ONLINE FEATURE

The Benefits of Artificial Intelligence Technology in the Health Sector

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Key Points

- **Artificial intelligence (AI) technology has the opportunity to transform the health sector and improve outcomes for patients.**
- **AI has shown tremendous potential already in the form of diagnostics and imaging. This has occurred particularly in breast cancer screening and diagnosis of diabetic retinopathy.**
- **AI provides more affordable health services to payors and patients by vastly reducing costs and increasing efficiencies.**

Key Words: Artificial Intelligence, Machine Learning, Health Outcomes

Abbreviations used in text: FDA= (United States) Food and Drug Administration

Introduction

Artificial intelligence (AI) technologies have the ability to improve health outcomes for patients and increase the efficiency of health care delivery. As AI optimises and automates those tasks previously carried out by humans, patient care and operational processes can be improved. To date, numerous forms of AI have been utilised by providers, payors, and pharmaceutical firms to improve health care offerings. New innovations and improvements in AI will continue to bring about improved outcomes for patients and positive economic impacts for health systems. AI has terrific potential to transform the medical industry. With the potential for such broadscale changes, there are a number of considerations to take into account. Relevant regulatory frameworks and the benefit of human interaction in the delivery of healthcare will be important factors when considering novel technologies. Doctors and other allied healthcare providers will play a role in the implementation of AI in the health sector to ensure safe and effective care is delivered.

Health Benefits

The positive effects of AI on health outcomes have been well documented. Notably, AI solutions have shown tremendous potential for improvements in imaging and diagnostic capabilities. One such AI solution developed by Google gained international attention when the system was able to outperform radiologists in breast cancer screening. The system showed a reduction of 5.7% and 1.2% in false positives as well as 9.4% and 2.7% in false negatives, in the US and UK respectively, when compared against human radiologists on first read (McKinney et al., 2020). This breakthrough technology likely represents only a preview of the immense capabilities that have yet to be developed. Similar studies have shown AI technology to be more adept at diagnosing disease when compared against human physicians. In one study on skin cancer, an AI solution developed by Google outperformed dermatologists in detecting melanoma. As the authors put it: "Irrespective of any physicians' experience, they may benefit from assistance by a CNN's [convolutional neural network – an AI solution] image classification"(Haenssle et al., 2018). Beyond cancer diagnosis, AI technology has been shown to detect hereditary diseases in children (Hsieh et al., 2019), genetic diseases in infants (Clark et al., 2019), as well as predict cognitive decline that may lead to Alzheimer's disease (Budd, 2019). In 2018, the FDA approved IDx-DR, an AI technology that is used to diagnose diabetic retinopathy by analysing retinal images without the input of a physician (FDA, 2018). By deploying this technology to primary care clinics and other outpatient settings, patients have increased access to quality care. The trend is clear – artificial intelligence is beginning to transform the health sector, leading to vast improvements in offerings to patients.

Economic Benefits

In addition to improving health care quality and outcomes, AI can introduce positive system-level economic impacts, such as more affordable health services. By increasing automation, routine processes can be streamlined and offered to more patients at lower cost (Horgan et al., 2019). Workforce capabilities can be optimized, allowing health systems to operate in a more lean and efficient manner. For example, AI can free doctors from engaging in repetitive occupational tasks that can easily be automated (Horgan et al., 2019). By realising the benefits of increased automation, health resources could be directed to other higher priorities, such as research output. As populations increase and the demand for health services rises, AI will be able to offer expanded and lower cost care to more patients (Sunarti et al., 2021). From a macroeconomic perspective, AI is predicted to add $15.7 trillion to the global economy by 2030. The health care industry has been identified as the sector most likely to experience the most disruption due to AI innovation over the coming decade (Rao & Verweij, 2017). In the European context, introduction of AI technology could save European health systems €170.9 to €212.4 billion annually (Biundo & Strübin, 2020). By optimizing the often-limited resources of public health systems, AI technology can improve availability, quality, and access to care.

Barriers to Implementation

Certain barriers exist to full implementation of AI technologies. Improvements in regulatory frameworks, applicable data protection laws, and new job training schemes will be necessary in order to fully welcome AI in medicine. Additionally, as with any new technology, there could be apprehension to uptake (Murphy et al., 2021). Providers may cite a change in the therapeutic relationship with patients as AI takes on more tasks (Dalton-Brown, 2020). The unique and personal nature of the doctor-patient relationship ought to be given special consideration with efforts to preserve its spirit as more automation enters the health sector. While AI has tremendous opportunities to improve and advance health care, its adoption will need to be cautious, taking into account patient needs and superseding corporatist interests.

Conclusions

Undoubtedly, artificial intelligence technology offers tremendous value to the health sector. Most importantly, from a patient care perspective, AI technology has already shown its ability to improve diagnostic accuracy and specificity compared to current practices. From a broader perspective, AI can improve the health care industry by optimizing workforce resources and expanding access to care for patients. Doctors in the coming decade will play an important role in ensuring high quality and novel AI technologies are implemented which may complement the current care standard. Overall, AI represents a positive development in expanding and advancing care globally for the benefit of patients.

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