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Utilization of artificial intelligence by health technology assessment agencies to improve efficiency of health technology appraisals

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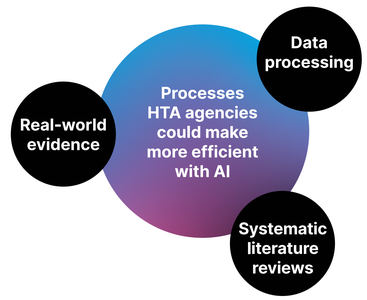
Introduction and objectives

Artificial intelligence (AI) is the use of automated algorithms that perform processes similarly to the human brain, based on natural language processing, data mining, deep learning, and machine learning.[1] Offering a variety of possibilities in accelerating data analysis and decision-making, advanced analytics—including AI—have generated a critical paradigm shift in the way data are collected and managed, enabling more efficient analysis and synthesis of data. Research on the use of AI in the healthcare sector is sparse, not sufficiently systemized, or focused around specific clinical areas.[2] Particularly in the healthcare sector, AI has been mainly used by pharmaceutical industries to accelerate and optimize drug discovery, precision medicine, and clinical trial set-up, as well as by healthcare professionals to make accurate and swift diagnoses and document medical information more efficiently.[3] AI has also been used to streamline administrative tasks, improving overall operational efficiency within healthcare organizations.[3] Despite these advances offered by AI in the healthcare sector, patient access to new technologies can still be delayed due to the time-consuming evaluation processes undertaken by health technology assessment (HTA) agencies, which entail the collection and management of heterogenous data through multiple steps and evaluations. Although several recent reports have investigated whether AI is used by manufacturers towards HTA evidence generation,[4,5,6] no studies have investigated if and how AI is being used by HTA agencies to improve their efficiency. The aim of this research is to identify whether AI is being used by HTA agencies to expedite technology review processes through automatization of routine tasks.

Lengthy HTAs create a barrier to market access

Methods

A targeted gray literature search was conducted to explore if potential AI-enhanced methods are being considered or utilized by HTA agencies to improve efficiency of healthcare technology evaluations by potentially facilitating the management of big data and the decision-making process. Particularly, the websites of the HTA agencies in Germany (Federal Joint Committee [Gemeinsamer Bundesausschuss], G-BA), Canada (Canadian Agency for Drugs and Technologies in Health, CADTH / Institut National d'Excellence en Santé et Services Sociaux, INESSS), UK (National Institute for Health and Care Excellence, NICE), and Australia (Pharmaceutical Benefits Advisory Committee, PBAC) were investigated.



Results

HTA agencies have identified AI's potential to improve the efficiency of decision-making. However, AI is currently not being formally utilized to accelerate and automatize the technology appraisal process. Instead, HTA agencies focus on the utility of AI to improve healthcare delivery in clinical practice and on the development of a framework for the evaluation of health technologies with AI elements.

G-BA

AI's potential in healthcare has been identified and the G-BA has been making use of its Innovation Fund to finance the PEAK research project, which aims to capture doctors' and patients' perspective towards the use of AI in diagnosis and therapy.[7] The knowledge gained from the corresponding survey about the acceptance and attitudes of doctors and patients towards the use of AI procedures will assist in the implementation of these procedures in practice and in the improvement of care.

CADTH/INESSS

AI's potential contribution in healthcare is acknowledged; CADTH outlines AI's potential to positively impact methods of knowledge synthesis such as systematic literature reviews through automation of data extraction and searching.[8] However, there is no mention of such automation currently being utilized by CADTH. INESSS has also published its take on AI's potential in healthcare. However, INESSS focuses on the challenges posed to HTA processes by health technologies that involve AI elements. This includes a commentary on how health authorities must regulate AI and a discussion on issues surrounding the integration of AI into healthcare organizations and systems, without any mention of improving the efficiency of HTA agencies.[9,10]

NICE

The complexity posed by AI has been recognized. This has led to adapting NICE's evidence standard framework to ensure that the value of new health technologies with AI elements to the healthcare system is appropriately assessed.[11] Additionally, NICE has partnered with institutions in the European Union for establishing the HTx project; one of the aims of the project is to create a framework for Next Generation HTA to support real-time decision-making, using advanced analytics on reimbursement of health technologies throughout Europe.[12]

International collaboration

An international collaboration has been formed between HTA agencies in Canada and the UK, the Australian Government Department of Health and Aged Care, and the Pharmaceutical Management Agency in New Zealand, aiming to facilitate knowledge-sharing about developments in the evaluation of digital health technologies, including technologies that involve an AI component.[13,14,15]

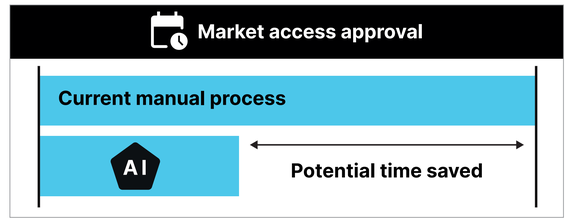
Current HTA Agency AI adoption

G-BA	Utility of AI in diagnosis and therapy
CADTH	AI's potential to automatize data extraction and searching
INESSS	Regulation of AI by health authorities
NICE	• Framework for the assessment of heath technologies with AI elements • Framework for incorporating AI in HTA process to support decision-making
International collaboration	Knowledge-sharing regarding the assessment of health technologies with AI elements

Discussion

Despite the advent of novel AI-assisted methods that could automate and potentially expedite routine tasks (eg, systematic literature reviews) conducted by HTA agencies, HTA processes have not yet formally incorporated AI to optimize the efficiency of technology appraisals. One possible reason could be that due to the lack of systemized knowledge-sharing about the use of AI, HTA agencies are not yet in a position to modify their decision-making process. Given that AI-assisted methods could potentially help alleviate budgetary challenges, opportunities exist for AI to be used by HTA agencies for integrating evidence from clinical trials and real-world data to support decision-making and accelerate patient access to innovative therapies. Going forward, collaboration and knowledge-sharing across markets will help implement regulatory frameworks, refine methodologies, and guide policies to improve the relevance of AI for HTA decision making.

AI could be used to improve eficiency



Conclusions

Overall, our research identified that even though HTA agencies have acknowledged the benefit of AI tools in accelerating time-consuming evaluation processes, they still have not been utilizing them to improve their efficiency. Incorporating AI in the assessment of health technologies by HTA agencies will facilitate the management of big data and the decision-making process, allowing for faster patient access to new technologies.

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