SYNDESIS HEALTH

The AI and Data-driven Future of Healthcare

A Syndesis Health White Paper

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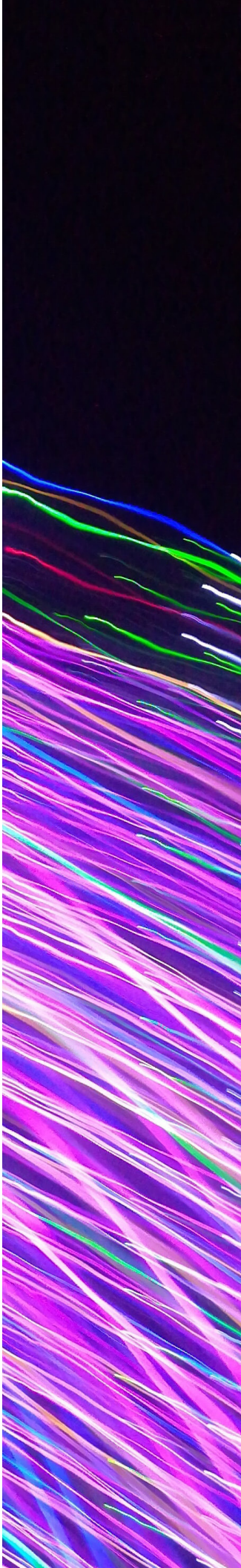

Introduction

The size of the global healthcare sector continues to grow at an unprecedented rate. It's estimated that global spending on healthcare grew approximately 40% between 2018-2022, approaching a record $12 trillion (USD) in 2022.[1]

In line with this economic growth, the size of healthcare data has grown exponentially during the same period, representing approximately 30% of today's worldwide total data volume. Some estimates expect that share to reach 36% by 2025.[2] This growth has been fueled by several technological factors, including increased healthcare digitization, usage of telehealth, and wearables, and reduced costs associated with data rich medical services, such as whole genome sequencing ("WGS") and pharmacogenomic ("PGx") testing.

In addition to increased healthcare spending and availability of data, improvements in artificial intelligence ("AI") capabilities have increased greatly in recent years. The combination of these three factors is leading to several positive trends in healthcare, such as better diagnostic accuracy and predictive analytics capabilities (e.g., disease outbreak forecasts). A prime example of these trends is the development of personalized treatment plans – otherwise known as precision medicine. The ability to aggregate data from both clinical patient journeys and genomic sequencing combined with the application of AI-driven tools is enabling a future where the delivery of patient care has the potential to be more personalized. The tailoring of disease treatment and prevention will not only benefit individuals but has the potential to improve population health outcomes significantly.

Although the potential benefits of a healthcare future driven by data and AI seem obvious, the challenge lies in doing so in a value-based way (i.e., both cost-effective and high quality). This paper discusses some of the factors pushing healthcare and life sciences towards a value-based, AI and data-driven future, the challenges the industry is facing in achieving the potential of that future, and how some of those challenges may be addressed in a value-based way.

[1] World Economic Forum. (n.d.). World Health Day: 8 trends shaping global healthcare. [online] Available at: https://www.weforum.org/agenda/2023/04/world-health-day-healthcare-trends/

[2] www.rbccm.com. (n.d.). The healthcare data explosion. [online] Available at: https://www.rbccm.com/en/gib/healthcare/episode/the_healthcare_data_explosion

A Data-driven Future for Healthcare

There are several forces combining to drive healthcare and life sciences toward a data-driven, AI-enabled future:

A global desire for personalized care

With the power of AI and access to data, solutions to improve patient outcomes through precision medicine are viable for the individual and can be scaled for widespread adoption. Implicit in this focus is the recognition that one size does not fit all. Diverse populations require diverse options for care, but those options must be economically sustainable.

The need to reduce the cost of care delivery

If current trends in healthcare spending continue, that growth will be unsustainable in the long-term. Containing and reducing the cost of care, particularly in aging populations around the world, is a prime driver for both healthcare providers and payors to adopt new innovations.

A push toward more efficient care delivery

The desire to do things more inexpensively is driving a push towards efficient delivery of care. In this regard, healthcare payors and providers are adopting value-based care in a bid to drive efficiencies across the healthcare business cycle that reduce costs. In value-based healthcare systems, medical reimbursement is driven by quality vs. quantity of care.

The need to support providers in healthcare delivery

The state of healthcare delivery is conflicted. Those choosing to pursue careers in healthcare are largely motivated by the desire to improve patient health outcomes but are often required to expend a great deal of energy on administrative tasks that are peripheral to that central goal. These conflicting requirements lead to a stressful environment reducing the effectiveness and quality of experience for healthcare providers.[3]

Achieving these objectives has been formulated into the "Quadruple Aim" for healthcare – summarized as improved patient experience, lower cost of care, better patient health outcomes, and improved staff experience.[4]

[3] Arnetz, B.B., Goetz, C.M., Arnetz, J.E., Sudan, S., vanSchagen, J., Piersma, K. and Reyelts, F. (2020). Enhancing healthcare efficiency to achieve the quadruple aim: An exploratory study. BMC Research Notes, 13(1). doi: https://doi.org/10.1186/s13104-020-05199-8.

[4] Bodenheimer, T. and Sinsky, C. (2014). From Triple to Quadruple Aim: Care of the Patient Requires Care of the Provider. The Annals of Family Medicine, 12(6), pp.573–576. doi: https://doi.org/10.1370/afm.1713.

Quadruple Aim

From the outset, there is a seeming contradiction in the Quadruple Aim model: striving to achieve quality improvement while improving efficiency at reduced cost.[5] Typically, the former would require increased capital investment while the latter is focused on cost cutting, service reductions, and requiring more productivity from existing resources despite potential negative consequences to both people and systems.

The Quadruple Aim neatly frames both the potential benefits and the challenges the healthcare industry faces in realizing a data and AI-driven future. There are no set metrics or outcomes prescribed by the Quadruple Aim. Healthcare organizations can use the general principles to establish their own objectives, how best to achieve them, and what metrics will be used to measure progress. Generally, the primary focus has been improving the quality of patient lives (via better health outcomes) at both the individual level and for whole populations, but the need to control and ultimately lower costs dominates the attention of administrators at healthcare providers.

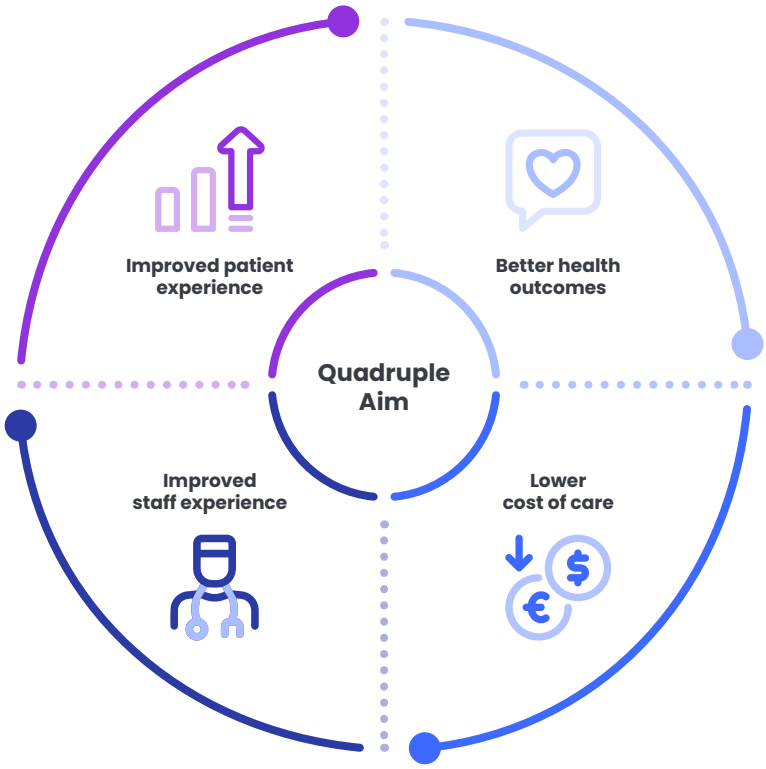

Figure 1. Quadruple Aim components

> Given these factors, legacy technology tools have proven inadequate to managing the challenges posed by the Quadruple Aim. Access to special purpose AI tools and quality medical data will be critical for realizing the potentially contradictory goals. AI tools provide the means to analyze and deliver insights on improving quality for both patients and healthcare providers (at reduced cost), while access to high quality, relevant data provides the raw fuel required to do so. In this way, AI and data become the key enablers for healthcare institutions to take a value-based approach to improving health outcomes while controlling and reducing costs.

[5] Arnetz, B.B., Goetz, C.M., Arnetz, J.E., Sudan, S., vanSchagen, J., Piersma, K. and Reyelts, F. (2020). Enhancing healthcare efficiency to achieve the quadruple aim: An exploratory study. BMC Research Notes, 13(1). doi: https://doi.org/10.1186/s13104-020-05199-8.

Improving Health Outcomes

Healthcare systems (especially in the US) are shifting from "evidence-based medicine" towards "value-based medicine" practices, whereby more emphasis is placed on the value received from an intervention. It is estimated that as much as $1 trillion of US healthcare spend is currently wasted.[6] Healthcare systems are experimenting with numerous ways to address this issue while improving patient outcomes, but most of them rely on adopting a value-based approach to medicine in some way. Value-based medicine is:

> *...the practice of medicine emphasizing the value received from an intervention. Value is measured by objectively quantifying:*
>
> 1. *the improvement in quality of life and/or*
> 2. *the improvement in length of life conferred by an intervention.*[7]

Value-based medicine is an extension of evidence-based medicine and incorporates the latter's best features by "... incorporating quality of life perceptions of patients with a disease in concerning the value of an intervention."[8]

Figure 2. Elements of a value-based healthcare system

Figure 2 represents the six major elements required in a truly value-based healthcare system according to the Institute for Strategy and Competitiveness at the Harvard Business School.[9] Several of the elements are either explicitly tied to support from information technology (i.e., points four and six), or implicitly dependent on systems to support those activities at scale (i.e., points one through three). Given this dependence on systems, there is also a direct dependence on the data stored in them.

[6] Shrank WH, Rogstad TL, Parekh N.(2019), Waste in the US Health Care System: Estimated Costs and Potential for Savings. JAMA. 2019;322(15):1501–1509. doi: 10.1001/jama.2019.13978

[7] Brown, G.C., Brown, M.M. and Sharma, S. (2003). Value-based medicine: Evidence-based medicine and beyond. Ocular Immunology and Inflammation, 11(3), pp.157–170. doi: https://doi.org/10.1076/ocii.11.3.157.17355

[8] Brown, G.C., Brown, M.M. and Sharma, S. (2003). Value-based medicine: Evidence-based medicine and beyond. Ocular Immunology and Inflammation, 11(3), pp.157–170. doi: https://doi.org/10.1076/ocii.11.3.157.17355

[9] Porter, M. (2019). Value-Based Health Care - Institute For Strategy And Competitiveness - Harvard Business School. [online] Hbs.edu. Available at: https://www.isc.hbs.edu/health-care/value-based-health-care/Pages/default.aspx

AI-based solutions are beginning to demonstrate their effectiveness for handling more of the burden, more efficiently, than legacy systems alone.

Most healthcare institutions still depend on legacy IT systems to organize, measure, and align their efforts with a value-based approach. This is a laborious, time intensive process since information related to patient demographics, diagnosis, procedures, medications, lab results, and imaging are often kept in separate source systems. Exacerbating this situation are the numerous modalities of the captured data, and the reality that a great deal of it is kept in unstructured vs. structured formats (increasing the difficulty of analyzing it with legacy tools). This complex but data-rich scenario is exactly the circumstance in which AI-based tools excel.

As described, the complexity of driving improved health outcomes using medical data is driven by source fragmentation, multiple modalities, volume, and effectively identifying and visualizing useful insights. Although AI-based solutions are not a complete panacea for these issues, systems using various flavors of AI (e.g., machine learning, natural language processing ("NLP"), machine vision) are beginning to demonstrate their effectiveness for handling more of the burden, more efficiently, than legacy systems alone. Currently, machine learning models can be used to mine health data (clinical, social determinants, genomics, etc.) to identify current and prospective health needs to inform care and disease management. NLP can be applied to claims and clinical data to analyze provider diagnostic, treatment and prescribing patterns for potential performance issues that may affect patient health. For example, KAID Health provides a solution that analyzes aggregated claims and clinical data (including unstructured notes) to enable care providers to identify improvement opportunities that patients need most. The platform directly supports the goals of value-based medicine in that it promotes team-based care and appropriately incentivizes both providers and staff who successfully execute interventions.

Many of these solutions can also provide advanced data analytics in environments with fragmented data. For example, Atropos Health provides an AI-driven platform (supported with clinician-in-the-loop) that enables care providers to generate publication-grade evidence in less than 48 hours for numerous disease types. This platform leverages hundreds of millions of de-identified clinical records and specialty data sources to provide insights beyond what a single hospital (or even hospital network) could derive through solely using its own data resources. This ability to efficiently access and leverage data at scale is an essential component for gaining the insights required to drive better health outcomes using a value-based approach.

The potential demonstrated by AI is such that even legacy EHR providers, such as Epic and Cerner, have realized the need to deploy AI-based solutions to help better manage the objectives of the Quadruple Aim.[10] AI will not be the solution for the delivery of every value-based care challenge, but it represents one of the best tools for automating functions and extracting insights from datasets. AI is a worthwhile investment for healthcare and life sciences organizations that want to use data-driven insights to improve health outcomes, contain costs, and improve the experience of both patients and caregivers.

[10] Landi, H. (2023) Himss23: Epic analytics leader details efforts to bring GPT-4 into healthcare and growing work in Genomics, Life Sciences, Fierce Healthcare. Available at: https://www.fiercehealthcare.com/health-tech/himss23-epic-analytics-leader-details-efforts-bring-gpt-4-healthcare-and-growing-work

Reducing Cost of Care

A large part of reducing costs will stem from changing the healthcare model from a reactive to a proactive approach, and focusing on prevention and health management rather than disease treatment. This shift is expected to result in a better experience for both patients and providers, and to improve healthcare outcomes at a population level while reducing costs (e.g., fewer hospitalizations, decreased medical errors, faster recovery). Healthcare participants are starting to realize the role that data (enabled by AI-powered tools) plays in implementing this transformational shift in the practice of medicine.

Several beneficial applications for AI in healthcare purposes will drive cost efficiencies over time (See Figure 3). A 2018 Forbes article stated that the most important areas AI could influence would be administrative workflows, image analysis, robotic surgery, virtual assistants, and clinical decision support.[11] A report by Accenture emphasized the same areas, and included connected machines, dosage error reduction, and cybersecurity as additional areas.[12] A McKinsey report includes areas such as connected and cognitive devices, robotics-assisted surgery, targeted and personalized medicine, and electroceuticals.[13]

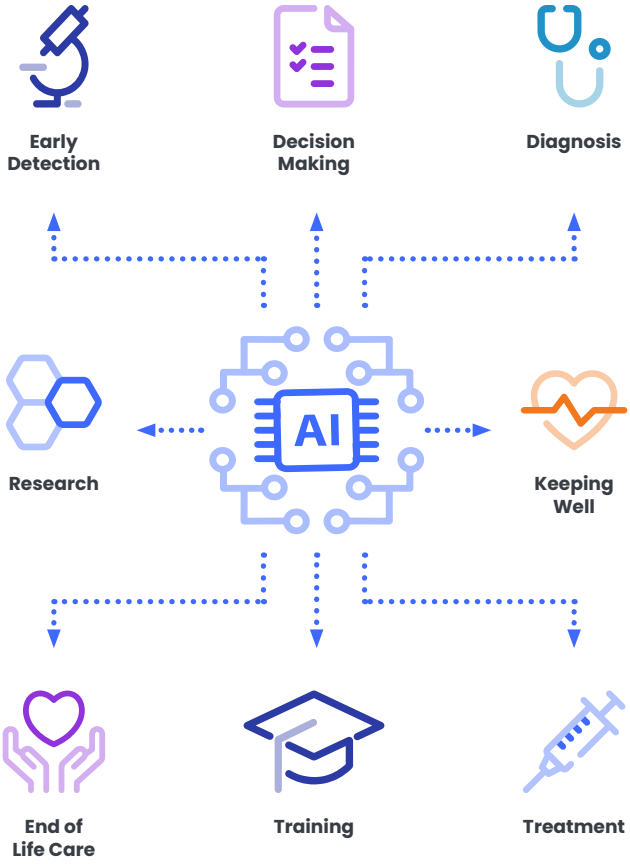

Figure 3. Application areas of AI in medicine

AI will certainly bring great improvements to almost every process within healthcare delivery and administration. Indeed, the anticipated cost savings may be the determining factor driving adoption and implementation of AI applications. It is estimated that AI-based applications can cut annual US healthcare costs by $150 billion in 2026.[14] AI-based technology is expected to have a significant impact in predicting potential ailments and proactively dealing with them through continuous monitoring and earlier intervention. Should treatment be required, AI will have a hand in tailoring treatments and increasing the efficiency of follow-ups.[15] Leveraging AI in these ways is fully aligned with the goals of value-based medicine. As a result, the AI-associated healthcare market is expected to have a compound annual growth rate of almost 50% over the next five years, reaching $102.7 billion (USD) by 2028.[16]

[11] Marr B. How is AI used in healthcare—5 powerful real-world examples that show the latest advances. Forbes; 2018.

[12] Kalis B, Collier M, Fu R. ,10 promising AI applications in health care. Harvard Business Review; 2018.

[13] Singhal S, Carlton S., The era of exponential improvement in healthcare? McKinsey Co Rev.; 2019.

[14] Team, I. (n.d.). Forbes Insights: AI And Healthcare: A Giant Opportunity. [online] Forbes. Available at: https://www.forbes.com/sites/insights-intelai/2019/02/11/ai-and-healthcare-a-giant-opportunity/?sh=7a12b4e54c68 [Accessed 2 Jun. 2023].

[15] Bohr, A., Memarzadeh, K., (2020), The rise of artificial intelligence in healthcare applications, AI in Healthcare, 2020:25-60. doi: 10.1016/B978-0-12-818438-7.00002-2

[16] MarketsandMarkets. (n.d.). Artificial Intelligence (AI) in Healthcare Market Size, Growth Report Analysis 2031. [online] Available at: https://www.marketsandmarkets.com/Market-Reports/artificial-intelligence-healthcare-market-54679303.html?gclid=EAIaIQobChMI7PK3xp6W_wIVvCuzAB3M-AB4EAAYAiAAEgL3vvD_BwE [Accessed 2 Jun. 2023].

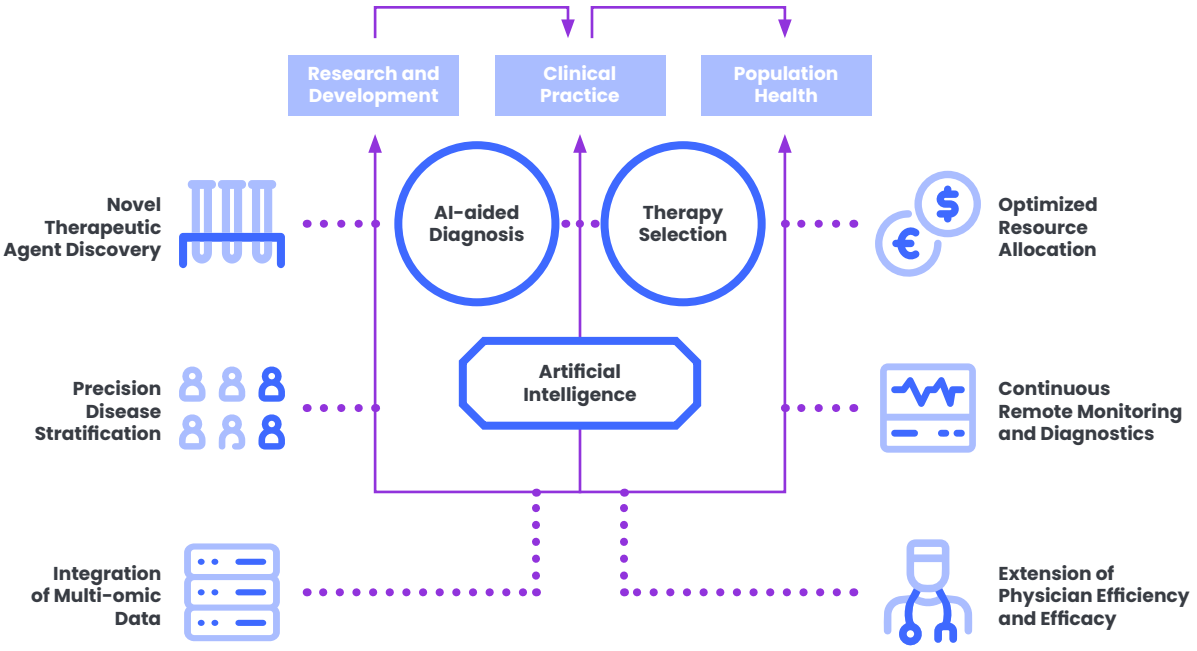

Figure 4. High-level AI use cases in healthcare

Healthcare AI systems need large volumes of high-quality medical data representing a diversity of populations to train and continuously refine their algorithms. A diversity of data improves the probability of developing treatments and medications that are both safe and effective for global populations. For this reason, access to medical data is a critical component of the value chain expected to deliver the healthcare of the future. This becomes apparent when a specific example, like applying AI to the detection and treatment of cardiovascular diseases, is explored.

As shown in Figure 4, an AI system can support, or automate, diagnosis as well as therapy selection, both of which feed directly into the performance of clinical practice. Cardiovascular data is fed to machine learning algorithms that are trained to develop models used by applications to perform diagnosis with accuracy sometimes exceeding human experts, and, at the very least, can be used to augment practitioner experience.[17] Recent developments in Large Language Models (LLMs), such as ChatGPT and BARD, point to a future whereby medical AI systems will be able to access vast libraries of research papers and leverage that knowledge, in combination with clinical and genomic data, to perform diagnosis and suggest treatments at scale and a low cost. The potential efficiency gains AI can provide will be a major factor in reducing healthcare costs. Increased scale and low cost mean increased health equity effected by easier access to high quality medical advice. To realize these benefits, AI algorithms will need large volumes of the right kind of clinical and genomic data. In addition to volume, that data must exhibit a high degree of relevance for the required purpose by including appropriate attributes for specific disease types, mapping to appropriate international standards, possessing longitudinal integration, and often most critically, representing diverse population sets.

[17] Choi, D.J, Park, J.J., Lee, S. (2020), Artificial Intelligence for the diagnosis of heart failure, npj Digital Medicine, 3: 54 (2020).

Improving Patient Experience

For decades, people around the world have routinely used the internet to diagnose their own illnesses, often with mixed results. The generally low quality of online health resources means that many searches can be harmful. Research has shown that on average online symptom checkers listed the correct diagnosis just 51% of the time and advised seeking care two-thirds of the time. Physicians fared much better, providing the correct diagnosis 84% of the time.[18]

But this comparison between human experts and computer systems has been rendered obsolete with the recent advent of "Large Language Models" (LLMs), such as the Generative Pre-Trained Transformer 3 (GPT-3). LLMs are general-purpose AI models that are trained on unstructured text from the internet to predict the next word in a sentence.

The efficacy of ChatGPT, the user-friendly version of GPT-3, has already been tested and found to provide the correct diagnosis 87% of the time when asked using plain language, beating both human physicians, as well as previous, non-AI, symptom checkers.[19]

Moreover, a recent paper tested an evolved LLM called MedPALM-2 that specializes in medical diagnosis and found that it exceeded the passing score of USMLE-style questions with a score of 86.5%.[20]

These are remarkable findings that demonstrate exponential improvements in AI systems over a very short period. LLMs have the potential to be real game changers in medical diagnosis. Given that language is at the heart of health and medicine, underpinning interactions between

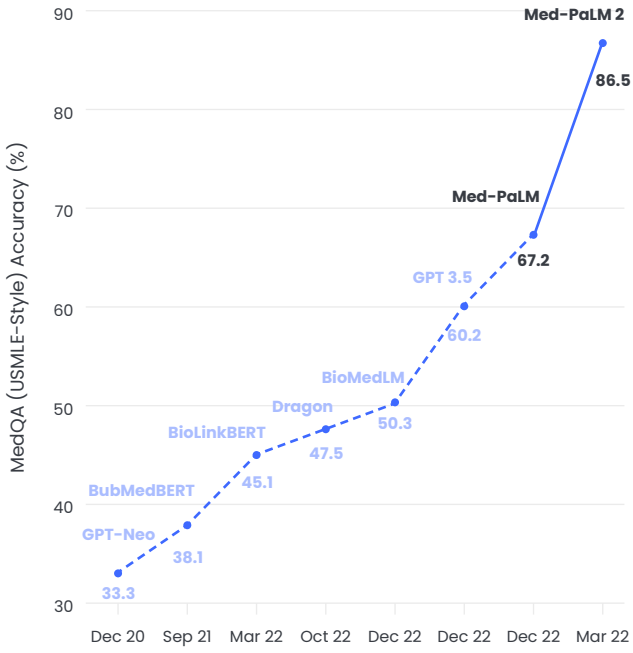

Figure 5. Evolution of Large Language Models

patients and healthcare practitioners, we are clearly seeing a new era whereby patients will be routinely health-checked by AI systems using a wide range of data, including real-time data from wearables or medical devices, clinical data from EHRs, unstructured text and image data, as well as genetic and various other "omics" data, linked to advancing medical knowledge as published in research papers. An AI-driven "personal physician" would have the potential to monitor a person's health and well-being and predict potential illnesses before they manifest, or help a patient manage an existing illness better. This could represent significant, positive health outcomes for patients and reduced costs for healthcare systems. We are at the beginning of a new, very exciting era in medicine.

[18] Semigran, H.L, Linder J.A., Gidengil, C, Mehrotra A, Evaluation of symptom checkers for self-diagnosis and triage: audit study (2015), BMJ 2015;351:h3480. https://www.bmj.com/content/351/bmj.h3480

[19] Mehrotra, R.H., Andrew Beam, Ateev (2023). ChatGPT-assisted diagnosis: Is the future suddenly here? [online] STAT. Available at: https://www.statnews.com/2023/02/13/chatgpt-assisted-diagnosis [Accessed 2 Jun. 2023].

[20] Singhal K et al, (2023), Towards expert-level medical question answering with Large Language Models, In: https://arxiv.org/pdf/2305.09617.pdf

However, to realize this future, providers, payors, and regulators must understand the utility of AI-based solutions and align on ways to cost effectively adopt their usage for improving the patient experience. Unfortunately, given the slower pace of digital transformation, higher regulatory burdens, and strained budgets, the healthcare sector has generally adopted new digital technologies slower than other sectors. For example, a study by Deloitte found that 84 percent of providers "... say that predictive analytics will be extremely important for their organization's strategies in three years, compared to 36 percent who say analytics are extremely important today."[21] It remains to be seen if provider and patient experience during the Covid-19 pandemic has significantly changed that dynamic, but the gap is indicative of the resistance to adopting advanced technologies. To close that gap, the patients, practitioners, and administrators that will be using these systems must be able to trust the results they provide. The data used to train machine learning models must be representative of the populations making use of the AI systems those algorithms enable. Ultimately, for these AI systems to be trusted and adopted, they need to be further improved, validated, and benchmarked, and issues regarding their safety, ethics alignment, and regulation must be resolved.

84%

of providers say that predictive analytics will be extremely important for their organization's strategies in three years

[21] Deloitte Insights. (n.d.). Shifting into high gear, [online] Available at: https://www2.deloitte.com/us/en/insights/industry/health-care/health-system-analytics-growing-strategic-focus.html

Improving Staff Experience

Similar to the patient experience, "narrow" AI is being gradually adopted by healthcare providers in several application areas, including optimizing operating rooms scheduling, providing preliminary diagnoses of medical images, and detecting or predicting adverse events. Applying AI to clinical practice promises enormous economic benefits for healthcare systems. A report by Harvard researchers found that AI could save the US between 5% and 10% in healthcare spending, which translates to around $360 Billion annually if adopted more widely.[22] This number does not take into account the personal and social benefits of improved health outcomes for patients or the impact on the broader economy of productivity lost due to illness.

Despite this potential, there is evidence that the implementation of AI in medicine has so far been "hit or miss." A recent systematic review found that there is a "paucity of robust evidence" that AI can enhance clinical outcomes.[23] The review found that only 39 out of the 11,839 articles on AI described randomized medical trials. Moreover, the small sample sizes and single-center designs of those studies limit their generalizability. Clearly, more evidence is required in the form of randomized controlled trials to demonstrate the effectiveness of AI systems in clinical practice. In addition, having the right regulatory framework for AI in Medicine will most certainly accelerate the creation of such evidence.

Meanwhile, the advent of "general-purpose" AI systems, such as LLM, are enabling new possibilities for enhancing the experience of healthcare personnel and increasing their productivity and effectiveness. There are at least two areas where LLMs will affect healthcare professionals' ability to improve patient lives. The first area will be providing triage. When used correctly, LLM-based solutions can allow healthcare organizations to provide patients with timely, helpful, and accurate care and advice. Given the previously mentioned statistic that 89% of patients search online for their symptoms before seeking provider healthcare guidance, LLMs may leverage those searches in performing virtual triages, and thus support and improve triage decisions in a clinical setting.

The second area will be providing "expertise on tap," a way for clinicians to get a "second opinion" quickly when faced with a complex patient case. Such "expert systems" have been an application area for AI since the 1970s, but only recently have we developed the technological capability to create expert systems in medicine that can potentially boost practitioner productivity, as well as improve patient outcomes. Making specialized medical expertise readily available to clinicians everywhere at the tap of a button will revolutionize medical care and will be a key accelerant for achieving global heath equity.

It is important to emphasize that LLMs are still in their infancy and there is a need to develop trust in these tools before they are widely adopted in healthcare practice. As with other AI-based solutions, this will involve increased regulation from government bodies, appropriate industry validation protocols, and alignment of these models to ethical standards. Importantly, LLMs require a huge amount of data for their training, which requires the sharing of medical, administrative, and other data between institutions. This is a particular challenge in healthcare given existing data silos required to comply with strict data privacy laws and instructional data protection agreements. For LLMs to deliver on their promise, we need innovative data sharing solutions that allow cross-border and cross-institutional data sharing; such solutions can be federated data sharing systems, or the centralization of de-identified data from various institutions and countries. The use of synthetic data via these federated or centralized architectures may also be leveraged to meet the needs of healthcare and life sciences organizations while protecting patient privacy.

[22] Sahni N et al, The Potential Impact of Artificial Intelligence on Healthcare Spending, (January 2023 – working paper, NBER, accessed via: https://www.nber.org/books-and-chapters/economics-artificial-intelligence-health-care-challenges/potential-impact-artificial-intelligence-healthcare-spending)

[23] Lam TYT, Cheung MFK, Munro YL, Lim KM, Shung D, Sung JJY, Randomized Controlled Trials of Artificial Intelligence in Clinical Practice: Systematic Review, J Med Internet Res 2022;24(8):e37188, doi: 10.2196/37188

Conclusions

On average, global health outcomes have improved dramatically over the past century leading to an increase in life expectancy and reduced child mortality rates. Notwithstanding events like the Covid-19 pandemic, these trends should continue as global populations gain access to better healthcare, and medical innovations become more accessible to those in developed countries. However, these improved outcomes will lead to older global populations requiring greater access to care and medications with greater associated costs. To achieve all the goals of the Quadruple Aim, providers and other healthcare participants must explore broader use of digital technologies to support the positive trendline for health outcomes in a way that is economically viable.

AI-based solutions will form the core of required digital technologies. Medical advancements by biopharmas, contract research organizations (CROs), and digital health innovators will be dependent on using AI tools fueled by large, diverse datasets to enable faster interventions, improve treatments, and accelerate the discovery of new drugs required to improve global health outcomes. In some way, all these examples require the ingestion of large volumes of multimodality data to generate meaningful insights. For example, precision medicine would require the use of patient-specific genetic information, as well as access to an exhaustive list of chemical compounds found in drugs, to identify potential adverse reactions for a particular patient. Legacy systems do not have the capability to handle these tasks for a cost that provides sufficient value, while AI-based tools are optimized for these conditions.

For these reasons, the future of healthcare will be AI and data-driven. The complexities of managing both care delivery and drug development will require the combination of different data sources – EHR clinical data, genomic sequencing data, social determinants, radiology images, etc. – sometimes dynamically, to deliver on the promise of the next generation of value-based, precision medicine.

Making that future happen will not be easy. There are four main challenges that must be solved to realize the vision of low-cost, high-value global healthcare:

1. **Increasing the availability of diverse sources** of high-quality clinical data for research in a secure, compliant, and ethical way.

2. **Supporting the establishment and execution** of genomic sequencing programs to include developing countries to ensure diversity of genomic data and representation of global populations.

3. **Creating mechanisms** to enrich clinical data with genomic and other information to increase its research utility.

4. **Enabling the AI-driven analytics and connective infrastructure** required to generate useful insights from high volume, high modality data for societal good in an economically viable way, while complying to strict ethical guidelines.

To achieve those four objectives within the context of the Quadruple Aim, it will be vital to ensure alignment and support collaboration between healthcare, life science, and government organizations:

Hospitals and other frontline healthcare institutions play a pivotal role in providing care and collecting the real-world clinical data required to draw insights. Currently, hospitals in emerging market countries play a limited role in research and participation in clinical trials. If properly resourced, these organizations have the expertise to add significant value at a lower price point than peer institutions in the US and Europe.

To increase the accessibility of genomic data available for research, it will be necessary to establish National Genomic Sequencing Programs (NGSPs). Although complex, NGSPs will enable countries to better protect the interests of their citizens regarding security and privacy, while providing a means of working with global life sciences organizations. For the sake of global health equity, it is important that developing countries not be excluded from this historical transformation of healthcare and medicine. They must be given the opportunity, through access to expertise and funding, to establish their own NGSPs.

Greater participation from worldwide hospitals and NGSPs in emerging market countries will help ameliorate the current lack of diverse RWD. However, life science organizations (e.g., biopharmas, CROs) will require the ability to access this data in a way that is secure, protects patient privacy, and is compliant with the existing patchwork of global regulation.

Lastly, all these groups will need new ways to communicate and partner with one another, effectively and securely, using a suite of tools optimized for global collaboration. For example, to foster adoption of diverse, global data sets, it must be straightforward for biopharmas, CROs, and regulators to conduct due diligence to understand the provenance of data they haven't traditionally used.

Driving this level of global alignment will not be easy. It will require the creation of new ecosystems for scientific and commercial collaboration. These networks must provide platforms for stakeholders to gain access to high quality, well-organized global data as well as the AI-enabled tools required to foster collaborative research and gain meaningful insights. Further, this must be done in a way that enables the Quadruple Aim - improving patient experience, lowering cost of care, advancing patient health outcomes, and improving staff experience.

Syndesis Health is creating such a network to empower global health research and innovation. Our mission is to address global health equity by providing access to RWD and RWE from worldwide, hard to reach populations in a way that is conducive to the needs of patients, hospitals, biopharmas, CROs, digital health innovators, and regulators. Our AI-enabled platform provides that access in a secure, ethical and compliant way that facilitates collaborative research.

About Syndesis Health

Syndesis Health accelerates research and innovation for healthcare and life sciences companies. The company was founded on the potential for real-world clinical data to advance medical research, improve patient health outcomes, and inform healthcare policy decisions. The Syndesis Health Network enables secure collaboration amongst member organizations and is powered by Syntium, the Syndesis data platform. Visit https://syndesis.com to learn more.

About the Authors

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