Artificial intelligence in healthcare
– Implications and recommendations for action

Joint reflection by Sandoz Germany and Flying Health

Executive Summary

Artificial intelligence will permanently change healthcare - hopefully for the better. AI-based applications promise great potential in the context of prevention, diagnostics, therapy, and follow-up care. To leverage this potential, all stakeholders need to consider early on what implications AI will have for the system, but also for them specifically.

For *patients*, AI should primarily lead to improved care, in which they can participate more actively and more powerfully. At the same time, however, this requires their active cooperation in generating and providing the necessary health data.

For *physicians*, the main opportunity lies within understanding and leveraging AI applications as support in their daily work. Capacities that are freed up by the practitioners' use of AI can be invested in more intensive care of patients and the development of new skills needed to leverage AI's full potential.

From an *industry* perspective, AI means both support and new challenges in the context of research and development. Efficiency gains in the conduct of clinical trials are offset by increased complexity in the production of increasingly personalized therapies. Building the analytical capacity and capabilities required for optimal use of AI technologies will therefore become crucial for the industry.

The role of *payers* in the context of AI is primarily that of enablers. With the help of payment incentives and additional information offerings, they can accompany both patients and physicians on the path to AI-supported care. At the same time, AI also offers payers the potential to realize efficiencies, close gaps in care, and thus contribute to a better, more efficient, and - in perspective - more resource-saving healthcare system.

AI is here to stay – even or especially in healthcare

The development and use of artificial intelligence (AI) technologies has increased significantly in recent years. Writing texts, creating photos, designing art - all this is now possible with the help of AI applications and is based on the ability to analyze large amounts of data and to recognize patterns quickly and accurately. In healthcare, AI is expected to hold enormous potential for improved research, diagnosis, and treatment, but also in prevention of diseases[1].

The areas of application and use cases for AI solutions in healthcare are diverse (Figure 1). Initial examples include faster identification of study participants, improved diagnosis of tumor diseases or data-based simulation models – also known as digital twins – as well as systems that optimize operating room procedures.[2]

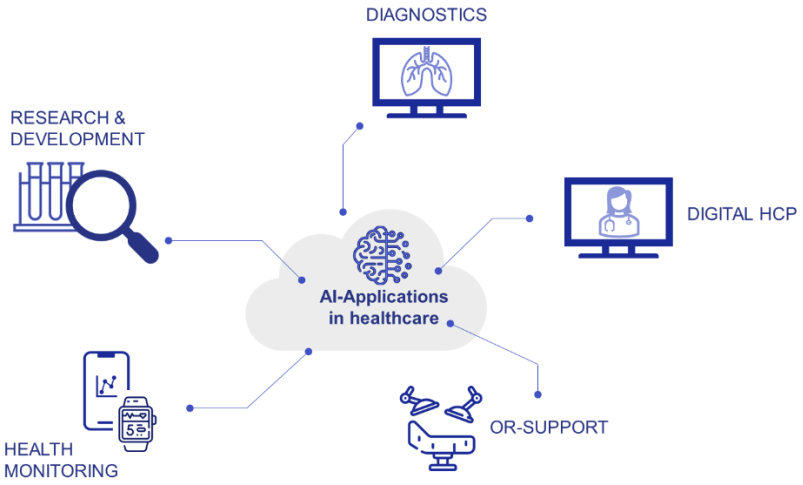

Fig. 1: Selected areas of application for AI solutions in healthcare (Illustration Flying Health).

The use of AI still poses challenges for many players

In addition to the potential of AI solutions, however, the challenges associated with their use are also a large part of the public debate. Challenges are seen above all in the context of regulation and remuneration of AI applications: Time savings and cost reductions due to early diagnosis or treatment must be rewarded in the remuneration system. Transparent and innovation-friendly regulations are necessary to ensure competitiveness in the context of AI applications at home and abroad[3-5].

Further skepticism is repeatedly voiced when it comes to security, data protection and ethics in the use of AI. The reliability of AI applications depends to a large extent on the quality and quantity of the data that is available for AI development[6,7]. Inadequate structures for data collection, storage, and transmission, however, lead to an insufficient data basis in many areas of the German health care system[8,9].

In many cases, skepticism towards AI solutions can be attributed to a lack of information. Numerous stakeholders do not feel sufficiently trained in dealing with AI applications[6]. Above all, uncertainty exists when it comes to the question how AI will affect structures, processes, and responsibilities in healthcare.

It will be important for all stakeholders to deal with AI and its implications early on to be able to leverage its full potential

The implications of AI in healthcare are as diverse as its use cases. In the following, we would like to reflect on what we consider to be the most important implications and discuss recommendations how to optimally adapt to them.

AI promotes and demands empowered patients

AI solutions are meant to make care better and more efficient. For *patients*, this will hopefully translate into to higher cure rates and an improved quality of life. This should be achieved by parallel developments made possible with the help of AI-based applications – e.g., personalized prevention approaches, more precise early detection and diagnostics, more targeted therapy selection through AI-based decision support, and improved monitoring.

Simultaneously, AI applications can help *patients* to play a more active role in shaping their own health. AI-based symptom checkers or at-home tests, for example, make it possible to transfer diagnostics, therapy, or follow-up care to the patients' homes. That way, patients can participate more actively in their own care.

However, to benefit from AI, *patients* also need to make an active contribution. This primarily involves the generation and anonymized provision of their health data for the (further) development of AI applications – for example, by adherently using wearables to record relevant health parameters and sharing this data with their attending physicians and the scientific community.

AI solutions offer support for the care providers

From the *physicians'* perspective, AI primarily offers opportunities for more effective and efficient prevention, diagnosis, and therapy (selection). AI-based CT scans can often identify tumors faster and more accurately than the human eye. AI technologies that analyze symptoms and provide treatment recommendations, in turn, allow other care providers such as pharmacists or medical assistants to be more involved in diagnosis and treatment. The capacities saved can be invested in more intensive care of patients with complex diagnoses.

To enable *healthcare providers* to use AI correctly, additional education is needed. The correct use of AI, its added value, but also its limitations must become an essential part of medical education and training. Corresponding offers should be actively demanded by *healthcare providers* and mandated by law.

Physicians, as well as training and further education institutes, should also adapt to changing role requirements due to AI. AI will not replace practitioners, but collaboration between physicians and AI will become more and more important to provide patients with the best possible treatment. Evaluating and interpreting AI applications will therefore quickly become crucial skills for p*hysicians* in addition to their clinical expertise.

AI can help the industry develop individualized therapy offerings

For the (pharmaceutical) *industry*, the changes outlined above primarily have implications in research and development. On the one hand, clinical studies can be set up, conducted, and evaluated more quickly and in a more targeted manner with the help of AI. On the other hand, AI will raise the bar in drug development by driving the personalization of care. As a result of the latter, (drug) therapies will be more precisely tailored to individual patients and manufacturing complexity will increase.

AI also has implications for marketing and sales. Prescribing dynamics will change when AI-based systems increasingly support physicians in therapy and medication selection. Targeting the right physicians at the right time with the right content will be crucial for the *industry* to generate added value.

The *industry* must therefore adapt its strategies, processes, and products at an early stage to the changes that AI will bring to healthcare. It will be essential to build up the necessary analytical capacities and skills to be able to make optimal use of the database generated by and for AI. To ensure that the required transformation processes do not peter out, a clear commitment on the part of corporate management to investing in AI needs is needed.

Payers can set the course for AI-based care

Increased use of AI and the data it generates also have implications for *payers*. On the one hand, they offer the opportunity to identify and address gaps in care more quickly – for example, with the help of AI-based predictive models. On the other hand, there is growing pressure for more data-based policyholder management: In times of increasingly personalized care, individuals also expect more personalized offerings from their insurers.

Payers also have a key role to play when it comes to setting the course for the use of AI in healthcare. Prevention and early detection, for example, will only be intensified if they are incentivized accordingly. The same applies to the use of freed-up capacities among healthcare providers: If these are to be used for more intensive care of individual patients and not for increasing the number of patients, this must be incentivized by appropriate remuneration structures.

Finally, *payers* are also needed when it comes to informing and educating patients. As health guides, they could accompany the insured on the way to new care models and thus differentiate themselves from competitors.

Artificial intelligence will change healthcare as we know it today. It will therefore be important for all stakeholders to address the developments that AI is expected to bring at an early stage. This requires additional information offerings. Education can reduce existing skepticism about the increased use of AI and instead, help to fully exploit the potential of AI applications. This way, all stakeholders can be accompanied on the path to better and more efficient healthcare – with and thanks to AI.

Date of publication: November 2023

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