Technology and the patient journey

The frenetic pace of modern technological innovation can be exhilarating yet overwhelming. With breakthroughs occurring almost daily, it is often difficult to determine which new development is truly effective and which will be superseded in a week's time. The possibility of obsolescence may account for the Canadian healthcare system's reluctance to change existing methods. Yet technologies such as robotics, artificial intelligence, and big data have the ability to make care delivery more accurate, efficient, and equitable. Let us follow the typical patient's healthcare journey and look at ways these fields can impact patient triage, diagnosis, and treatment.

Upon contact with the healthcare system, patients must first be triaged to determine the urgency of their issue. This process becomes more complex if English is not a patient's first language, as accessing translation services can require time that a patient may not have. But what if triage could be provided in someone's native language? This becomes feasible through a form of artificial intelligence called natural language processing, as described in the feature article by Attrey and Levit. Triage chatbots in a patient's first language might collect more complete information, allowing for a more accurate determination of urgency. Incorporating Internet access into these chatbots could also direct people with lower-acuity cases to their family physician or urgent care, easing some of the burden on emergency departments.

Once triage is complete, information gathering begins in the hopes of establishing a diagnosis. In some cases, medical professionals have a wealth of information to aid in this process: past history, reported symptoms, exam findings, imaging, and countless lab tests. Companies have developed artificial intelligence networks similar to IBM's Watson that can process this information and create a differential diagnosis.¹ Yet in some areas, such as psychiatry, lengthy and overlapping criteria increase the difficulty of identifying a patient's condition. In their article on major depressive disorder, the *History of Medicine* department suggests that data analysis techniques could help differentiate between mood disorders. By identifying correlations between prior patients' symptoms and diagnoses, this all-important process could be expedited.

The treatment phase features multiple modalities tailored to the patient's overall health and care goals. Surgical intervention often plays a key role, and in the quest to optimize outcomes the field is increasingly turning to robotic solutions. For patients, a robot-assisted procedure can seem equivalent to the low-tech alternative: the procedure appears identical, complication rates are similar, and outcomes are

the same or better.² On the other side of the curtain, robot-assisted surgery is not always viewed as beneficial, especially considering its high cost and use of proprietary equipment.³ The *Thinking On Your Feet* department observes that medical learners may also be impacted. Most robotic setups contain one control console, which can prevent surgical residents from participating in cases. By placing a robot between the patient and the physician, trainees are distanced from learning opportunities. Care must be taken to ensure that embracing technology does not hamper future patient care.

Innovations such as these can illuminate previously overlooked issues and facilitate solutions that were once beyond the capabilities of our healthcare system. They cannot act as a magic bullet – in spite of anticipated limitations, technological advances can have unexpected repercussions – but it is essential to pursue all avenues that could benefit patients. We hope the wide-ranging and nuanced explorations of medical technology in this issue will help showcase what technology can do for Canadian healthcare.

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