

# Beyond the scalpel

## Why trainees need to prepare for the AI revolution in urology

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Urologists have always been at the forefront of embracing technology — from pioneering robotic-assisted surgery to harnessing lasers for lithotripsy, ablation, and enucleation. Like other medical specialties, urology is now faced with a revolution driven by artificial intelligence (AI). As AI continues to progress at an unprecedented rate, future urologists must be prepared to navigate this new frontier. Looking across the border to our American colleagues, there is already substantial public interest and demand for clinicians and healthcare systems to be supported by AI. Indeed, when AI is deployed in appropriate clinical contexts, patient outcomes can improve.<sup>1</sup> To ensure Canadians are not left behind, training programs must prepare the next generation of urologists to be responsible stewards of AI.

While there has been a remarkable proliferation of AI applications in healthcare, concerns regarding the quality of these models have recently emerged.<sup>2</sup> To date, only one AI tool, ArteraAI, is recommended by urologic clinical practice guidelines — a humbling reminder of the challenges in translating AI applications from bench to bedside. Therefore, urologists must develop basic AI literacy to assess the suitability of AI tools for clinical use, similar to how trainees are expected to critically evaluate scientific literature.

The Temerty Centre for AI Research and Education in Medicine has taken proactive steps, organizing educational seminars to provide residents with essential AI terminology and a standardized approach to appraising AI study quality. The enthusiastic responses received from participating programs, including urology, thoracic surgery, cardiac surgery, pediatrics, and pathology, underscore the value of such initiatives, and we anticipate growing interest from other institutions in the coming years.

Still, even the most accurate AI tools will not bring clinically meaningful benefits without adequate resources

and personnel capable of translating their predictions into actionable interventions.<sup>1</sup> As end-users of these tools, urologists must play a central role in informing the design of clinical dashboards and patient care pathways, ensuring seamless integration into existing clinical workflows while optimizing the use of limited hospital resources. If urologists are not involved in these conversations early on, this may result in suboptimal adoption of AI tools, decreased user satisfaction, alert fatigue, and ultimately, missed opportunities to enhance urologic care.

Importantly, although AI tools may offer valuable clinical decision support, they are not immune to errors and biases. Overreliance on AI tools may diminish clinical reasoning and problem-solving skills, or in extreme cases, inadvertently alter clinical practice by being trained by the AI algorithm itself — a phenomenon we have previously described as “induced belief revision.”<sup>3</sup> Therefore, urologists must learn to critically evaluate AI predictions within the context of each patient, using AI as a supplementary resource rather than a replacement for their own clinical judgement.

In conclusion, AI will undoubtedly play a major role in urologic care in years to come; however, this AI revolution also presents challenges, from ensuring the quality and reliability of AI models to mitigating the risks of overreliance and bias. By equipping themselves with basic AI literacy, actively participating in the clinical deployment of AI tools, and maintaining a critical mindset, urologists can ensure that these technologies enhance rather than undermine the delivery of urologic care. Through ongoing collaborative efforts and AI education, the next generation of urologists can harness the transformative power of AI to improve patient outcomes while preserving the essence of patient-centered care.

### REFERENCES

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