genes using Artificial Intelligence (in particular the aforementioned tools) and the limits of science on this field is under debate. These are some of the questions that will be discussed on this article.

2. Artificial Intelligence and Health: Google DeepMind, AlphaFold and AlphaMissense

Some years ago, the debate was opened when information concerning the AI's health tools for skin conditions was covered by the media. It was a tool launched by Google that will assist 'users in self-diagnosing issues ranging from acne to melanoma'[11]. At the very beginning, the dilemma among the use of this tool by experts or society as a whole was a key aspect. The debate about the 'democratisation' of these tools and the possibility for individuals to study their skin and promoting self-diagnosing is a real – not irrelevant issue – .

The opinion of Google was nuanced: it was not intended to provide a diagnosis, but to give access for the public to information. This way, users may have an instrument to know what to do. It was conceived as a tool. The last word must be said by the dermatologist, but the public may gain access to information that may be useful for making a decision. For example, it is a classical problem that having access to dermatologists is not easy on the health system. The users of these tools may obtain information and if they see that the opinion of an expert is necessary, they will go further. The problem comes when the information is not sufficient, prediction is not easy to be done; it is not right or may have fatal consequences on certain circumstances. These are aspects to be taken into account[12].

Another dimension in the use of these digital tools is the voluntary donation of

[8] See 'Our AI Principles', accessed 8 August 2025, https://ai.google/responsibility/principles/.

[9] This information was published by a CEO of the company on 7 June 2018. Accessed 8 August 2025, https://blog.google/technology/ai/ai-principles/.

[10] See this information on the same website, accessed 8 August 2025, https://blog.google/technology/ai/ai-principles/.

[11] See 'Google launches AI health tool for skin conditions', *Financial Times*, 18 May 2021, accessed 8 August 2025, https://www.ft.com/content/6d4cd446-2243-43f4-befd-565b4e880811.

[12] See Maria Giavina-Bianchi, 'Should we be guinea pigs for Google's artificial intelligence app?', *International Journal of Dermatology* (2022), vol. 61, issue 7, e252-e253, https://doi.org/10.1111/ijd.15976. On the relationship among doctors and patients and the role of AI, see Aurelia Sauerbrei, Angeliki Kerasidou, Federica Lucivero *et al.*, 'The impact of artificial intelligence on the person-centred, doctor-patient relationship: some problems and solutions', *BMC Medical Informatics and Decision Making* (2023), 23: 73, https://doi.org/10.1186/s12911-023-02162-y.

data by users. In the specific case of applications designed for the diagnosis and monitoring of dermatological conditions, Google has explicitly emphasized that algorithms are only as good as the data with which they have been trained, thereby encouraging patients to contribute personal data in order to enhance model performance[13]. The strategy is part of a broader process of consolidating digital health infrastructure, in which the volume and diversity of data are essential prerequisites for achieving relevant and reproducible clinical outcomes. However, the ethical and legal issues surrounding informed consent, privacy protection, and the secondary use of data remain highly topical. Recent literature highlights the tensions between the collective benefit generated by training algorithms on large datasets and the individual rights of patients, particularly in the context of European data protection regulations (GDPR)[14]. In parallel, the need for responsible governance of artificial intelligence in healthcare is becoming increasingly evident, one that integrates both the principles of biomedical ethics and the standards of algorithmic transparency. Thus, although Google's declared mission is to support scientific progress through the provision and integration of data, the sustainability of this initiative directly depends on the development of normative and institutional frameworks capable of ensuring a balance between innovation and the protection of fundamental rights.

What has been the process of the development of AI instruments on health issues that Google has improved in recent times? In particular, Google DeepMind[15] brings together two of the world's leading AI labs – Google Brain[16] and DeepMind – into a single team (2023). Over the last decade, the two teams were responsible for some of the biggest research breakthroughs in AI.

The revolution of AI use is going on: AlphaFold, as an example, is a relevant tool for science and biology, in particular[17]. It provides open access to over 200 million protein structure predictions to accelerate scientific research. It has been developed by Google DeepMind with the objective of predicting the protein's 3D structure from its amino acid sequence. This has been considered a revolutionary tool by the scientific community. The comments of Victoria HATCH are very optimistic in this sense: '*The availability of AlphaFold DB, a huge resource of protein structures, can perhaps be compared to the release, two decades ago, of the entire human genome sequence in the public domain, which has resulted in substantial advances in biomedical research, including in new unforeseen directions. The availability of structure models for most*

[13] Olsen, Quita, Amalie Dyda, Leanna Woods, Elton Lobo, Rebekah Eden, Michelle A. Krahe, Bernadette Richards, Nalini Pather, Lesley McGee, Clair Sullivan, and Jason D. Pole. 2025. 'Worldwide Willingness to Share Health Data High but Privacy, Consent and Transparency Paramount, a Meta-Analysis.' *npj Digital Medicine* 8: 540. https://doi.org/10.1038/s41746-025-01868-9.

[14] Morley, Jessica, Caio C. V. Machado, Christopher Burr, Josh Cowls, Indra Joshi, Mariarosaria Taddeo, and Luciano Floridi. 2020. 'The Ethics of AI in Health Care: A Mapping Review.' *Social Science & Medicine* 260 (September): 113,172. https://doi.org/10.1016/j.socscimed.2020.113172. Also see Mittelstadt, Brent. 2019. 'Principles Alone Cannot Guarantee Ethical AI.' *Nature Machine Intelligence* 1: 501–507. https://doi.org/10.1038/s42256-019-0114-4.

[15] See https://deepmind.google/, accessed 9 August 2025.

[16] See https://research.google.com/teams/brain/, accessed 9 August 2025.

[17] See the video 'AI as a tool for Science', in https://www.youtube.com/watch?v=70E7Q_g-eiU, accessed 11 August 2025.

individual proteins similarly constitutes a step change in biology with a potentially massive impact. The models will provide new insights and understanding of fundamental processes related to health and disease, with applications in biotechnology, medicine, agriculture, food science and bioengineering. It will probably take one or two decades until the full impact of this development (scientific, medical and economic) can be properly assessed'[18].

But this is not the end. This is the beginning of this revolutionary instrument for scientists. In the opinion of Tunyasuvunakool *et al.*: '*Although we present several case studies to illustrate the types of insights that may be gained from these data, we recognise that there is still much more to uncover*'[19].

The system must be improved, but the limitations of it are less important than the benefits, considering the progress that the scientific community may obtain in the near future. The position of some scholars is clear about this: 'By developing an accurate protein structure prediction algorithm, coupled with existing large and well-curated structure and sequence databases assembled by the experimental community, we hope to accelerate the advancement of structural bioinformatics that can keep pace with the genomics revolution. We hope that AlphaFold – and computational approaches that apply its techniques for other biophysical problems – will become essential tools of modern biology'[20].

One of the main aspects of these technologies, using AI tools, is the possibility to accelerate progress in biology, together with stopping diseases and designing vaccines to prevent them. Stopping malaria is a key example for the use of this technique[21] and, in the same way, the prevention of osteoporosis[22]. Understanding the faulty proteins linked to cancer and autism is another use of AlphaFold, in the opinion of the scientific community[23].

Genetic mutations are another aspect covered by these Google tools of AI. This is the case of AlphaMissense, based on the aforementioned AlphaFold, and presented by Google DeepMind in 2018[24]. It is the same with AlphaMissense[25].

---

[18] See Victoria Hatch, 'Great expectations – the potential impacts of AlphaFold DB', https://www.ebi.ac.uk/about/news/perspectives/alphafold-potential-impacts/, accessed 11 August 2025. Emphasis added.

[19] See Kathryn Tunyasuvunakool, *et al.,* 'Highly accurate protein structure prediction for the human proteome', *Nature,* vol. 596 (26 August 2021), pp. 590–596, on p. 595, https://doi.org/10.1038/s41586-021-03828-1.

[20] See John Jumper *et al.,* 'Highly accurate protein structure prediction with AlphaFold', *Nature,* vol. 596 (15 July 2021), pp. 583–589, on pp. 588–589, https://doi.org/10.1038/s41586-021-03819-2.

[21] See 'Stopping malaria in its tracks', 13 October 2022, https://deepmind.google/discover/blog/stopping-malaria-in-its-tracks/, accessed 12 August 2025.

[22] See 'Fighting osteoporosis before it starts', 27 September 2022, https://deepmind.google/discover/blog/fighting-osteoporosis-before-it-starts, accessed 12 August 2025.

[23] See the information provided the 22 September 2022 on https://deepmind.google/discover/blog/understanding-the-faulty-proteins-linked-to-cancer-and-autism/, accessed 12 August 2025.

[24] See https://www.euronews.com/health/2023/09/21/whats-alphamissense-this-new-google-deepmind-tool-analyses-genetic-mutations, accessed 12 August 2025.

[25] See 'A catalogue of genetic mutations to help pinpoint the cause of diseases', in https://deepmind.google/discover/blog/a-catalogue-of-genetic-mutations-to-help-pinpoint-the-cause-of-diseases/, accessed 13 August 2025.

3. AI and Health: Are There Any Limits?

There is no doubt about the positive use of these AI tools and the development for biology promoted by them. The benefits for the scientific community – and for society as a whole – are nameless and unlimited. But, as lawyers, we must confront its benefits with the eventual risks to the public and the limits that science (and data) have. These are the aspects that will be analysed. AI is a tool (a very useful tool, of course) that try to help the scientific community to obtain results. These technologies may be helpful for certain pathologies (rare diseases) and for obtaining predictions in record time.

The use of artificial intelligence is something relatively new and one of the most important issues to be considered is that the obtained results must not substitute the labour of professionals. This aspect is crucial. If the use of some applications is expanded to the global public (such as the example aforementioned about skin diseases), this must not be an excuse to substitute the labour of experts on this field. On the contrary, this will be a risk for the health of patients, instead of a useful tool.

One of the main aspects of these tools, taking into account that they use millions of data, coming from different sources, is the anonymization of these data. This must be one of the most relevant limits to be considered and promoted.

The feeling of the observers of the use of these technologies is that we are at the beginning of this process and the predictive effectiveness of these technologies must be proved in the near future, together with the application of them in different sectors. Of these sectors, the field of health is one of the most problematic, due to the consequences derived from the use of these AI technologies on this area. But the expansion of AI in other fields, such as biotechnology, medicine, agriculture, food science and bioengineering, merely as examples, is almost unlimited.

When these technologies began to be expanded, some years ago, Google published some Objectives and Principles concerning the use of AI. There was a long list of them, such as the following[26]:

a) be socially beneficial
b) avoid creating or reinforcing unfair bias
c) be built and tested for safety
d) be accountable to people
e) incorporate privacy design principles
f) uphold high standards of scientific excellence
g) be made available for uses that accord with these principles

The content of that website has been changed, and the list of principles has been substantially reduced. But the idea of 'responsibility' or responsible use of AI by Google seems to be a key aspect to be taken into account. There is an AI responsibility

[26] This information was available on https://ai.google/responsibility/principles/. It was the information provided in 2024, accessed 4 September 2024. The content of this website now, accessed 15 August 2025, available at https://ai.google/responsibility/principles/, is substantially different. There were three principles: bold innovation, responsible development and deployment and collaborative progress, together.

report published since 2019 (the last one of February 2025[27]), available on the website. Information to the public about a responsible use of AI seems to be a relevant issue for Google, too[28].

It is also the case of limits on the use of AI. Last year, the Google website informed the public that: '*Google applications will not pursue: 1. Technologies that are likely to cause overall harm. Where there is a material risk of harm, we will proceed only where we believe that the benefits substantially outweigh the risks, and will incorporate appropriate safety constraints. 2. Weapons or other technologies whose principal purpose or implementation is to cause or directly facilitate injury to people; 3. Technologies that gather or use information for surveillance violating internationally accepted norms. 4. Technologies whose purpose contravenes widely accepted principles of international law and human rights. As our experience in this space deepens, this list may evolve*'[29].

One of these paragraphs concerned '*widely accepted principles of international law and human rights*'. The questions that we may formulate, as lawyers, are logical: What are these principles? We will try to focus our attention on them separately.

4. The Debate Is Open but the Future Is Now

The development of AI on different areas[30] is something real, and nobody may stop this revolution. But there is a challenge – it is common when a new area is expanded – concerning the ethical and legal limits of these techniques, in particular in a domain such as health and genetics. This challenge concerns the development of AI in different domains, where business responsibility and human rights are some spheres particularly sensitive. The launch of ChatGPT in 2022 and DeepSeek in 2025 are two main aspects of this revolution. Such as Popa Tache and Vâlcu have pointed out: '*Traditional international legal instruments have been slow to adapt and have lagged behind these technological developments, leaving a scission in the governance of corporate responsibility. In the absence of binding international rules, corporate liability for AI-related human rights abuses regulated by national laws is often insufficient or difficult to enforce in cross-border situations*'[31].

---

[27] See https://ai.google/static/documents/ai-responsibility-update-published-february-2025.pdf, accessed 15 August 2025. All the reports are available at https://ai.google/responsibility/principles/, accessed 15 August 2025.

[28] See the list of publications contained in https://research.google/pubs/?&category=responsible-ai/?utm_source=ai.google&utm_medium=referral about 'Open Research and Responsible AI', accessed 15 August 2025, and https://blog.google/technology/ai/?utm_source=ai.google&utm_medium=referral, accessed 15 August 2025.

[29] This information was available in Google website https://ai.google/responsibility/principles/, in September 2024. Accessed 4 September 2024.

[30] Military use is one of these fields where AI is essential; see Daniel Terrón Santos, 'Artificial intelligence and biometric systems for military use: redefining artificial intelligence from an ethical and legal perspective', *Journal of the Spanish Institute for Stategic Studies* (2024), 24, pp. 509–529, https://revista.ieee.es/article/view/6871/9059.

[31] See Cristina Elena Popa Tache and Elise Nicoleta Vâlcu, 'Artificial Intelligence and Corporate Liability Towards a New Legal-Ethical Contract in the Dynamics of Emerging Global Human Rights

It is true that '*there is an extremely exciting journey ahead*'[32], using the expression of Hannah FRY on this open debate; and we must examine the steps provided by International Organizations, trying to fix some ethical guidelines or principles on the use of AI for health reasons. The attention will be focused, firstly, on general and universal organisations, and secondly on the regional sphere, in order to see how these ideas are evolving, in order to promote a responsible use of AI in health issues.

4.1. The World Health Organisation Perspective

Concerning health – a crucial point of this paper – the perspective adopted by the World Health Organization (WHO) must be mentioned. This specialised agency of the United Nations is studying the connection among AI and health in order to regulate and determine some ethical guidelines for the development of these techniques. There is a clear concern about these issues by the WHO[33].

There are six WHO consensus ethical principles for the use of AI for health: 1) protect autonomy; 2) promote human well-being, human safety and the public interest; 3) ensure transparency, explainability and intelligibility; 4) foster responsibility and accountability; 5) ensure inclusiveness and equity and 6) promote responsive and sustainable AI[34].

It is necessary to promote a responsible AI for Health purposes. The WHO-Director General, Tedros Adhanom Ghebreyesus, has a realistic vision, saying that '*AI is already playing a role in diagnosis and clinical care, drug development, disease surveillance, outbreak response, and health systems management…the future of healthcare is digital, and we must do what we can to promote universal access to these innovations and prevent them from becoming another driver for inequity*'[35].

The need to extend the use of AI for the international community as a whole, in a responsible and sustainable way, seems to be one of the main aspects considered by the WHO. This revolution is here and the expansion of it is unavoidable. So, we must accept this reality and trying to promote – and cooperation among all the actors involved is essential – a use of these technologies with the necessary safeguards.

Convergences', *Juridical Tribune-Review of Comparative and International Law*, vol. 15, issue 2, June 2025, pp. 281–305, on p. 282, DOI: 10.62768/TBJ/2025/15/2/04, https://www.tribunajuridica.eu/arhiva/y15v2/4.pdf.

[32] See the podcast 'AI and neuroscience: The virtuous circle', in https://deepmind.google/discover/the-podcast/ai-and-neuroscience-the-virtuous-circle/, accessed 15 August 2025.

[33] See 'Artificial Intelligence for Health. Supporting countries to deploy responsible AI technologies to accelerate equitable health for all', in https://www.who.int/publications/m/item/artificial-intelligence-for-health, accessed 15 August 2025.

[34] See the document 'Ethics and governance of artificial intelligence for health: guidance on large multimodal models', 2024, in https://iris.who.int/handle/10665/375579, accessed 15 August 2025.

[35] See https://www.who.int/teams/digital-health-and-innovation/harnessing-artificial-intelligence-for-health, accessed 16 August 2025.

4.2. The United Nations Educational, Scientific and Cultural Organisation (UNESCO) Vision

The idea of equity is reflected in another document of the United Nations (UN) system. For example, in the field of UNESCO, a recent report concludes that '*AI has the potential to redefine medicine, making it more precise, proactive, and patient-centred. However, its success depends on equitable policies, ethical deployment, and a commitment to inclusive healthcare systems. As policymakers, researchers, and healthcare leaders, we must ensure that AI-driven advancements are harnessed to empower individuals and build a healthier, more equitable world*'[36].

UNESCO has promoted the need to fix some principles concerning the use of AI. In particular, the Recommendation on the Ethics of Artificial Intelligence (adopted 23 November 2021) must be mentioned[37]. The Recommendation balances the positive aspects of AI and the challenges in the use of these technologies, in order to enhance cooperation and an ethical use of them. In particular, health and social well-being are one of the main areas that states must take into account. Following this recommendation: '*Member States should endeavour to employ effective AI systems for improving human health and protecting the right to life, including mitigating disease outbreaks, while building and maintaining international solidarity to tackle global health risks and uncertainties, and ensure that their deployment of AI systems in health care be consistent with international law and their human rights law obligations*'[38].

Some aspects of this recommendation have been criticised by the doctrine; although this text has been considered a milestone, García San José considers: '*the restrictive nature of the concept of human dignity used in this instrument for not protecting against the risks of using systems of artificial intelligence (AI) in human embryonic experimentation through synthetic wombs*'[39].

4.3. AI and the Organisation for Economic Co-operation and Development (OECD)

One of the priorities of the OECD is AI and the uses of these technologies[40]. There is a Policy Observatory on these issues and, in particular, one of the main priorities is AI and Health[41]. A working paper published on January 2024 examines 'Collective action for responsible AI in health'[42], considering the Recommendation

[36] See Michio Tamatani, 'Harnessing AI for the future of healthcare: advancing equity, precision and personalized treatment', in https://en.unesco.org/inclusivepolicylab/e-teams/harnessing-ai-future-healthcare/discussions/harnessing-ai-future-healthcare-advancing-equity, accessed 16 August 2025, p. 3.
[37] See https://unesdoc.unesco.org/ark:/48223/pf0000381137, accessed 16 August 2025.
[38] See https://unesdoc.unesco.org/ark:/48223/pf0000381137, accessed 16 August 2025, p. 37, parr. 121.
[39] See Daniel I. García San José, "International Law against the risks of Artificial Intelligence (AI) in human embryonic research", *Cuadernos de Derecho Transnacional* (October 2022), vol. 14, n.2, pp. 512-532, https://doi.org/10.20318/cdt.202 2.7193.
[40] See https://www.oecd.org/en/topics/artificial-intelligence.html, accessed 16 August 2025.
[41] See https://oecd.ai/en/site/health, accessed 16 August 2025.
[42] See https://www.oecd.org/content/dam/oecd/en/publications/reports/2024/01/collective-action-for-resp

adopted in 2019 by the OECD[43].

4.4. The European Union as a Leading Regulating Actor

The need to regulate data protection[44] and many issues related to technology and human rights have been objectives of the EU for decades. This is not the place to analyse the regulations, directives and rules adopted on this regional area about this field. The last step on this area is Artificial Intelligence Regulation[45]. The word 'health' is repeated 78 times throughout the regulation text. But what is the role played by these rules in a world where technological enterprises follow their own direction in order to promote and advance AI with a minimum of soft rules? There is a contradiction among the need to regulate – for safety and security reasons – in the field of the EU when we are playing in the 'universal area', where the USA and China are the leaders of the improvement of these technologies[46]. The EU needs to leader and to promote the right to health, together with a responsible policy that must take into account recent developments on AI. This is possible: the EU has shown its potential on difficult times. The way to solve many problems related to the COVID-19 pandemic is a good example to remember[47].

There are also many other areas[48] where the EU tried to focus its attention for

onsible-ai-in-health_9a65136f/f2050177-en.pdf, accessed 16 August 2025.

[43] Available in the same document, https://www.oecd.org/content/dam/oecd/en/publications/reports/2024/01/collective-action-for-responsible-ai-in-health_9a65136f/f2050177-en.pdf, accessed 16 August 2025, p. 12.

[44] On this issue, see Ayça Zorluoğlu Yilmaz, 'Joint Controllership under the GDPR-Concept, Responsibility and Liability', *Juridical Tribune-Review of Comparative and International Law*, n.1 (March 2025), pp. 93–107.

[45] See Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonised rules on artificial intelligence and amending regulations (EC) No 300/2008, (EU) No 167/2013, (EU) No 168/2013, (EU) 2018/858, (EU) 2018/1139 and (EU) 2019/2144 and Directives 2014/90/EU, (EU) 2016/797 and (EU) 2020/1828 (Artificial Intelligence Act), *OJ L* 2024/1689, 12.7.2024. The main issues of the regulation of this sector in the EU, may be explored at https://digital-strategy.ec.europa.eu/en/policies/european-approach-artificial-intelligence, accessed 19 August 2025. The debate about the content of this Regulation and the extraterritorial effect of some aspects of it has been discussed, among others, by Aurelio López-Tarruella Martínez, 'The Future Regulation of Artificial Intelligence and Relations with Third States', *Revista Electrónica de Estudios Internacionales* (2023), núm. 45, June 2023, https://reei.tirant.com/reei/article/view/2257/2155, DOI: 10.17103/reei.45.04.

[46] The EU will continue to face a dilemma about the need to protect human rights and data in order to regulate AI and the so called 'AI Cold war' among USA and China. On this issue, see Richard Heeks and Yujia He, 'Analising the US-China "AI Cold War" Narrative', *Manchester Center for Digital Development Working Paper* 110, 2024.

[47] See Stefania Negri, 'The European Union as a Global Health Actor: Challenges and Opportunities', *The Journal of Law, Medicine & Ethics* (2024), Tome 52, n. 3, Fall 2024, pp. 755–758, DOI: 10.1017/jme.2024.146.

[48] One example of this is the field of substances of human origin, and the adoption of a new Regulation (2024/1938) on this area. See Xavier Pons Rafols, "The Regulation of Therapeutic Use of Substances of Human Origin (SoHO) in European Union Law: New Developments and Main Legal Aspects", *Revista de Derecho Comunitario Europeo* (2025), núm. 81, pp. 89–131, https://recyt.fecyt.es/index.php/RDCE/article/view/114800/84536, accessed 16 August 2025, https://doi.org/10.18042/cepc/rdce.81.03. In the same way, the need to regulate the use for genetic resources and the sharing of benefits arising from their

therapeutic reasons. The need to balance the safe use of technologies[49] with the development of them is one of the main aspects to be discussed. And the perspectives on this topic are confronted with the fast evolution of this sector and the uses of AI technologies in almost all the domains. The EU may be conscious of this fact; on the contrary, we will find an 'island of excess of regulation ', in a world without rules. We must be cautious, because the position of the EU is extremely delicate on this side.

This question has been carefully analysed by different institutions; it is very interesting the document 'Artificial Intelligence in healthcare. Applications, risks and ethical and societal impacts'[50]. One of the main issues to be improved is to get a strategy for AI development across EU States, following this report. It is important for the EU in order to have one voice in the international environment. If it is not the case, the position of the EU will decline, but technology, on the contrary, will be improved by those that have the possibility of doing that.

4.5. The Council of Europe and AI

On 5 September 2024, it was adopted in Vilnius, the Council of Europe Framework Convention on Artificial Intelligence and Human Rights, Democracy and the Rule of Law[51]. It is a flexible instrument, trying to expand certain principles to participant States (not only the members of the Council of Europe) in order to 'ensure that activities within the lifecycle of artificial intelligence systems are fully consistent with human rights, democracy and the rule of law, while being conducive to technological progress and innovation'. It is soon to evaluate the effects of this Framework Convention, but the positive aspect to be noted is that some States such as Canada and the USA, together with the EU, have signed the treaty since it has been opened for signature. There are some principles mentioned on it that must be respected. They remember us some guidelines and ideas pointed out by AI technological giants and the aforementioned international instruments. Fundamental principles such as human dignity and individual autonomy, equality and non-discrimination, respect for

use is another key question. See https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/14822-Use-of-genetic-resources-and-the-sharing-of-benefits-arising-from-their-use-evaluation-of-EU-rules_en, accessed 19 August 2025. Concerning genetics, see José Sánchez Hernández, 'New Genetics and Gen-IA, *the status processualis civis IA*?', *Ius et Scientia* (2025), vol. 11, n.1, pp. 250–277, https://dx.doi.org/10.12795/IESTSCIENTIA.2025.i01.12.

[49] The need to create a 'safe' online environment in the EU is not new. See María Isabel Torres Cazorla, « Ensuring a safe an accountable online environment: the need for the "Digital Services Act" and its historical basis », *Revue des affaires européennes* (2023), n. 3, pp. 617-624.

[50] See the document submitted by Karim Lekadir, Gianluca Quaglio, Anna Tselioudis Garmendia and Catherine Gallin, Study Panel for the Future of Science and Technology. EPRS (European Parliament Research Service), June 2022, https://www.europarl.europa.eu/RegData/etudes/STUD/2022/729512/EPRS_STU (2022)729512_EN.pdf, accessed 20 August 2025.

[51] See the Framework Convention, its Explanatory Report and the status of signatures and ratifications at https://www.coe.int/en/web/artificial-intelligence/the-framework-convention-on-artificial-intelligence.
This instrument is opened for signature 'by the member States of the Council of Europe, the non-member States which have participated in its elaboration and the European Union' (article 30.1 of the Framework Convention).

privacy and personal data protection, transparency and oversight, accountability and responsibility, reliability and safe innovation are crucial. There is a long way to run on this field, for a safe digital environment, aspiring to a minimum standard regulation of AI on this area.

5. Conclusions

The advances in the field of AI and the use of these technologies will be unstoppable. It is a revolution for all and in all sectors. Health is one of these areas where this revolution has shown positive and negative aspects. It is necessary to focus our attention in human beings[52] and the possibilities that these technologies may have in the near future, and ethical considerations must be taken into account, too. The need to cooperate (in the global sphere, among institutions and also putting together AI and human intelligence) is the great challenge of the 21st century[53].

For many years, technological companies have improved this area, and the connection of AI and health has shown potential that nobody could imagine[54]; the potentiality of these advancements remains to be seen. Many possibilities in order to regulate -or try to do that – AI have been explored. On this article some of them have been mentioned -in particular, the field of treaties and soft law, and, being realistic, the combination of all of them will be useful to advance on this path. Doctrine has explored many options, with pros and cons[55]. Some principles seem to be the option adopted by technological giants, as well as International Organizations that have assumed the responsibility of analysing this field seriously.

The advance of science and the use of these emerging technologies may be positive for human beings. This is one side of the coin. On the other hand, duties and the need to consider humans must be balanced. Following the idea promoted by Yotova, 'a good-faith interpretation of the human right to benefit from science and its applications'[56] is welcome.

---

[52] See You Chen *et al.,* 'Human-Centered Design to Address Biases in Artificial Intelligence', *Journal of Medical Internet Research* (2023), vol. 25, doi:10.2196/43251; and also, José Manuel Sánchez Patrón, 'The Legal Regulation of Biomedical Research applied to human beings: between the possible and the incongruent', *Ius et Scientia* (2024), vol. 10, n. 1, pp. 31–51, https://dx.doi.org/10.12795/IESTSCIENTIA.2024.i01.02.

[53] See Eric J. Topol, 'High-performance medicine: the convergence of human and artificial intelligence', *Nature Medicine* (2019), 25, pp. 44–56, https://doi.org/10.1038/s41591-018-0300-7.

[54] See Simona Fanni, 'Artificial Intelligence and the digital human body: in search of the *habeas data*', *Ius et Scientia* (2020), vol. 6, n. 2, pp. 200–224, https://dx.doi.org/10.12795/IETSCIENTIA.2020.i02.13.

[55] It is very illustrative the position of Daniel I. García San José, 'Legal and Bioethical Implications of Artificial Intelligence (AI). Special consideration of the International Regulatory Framework », *Cuadernos de Derecho Transnacional* (marzo 2021), vol. 13, n.1, pp. 255-276, DOI: https://doi.org/10.20318/cdt.2021.5959.

[56] See Rumiana Yotova, 'Anticipatory duties under the human right to science and international biomedical law', *The International Journal of Human Rights* (2024), vol. 28, n. 3, pp. 397–415, on p. 410, https://doi.org/10.1080/13642987.2023.2273289.

Bibliography

1. García San José, Daniel I. "International Law against the Risks of Artificial Intelligence (AI) in Human Embryonic Research.' *Cuadernos de Derecho Transnacional* 14, no. 2 (October 2022): 512–532. https://doi.org/10.20318/cdt.2022.7193.
2. Chen, You, et al. 'Human-Centered Design to Address Biases in Artificial Intelligence.' *Journal of Medical Internet Research* 25 (2023). https://doi.org/10.2196/43251.
3. Cheng, Jun, Guido Novati, Joshua Pan, et al. 'Accurate Proteome-Wide Missense Variant Effect Prediction with AlphaMissense.' *Science* 381, no. 6664 (September 19, 2023). https://doi.org/10.1126/science.adg7492.
4. Davenport, Thomas, and Ravi Kalakota. 'The Potential for Artificial Intelligence in Healthcare.' *Future Healthcare Journal* 6, no. 2 (June 2019): 94–98. https://doi.org/10.7861/futurehosp.6-2-94.
5. Fanni, Simona. 'Artificial Intelligence and the Digital Human Body: In Search of the Habeas Data.' *Ius et Scientia* 6, no. 2 (2020): 200–224. https://dx.doi.org/10.12795/IETSCIENTIA.2020.i02.13.
6. García San José, Daniel I. "Legal and Bioethical Implications of Artificial Intelligence (AI): Special Consideration of the International Regulatory Framework." *Cuadernos de Derecho Transnacional* 13, no. 1 (March 2021): 255–276. https://doi.org/10.20318/cdt.2021.5959.
7. Giavina-Bianchi, Maria. 'Should We Be Guinea Pigs for Google's Artificial Intelligence App?' *International Journal of Dermatology* 61, no. 7 (2022): e252–e253. https://doi.org/10.1111/ijd.15976.
8. Hatch, Victoria. 'Great Expectations – The Potential Impacts of AlphaFold DB.' European Bioinformatics Institute, August 11, 2025. https://www.ebi.ac.uk/about/news/perspectives/alphafold-potential-impacts/.
9. Heeks, Richard, and Yujia He. 'Analysing the US-China "AI Cold War" Narrative.' Manchester Centre for Digital Development, Working Paper 110, 2024.
10. Jumper, John, et al. 'Highly Accurate Protein Structure Prediction with AlphaFold.' *Nature* 596 (July 15, 2021): 583–589. https://doi.org/10.1038/s41586-021-03819-2.
11. Lekadir, Karim, Gianluca Quaglio, Anna Tselioudis Garmendia, and Catherine Gallin. 'Artificial Intelligence in Healthcare: Applications, Risks and Ethical and Societal Impacts.' Study Panel for the Future of Science and Technology, European Parliament Research Service, June 2022. https://www.europarl.europa.eu/RegData/etudes/STUD/2022/729512/EPRS_STU (2022)729512_EN.pdf.
12. López-Tarruella Martínez, Aurelio. 'The Future Regulation of Artificial Intelligence and Relations with Third States.' *Revista Electrónica de Estudios Internacionales* 45 (June 2023). https://doi.org/10.17103/reei.45.04.
13. Mittelstadt, Brent. 'Principles Alone Cannot Guarantee Ethical AI.' *Nature Machine Intelligence* 1 (2019): 501–507. https://doi.org/10.1038/s42256-019-0114-4.
14. Morley, Jessica, Caio C. V. Machado, Christopher Burr, Josh Cowls, Indra Joshi, Mariarosaria Taddeo, and Luciano Floridi. 'The Ethics of AI in Health Care: A Mapping Review.' *Social Science & Medicine* 260 (September 2020): 113172. https://doi.org/10.1016/j.socscimed.2020.113172.
15. Negri, Stefania. 'The European Union as a Global Health Actor: Challenges and Opportunities.' *The Journal of Law, Medicine & Ethics* 52, no. 3 (Fall 2024): 755–758. https://doi.org/10.1017/jme.2024.146.
16. Olsen, Quita, Amalie Dyda, Leanna Woods, Elton Lobo, Rebekah Eden, Michelle A.

Krahe, Bernadette Richards, Nalini Pather, Lesley McGee, Clair Sullivan, and Jason D. Pole. 'Worldwide Willingness to Share Health Data High but Privacy, Consent and Transparency Paramount, a Meta-Analysis.' *npj Digital Medicine* 8 (2025): 540. https://doi.org/10.1038/s41746-025-01868-9.

17. Pons Rafols, Xavier. 'The Regulation of Therapeutic Use of Substances of Human Origin (SoHO) in European Union Law: New Developments and Main Legal Aspects.' *Revista de Derecho Comunitario Europeo* 81 (2025): 89–131. https://doi.org/10.18042/cepc/rdce.81.03.
18. Popa Tache, Cristina Elena, and Elise Nicoleta Vâlcu. 'Artificial Intelligence and Corporate Liability: Towards a New Legal-Ethical Contract in the Dynamics of Emerging Global Human Rights Convergences.' *Juridical Tribune – Review of Comparative and International Law* 15, no. 2 (June 2025): 281–305. https://doi.org/10.62768/TBJ/2025/15/2/04.
19. Sánchez Hernández, José. 'New Genetics and Gen-IA: The Status Processualis Civis IA?' *Ius et Scientia* 11, no. 1 (2025): 250–277. https://dx.doi.org/10.12795/IESTSCIENTIA.2025.i01.12.
20. Sánchez Patrón, José Manuel. 'The Legal Regulation of Biomedical Research Applied to Human Beings: Between the Possible and the Incongruent.' *Ius et Scientia* 10, no. 1 (2024): 31–51. https://dx.doi.org/10.12795/IESTSCIENTIA.2024.i01.02.
21. Sauerbrei, Aurelia, Angeliki Kerasidou, Federica Lucivero, et al. "The Impact of Artificial Intelligence on the Person-Centered, Doctor-Patient Relationship: Some Problems and Solutions." *BMC Medical Informatics and Decision Making* 23 (2023): 73. https://doi.org/10.1186/s12911-023-02162-y.
22. Solaiman, Barry, and I. Glenn Cohen. 'A Framework for Health, AI and the Law.' In *Research Handbook on Health, AI and the Law*, edited by Barry Solaiman and I. Glenn Cohen, 1–19. Cheltenham: Edward Elgar Publishing, 2024. https://doi.org/10.4337/9781802205657.ch01.
23. Terrón Santos, Daniel. 'Artificial Intelligence and Biometric Systems for Military Use: Redefining Artificial Intelligence from an Ethical and Legal Perspective.' *Journal of the Spanish Institute for Strategic Studies* 24 (2024): 509–529. https://revista.ieee.es/article/view/6871/9059.
24. Topol, Eric J. "High-Performance Medicine: The Convergence of Human and Artificial Intelligence." *Nature Medicine* 25 (2019): 44–56. https://doi.org/10.1038/s41591-018-0300-7.
25. Torres Cazorla, María Isabel. 'Ensuring a Safe and Accountable Online Environment: The Need for the "Digital Services Act" and Its Historical Basis.' *Revue des affaires européennes* 3 (2023): 617–624.
26. Tunyasuvunakool, Kathryn, et al. 'Highly Accurate Protein Structure Prediction for the Human Proteome.' *Nature* 596 (August 26, 2021): 590–596. https://doi.org/10.1038/s41586-021-03828-1.
27. Yotova, Rumiana. 'Anticipatory Duties under the Human Right to Science and International Biomedical Law.' *The International Journal of Human Rights* 28, no. 3 (2024): 397–415. https://doi.org/10.1080/13642987.2023.2273289.
28. Zorluoğlu Yilmaz, Ayça. 'Joint Controllership under the GDPR: Concept, Responsibility and Liability.' *Juridical Tribune – Review of Comparative and International Law* 15, no. 1 (March 2025): 93–107.