

Tele-doctors? Navigating the Future of Healthcare: Advantages and Risks of AI-Enhanced Telemedicine*

Carlo Casonato

(Full Professor of Comparative Constitutional Law and Jean Monnet Chair on EU Law of AI (T4F) at University of Trento)

ABSTRACT The article explores the benefits and drawbacks of AI-supported telemedicine tools. Utilizing a case study as a focal point, it evaluates their implications on patient rights, the physician's role, and the broader landscape of medical practice

1. Introduction

According to the latest literature, the term “telemedicine” was first used in 1971 by a Boston doctor who had established a “microwave link” to remotely connect an urgent care clinic to the emergency department of the Massachusetts General Hospital.¹ Preceded by a decade-long experience with less sophisticated devices such as the telephone, this technology quickly spread. Following a series of technical improvements, it gained support from the US Department of Health.²

As early as the 1950s, projects were underway to condense disease characteristics into computer-processable information (bits) to assist doctors in decoding and interpreting a vast amount of otherwise overwhelming data. The motto of the time was encapsulated in phrases like “Electronic medical journals, electronic diagnostic machines, electronic medical records,” with the risk that doctors

might become mere “Push-Button Physicians”.³ Even during those years, the advantages of this novel approach were highlighted, emphasizing its liberation from distances, speed, and comprehensive analysis. However, certain limitations were identified from the outset, leading the director of the National Library of Medicine to assert, in 1964, that the new devices were “a new instrument of the research library, not a replacement”.⁴

Following a period of progress slowdown in the field of “electronic medicine,” which roughly corresponded to the so-called “winter of artificial intelligence,” funding in the sector was limited. However, with the advent of the new millennium, the extraordinary computational power of modern computers and emerging technologies (machine learning, neural networks, etc.) enabled the rapid processing of massive amounts of data, including health-related data that every individual leaves behind throughout their life. With a surge in sector investments, Artificial Intelligence (AI) became the technology with the fastest rate of adoption in medicine, unlocking significant advantages while also harboring notable risks.

In this short article, I will address some of the many issues related to the use of AI in medicine.

2. GP at Hand

The impact of the Covid experience and the subsequent erosion and depersonalization of many relationships have brought to the forefront the strengths and vulnerabilities

* Article submitted to double-blind peer review.

The article is a revised and updated version of the piece published in Italian *Telemedicina. Vantaggi e rischi della telemedicina assistita da intelligenza artificiale*, in E. Rigo (a cura di), *Per una ragione artificiale. In dialogo con Lorenzo d'Avack su Costituzione, ordine giuridico e biodiritto*, RomaTre Press, 2023, 219-227. Some of the presented points are part of the activities of the NextGenerationEU project (FAIR - Future AI Research - PE000013) co-funded by the European Union, and the national funded project *Medicine+ (AI, Law and Ethics for an Augmented and Human-Centered Medicine - PRIN 2022)*. The views and opinions expressed are solely mine and do not necessarily reflect those of the European Union or the European Commission. Neither the European Union nor the European Commission can be held responsible for them.

¹ J.A. Greene, *The Doctor Who Wasn't There*, Chicago, The University of Chicago Press, 2022, 3.

² R.L. Bashshur and G.W. Shannon, *History of Telemedicine. Evolution, Context, and Transformation*, Mary Ann Liebert Inc., 2010.

³ J.A. Greene, *The Doctor Who Wasn't There*, 181.

⁴ *Ibidem*, 187.

inherent in remote healthcare delivery.⁵ A compelling case that exemplifies the advantages and pitfalls of integrating AI into the realm of patient care relationships is *GP at Hand* by Babylon — a sophisticated “intelligent medical assistance” system already operational in select regions across the UK, the US, and Africa. This system, taken over by US company eMed after the financial difficulties encountered by Babylon Health,⁶ empowers participating General Practitioners (GPs) to swiftly and accurately generate diagnoses, prognoses, and treatment pathways for patients who opt for this mode of healthcare. To comprehensively assess the potentials and ambiguities of this service, I will propose an analytical framework that commences with a short exposition of the mentioned application (GP at Hand) and subsequently delves into its potential ramifications for patients, medical professionals, and the broader field of healthcare.

GP at Hand stands as part of a strategic initiative embraced by the British government and others, aimed at broadening access to high-quality primary care through the integration of digital technologies. One key facet of this initiative is the access to an online video consultation service, facilitated by an app developed by Babylon Health — a private enterprise affiliated with the National Health Service (NHS) now substituted by eMed.⁷ Individuals electing to register for this service embark on an initial phase of automated consultation, after which they can decide whether to activate a video consultation with a doctor. The app extends its accessibility around the clock (24/7), ensuring that a remote consultation with a physician can be secured within an average timeframe of four hours. In scenarios where this mode of consultation fails to meet expectations, patients retain the option to schedule a conventional in-person visit with a physician affiliated with the NHS, adhering to standard

protocols and waiting periods.⁸

One of the key features of the service is that the remote examining physicians are assisted by an AI mechanism, which allows them to access the patient’s medical history and their digital twin. Based on this data and the course of the dialogue, the system offers real-time suggestions for questions to be posed to the patient. This helps to clarify potential causes of the reported discomfort, make a diagnosis, provide a prognosis, and propose a treatment plan during the “visit”. Furthermore, a facial recognition system is employed to detect the patient’s emotional states (such as confusion, boredom, or concern), thereby guiding the physician in employing the most suitable communication strategies for conducting a precise and effective interview. The dialogue is automatically transcribed and recorded, remaining within the company archive and accessible to the patient.

This model presents both potentials and uncertainties, which, as previously mentioned, can be examined from the standpoint of their impact on the patient, the physician, and the field of healthcare as a whole.

3. The patient

First, the advantages for the patient are evident, particularly in terms of the speed of consultation. This is due to the operational mode of the provided service (24/7) and the opportunity to secure a video consultation within a few hours. Secondly, the AI system’s ability to correlate the patient’s medical history with insights gathered during the conversation, coupled with statistically probable outcomes derived from extensive databases, enables the formulation and suggestion of diagnoses, prognoses, and treatment proposals with a high degree of accuracy. Thirdly, concerning the patient-care relationship, facial recognition brings the advantage of assisting the physician in understanding the patient’s reactions, thereby facilitating the adjustment of communication methods and overall comprehensibility.

However, this system also carries a set of inherent risks. For instance, it’s widely acknowledged that AI systems incorporate and generate significant errors and biases.⁹

⁵ See National Academy of Medicine, *Toward Equitable Innovation in Health and Medicine: A Framework*, Washington, DC, The National Academies Press, 2023.

⁶ See E. Mahase, Babylon looks to sell GP at Hand and other UK business amid financial issues, in *BMJ*, 2023, 382; S. Trendal, New owner of remote NHS GP service pledges no disruption or staff cuts after Babylon bankruptcy, in *Health and Social Care, News*, Oct 4, 2023.

⁷ Cfr. www.england.nhs.uk/london/our-work/gp-at-hand-fact-sheet/#:~:text=Babylon%20GP%20at%20Hand%20is,point%20of%20use%20for%20patients.

⁸ T. Burki, GP at hand: a digital revolution for health care provision?, in *The Lancet*, 2019, 394, 457.

⁹ M. Burges and N. Kobie, The messy, cautionary tale

These problems stem from both the human factor in constructing the system and selecting training datasets, as well as from algorithmic results and their respective interpretations. A second problem pertains to the non-equivalence between an audio-video connection (guided by an AI system) and an in-person medical visit.¹⁰ In this sense, the app could contribute to a dehumanization of the doctor-patient relationship, where both parties content themselves with interacting solely with a virtual component. A third layer of concern is tied to the requirement that patients using *GP at Hand* possess strong digital skills. This element leads to a selective effect on individuals engaging with the system, which transcends the digital divide and impacts age and consequently the general health condition of patients, as well as their socioeconomic background and corresponding income.¹¹ This condition thus risks generating a potentially discriminatory effect based on both users' age and social status.¹²

4. The physician

The advantages and challenges of the examined application can also be assessed in relation to the physician utilizing it. On a positive note, this system allows the healthcare professional to choose their available time slots. The 24/7 mode, in fact, offers considerable flexibility in defining one's work hours, eliminating the need to adhere to standard schedules. However, it's worth noting that this flexibility is underpinned by the demand-to-supply logic.

of how Babylon disrupted the NHS, in *Wired*, 18 March 2019 (www.wired.co.uk/article/babylon-health-nhs). In general, see: D.A. Vyas et al., Hidden in Plain Sight — Reconsidering the Use of Race Correction in Clinical Algorithms, in *New England Journal of Medicine*, 2020, 874-882; A. Bracic et al., Exclusion cycles: Reinforcing disparities in medicine, in *Science*, 2022, 6611, 1158-1160.

¹⁰ K.E. Karches, The Moral Difference between Faces & Face Time, in *The Hastings Center Report*, 4/2023, 16-25.

¹¹ 94% of individuals who turned to GP at Hand are under the age of 45, and two-thirds of them come from affluent residential areas: T. Burki, *GP at hand: a digital revolution for health care provision?*, cit. 458; M. Burges and N. Kobie, *The messy, cautionary tale of how Babylon disrupted the NHS*, cit.

¹² L. d'Avack, *La rivoluzione tecnologica e la nuova era digitale: problemi etici*, in U. Ruffolo (dir.), *Intelligenza artificiale. Il diritto, i diritti, l'etica*, Giuffrè, 2020, 21 mentions the need for the opportunities of new technologies to be inclusive of as many citizens as possible regardless of their social status, income class, geographical location and other similar factors.

Some doctors might, in reality, find themselves compelled to work inconvenient hours. Among the benefits for the professional, it's worth also mentioning that *GP at Hand* provides the opportunity to perform their duties wherever a sufficiently strong network exists, minimizing unnecessary travel and enabling them to set up their "office" in any location.

Conversely, considering the aforementioned characteristics of the population segment that typically turns to the app in question (young individuals with higher income), *GP at Hand* could also have a discriminatory impact in reference to the medical field. Professionals participating in this initiative might end up treating wealthier and younger individuals (who statistically have better health conditions), leaving "traditional" colleagues to handle patients with more complex and demanding medical needs. Such a trend could be counterproductive for the doctors themselves who participate in the remote service: accustomed to dealing with the easier population segment, they might risk gradually losing their ability to address more serious and complex health issues, undergoing an overall process of de-skilling.

In a similar light, there's a risk that physicians, supported by the AI system in their activities, could fall into a routine where clinical decisions are effectively delegated to the machine. In an era of widespread, albeit mistaken, perception of technology as neutral, objective, and infallible, the *GP at Hand* doctor might find it more comfortable and prudent to not contest the algorithmic outcome, avoiding potentially risky personal responsibility.¹³ The threat, in essence, lies in the substantial capture of clinical decision-making by AI,¹⁴ potentially generating a new model of defensive medicine.

On the other hand, in a broader context, some observers believe that the use of AI in medicine encourages physicians to reclaim a central role in the doctor-patient relationship.

¹³ "The collective medical mind is becoming the combination of published literature and the data captured in health care systems, as opposed to individual clinical experience", according to D.S. Char, N.H. Shah and D. Magnus, *Implementing Machine Learning in Health Care – Addressing Ethical Challenges*, in *The New England Journal of Medicine*, 2018, 378(11), 981.

¹⁴ A. Simoncini, L'algoritmo incostituzionale: intelligenza artificiale e il futuro delle libertà, in *BioLaw Journal – Rivista di BioDiritto*, no. 1, 2019, 69.

This allows for delegating less crucial tasks to machines while concentrating on activities where a human element is essential.¹⁵ In these terms, the app could free healthcare professionals from the routine aspects of visits, enabling them to dedicate more time to complex cases and to revive the interpersonal dimension of their profession. Conversely, other commentators have analyzed historically established trends regarding medical workloads, identifying that the reduction in tasks does not necessarily correspond to an increase in time allocated to the remaining tasks but often results in a higher number of services to be delivered.¹⁶

5. Medical practice

The considerations discussed so far introduce the changes that the use of AI, as exemplified by *GP at Hand*, could bring about in medical practice. Among the numerous advantages, the following can be highlighted: the potential to re-organize healthcare services in a more flexible and effective manner, promptly and competently addressing the growing demand for health; assisting general practitioners (but not limited to them) in arriving at swift and accurate diagnoses and treatment paths; providing an opportunity to restore a central role for physicians in the care relationship; and the ability to structure a sustainable, patient-oriented approach to medicine. On a global scale, furthermore, the use of AI can be highly effective, especially in reference to middle- to low-income countries, where the ailing population would otherwise have no access to medical care.¹⁷

Alongside these opportunities, the use of AI in medicine does, however, raise a series of questions and doubts. First, the risk of potential atrophy in face-to-face visits (de-skilling) has surfaced, with the danger of an overall dehumanization of healthcare that could transform it into a sort of sophisticated

“call center”. Additionally, the provision of the app by private companies such as Babylon or eMed might drive the marginalization of the public dimension in a sector where economic and financial interests prevailing over those related to collective health cannot be ruled out. There’s a potential risk, for example, that algorithms programmed according to criteria oriented towards commercial speculation rather than the enhancement of public health could foster increased consumption of (specific) drugs, thereby elevating healthcare expenditure. Instead of promoting, for instance, strategies related to change in lifestyles. Concerning the overall economic sustainability of *GP at Hand*, it has also been observed that the ease of accessing video consultations could lead to an increase in demand (supply-induced demand).¹⁸

Furthermore, when referring to more sophisticated AI techniques such as machine learning, it becomes practically impossible to trace the internal steps and underlying logic adopted by the machine to reach the output. While the final outcome of the process is known, the sequence that generated it remains obscure due to the inherent opacity of the internal dynamics of the system.¹⁹ This phenomenon, the black box problem, holds particular significance in the medical field as well. It hinders the examination and potential adjustment of individual internal phases of the procedure and compromises the ability to scrutinize the congruence of the reasoning behind the decision. In the absence of transparency, there arises a strong doubt whether clinical decisions can truly enjoy full legitimacy and comprehensive recognition from patients.

Another potentially critical impact of employing *GP at Hand* on medicine pertains to its validation. As medical devices, these apps might follow well-defined paths of clinical trial. However, specific characteristics of these devices warrant special attention. In particular, mechanisms based on machine learning have the ability to adapt their functioning based on experience. Therefore, even if a device had initially been granted authorization for use, one must question how long such approval remains valid when the

¹⁵ E. Topol, *Deep Medicine: How Artificial Intelligence Can Make Healthcare Human Again*, New York, Basic Books, 2019.

¹⁶ R. Sparrow and J. Hatherley, High Hopes for “Deep Medicine”? AI, Economics, and the Future of Care, in *The Hastings Center Reports*, 2020, 50, no. 1, 14-17.

¹⁷ Babylon has announced its intention to extend the operation of the app to eleven Asian countries in addition to the United States. In Rwanda, also thanks to a grant from the Bill & Melinda Gates Foundation, the system is used by about two million people, at a one-off price of 20 cents. See T. Burki, *GP at hand: a digital revolution for health care provision?*, *supra*, 460.

¹⁸ *Ibidem*, 459-60.

¹⁹ See F. Pasquale, *The Black Box Society*, Cambridge MA, Harvard University Press, 2016.

device itself has autonomously modified its operations.²⁰

In more general terms, moreover, the question has been raised whether AI devices employed in the medical field should not be evaluated in light of a far broader spectrum of interests beyond their mere technical efficacy and security. As exemplified by *GP at Hand* itself, the utilization of such devices yields an impact that extends well beyond the therapeutic benefit of an individual service for a single patient. It engulfs a plethora of collective dimensions and variables spanning social, legal, professional, and economic realms. What warrants concern, therefore, is not only the potential harm to individual users (physicians or patients), but also the overarching models of medicine (and society) that the dissemination of these tools inherently carries.

6. Concluding remarks

What has been argued so far certainly does not lead to rejecting new AI technologies in the medical field. Instead, it urges us to reflect on the necessary precautions to avert risks and harness benefits.

First and foremost, it is imperative to prevent algorithm-assisted medicine from exacerbating existing social and economic vulnerabilities rather than addressing them. Effective tools must also be devised to ensure that professionals working with AI do not lose their familiarity with the principles underpinning human relationships, countering the trend of de-skilling that has emerged in the execution of other tasks. The economic and financial aspects involved must also be carefully evaluated to maintain a balanced system between the public and private domains.

Moreover, there is a crucial need to invest in educational and awareness initiatives aimed at both the general population and healthcare professionals. On the societal front, this approach will raise awareness about the potential benefits as well as the critical aspects of AI, preventing, for example, the generation of illusions about the infallibility of algorithmic medicine or the realization of risks associated with automation bias. On the professional side, it is important to strengthen

interdisciplinary training paths, ensuring that physicians are not tempted to delegate their role to machines. To give a concrete and safeguarding meaning to the principle of “Human in the Loop” it’s not enough to merely include humans in the process of forming medical decisions. Instead, these individuals must possess basic computer skills to interpret algorithmic decisions and have the authority and willingness to play a role of effective oversight in the diagnostic and treatment journey.²¹ Otherwise, there’s a risk that AI-linked medicine, even within the realm of current defensive medicine trends, might reinforce a hazardous process of medical de-humanization and de-responsibilization.

Returning to introductory reflections dedicated to the human element that must characterize law, ethics, and medicine, it can be concluded by emphasizing the necessity of “defending human specificity in relation to machines”.²² This recognition comes with the awareness that “science and technology alone will never be able to deliver a more just and equitable society”.²³

²⁰ In this respect, the European regulation (AI act) proposes monitoring throughout the life cycle of the system.

²¹ In this regard, Art. 14 of the AI act, in the version amended by the EU Parliament, provide for the following: “High-risk AI systems shall be designed and developed in such a way (...) that they be effectively overseen by natural persons as proportionate to the risks associated with those systems. Natural persons in charge of ensuring human oversight shall have sufficient level of AI literacy in accordance with Article 4b and the necessary support and authority to exercise that function...”.

²² L. d’Avack, *La rivoluzione tecnologica e la nuova era digitale. Problemi etici*, in U. Ruffolo (a cura di), *Intelligenza artificiale. Il diritto, i diritti, l’etica*, Giuffrè, 2020, 25.

²³ V. Rampton, *Where telemedicine always falls short*, in *Science*, 2022, 378, 6619, 480.

