
The Dual Role of LLMs in Shaping Cardiovascular Care



Large language models (LLMs) have emerged as a transformative technology with the potential to significantly impact cardiovascular care. At the ESC 2024 cardiology congress in London, experts explored how these models could improve patient communication, optimise administrative processes, enhance medical education and transform scientific research. Despite these promises, concerns about trustworthiness, bias, privacy and the risk of over-reliance remain prominent, so integrating LLMs into cardiovascular care demands a balanced approach.

Enhancing Patient Care and Easing Administrative Burdens

In cardiovascular care, one of the most exciting applications of LLMs is in improving patient communication. By using natural language processing capabilities, LLM-powered chatbots can offer patients 24/7 access to medical guidance, enabling better understanding of their conditions and treatments. These chatbots are particularly appealing for their potential to deliver empathetic responses and provide consistent information. However, they come with inherent risks. LLMs may "hallucinate," generating incorrect or misleading information, which could lead to adverse patient outcomes. To address this, experts emphasise the necessity of human oversight, ensuring that such tools act as supplements rather than replacements for clinical interactions.

LLMs also promise to alleviate one of the greatest sources of stress for clinicians: administrative tasks. In outpatient clinics, administrative responsibilities often exceed the time spent with patients, contributing to burnout. By automating time-consuming processes such as drafting notes, managing schedules and processing patient data, LLMs could give healthcare professionals more time to focus on direct patient care. Although these models excel in structured diagnostic scenarios and data analysis, experts caution against equating technical accuracy with clinical competence. Medicine requires nuanced decision-making and empathy, which cannot yet be replicated by artificial intelligence.

Transforming Medical Education and Training

Medical education stands to benefit significantly from the integration of LLMs. These tools provide equitable access to up-to-date information, breaking down traditional barriers to knowledge. Students can utilise LLMs for exam preparation, language translation and scenario-based learning, making medical training more efficient and inclusive. For those hesitant to ask questions in traditional classroom settings, LLMs offer a judgement-free environment, fostering greater engagement and understanding.

Nevertheless, the increasing reliance on technology in education raises concerns about its impact on essential communication skills. The ability to connect with patients and colleagues is a core aspect of medical practice. Over-reliance on AI tools risks diminishing these interpersonal capabilities. While LLMs excel in providing structured knowledge, they cannot replace the value of human interaction in building trust and understanding. Striking a balance between technological tools and the cultivation of soft skills will be critical to maintaining the holistic approach that defines effective healthcare delivery.

Revolutionising Scientific Research and Publishing

LLMs are expected to redefine how scientific research in cardiovascular care is conducted and disseminated. By optimising literature searches, improving manuscript quality and managing references, they can save researchers significant time and effort. These tools also enhance accessibility by enabling researchers to navigate vast datasets, ensuring their work reaches a broader audience. As a result, LLMs can amplify the visibility and impact of scientific publications, fostering collaboration and innovation in the field.

However, the integration of LLMs into research also presents challenges. Over-reliance on these models may compromise originality and authenticity in scientific writing, while errors in interpreting data could lead to flawed conclusions. Furthermore, an excessive dependence on

LLMs risks undermining the collaborative nature of research and eroding critical thinking skills among scientists. Ensuring that AI tools are used responsibly and complement human expertise will be vital to preserving the integrity of scientific inquiry. Proper governance and ethical frameworks will play a crucial role in mitigating these risks and ensuring the long-term benefits of AI-driven research.

Large language models hold immense potential to transform cardiovascular care, education and research. Their ability to optimise patient communication, reduce administrative burdens and enhance medical training and scientific collaboration presents a compelling case for their adoption. However, the challenges they pose—ranging from misinformation and bias to the erosion of essential skills and trust—cannot be ignored. A carefully considered approach, combining technological innovation with human oversight, is essential to ensure that LLMs enhance rather than undermine the quality of cardiovascular care. By addressing these challenges, the medical community can use the power of LLMs to drive better outcomes for patients, clinicians and researchers.

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