Physician Experience at the Leading Edge of the Digital Healthcare Transformation

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Physicians as a group have a highly variable love/hate relationship with digital technology: there is no doubt that digital technology has the potential to dramatically improve the care that we provide to our patients; however, it also has the potential to negatively disrupt how we work and interact with one another and may even cause harm, albeit rarely (Wachter 2015). One suspects that this trade-off is similar to what has been experienced by society as a whole as we have undergone the digital revolution over the past two decades. For example, although digital platforms have allowed us to stream more music than could ever be purchased by one individual, it comes at the cost of sound quality. Social media has allowed billions of people to connect across cultures but has opened up a whole new world of cyberbullying and "fake news."

Thus, technological advances are rarely, if ever, all positive or all negative but rather somewhere in between. This special issue of *Healthcare Quarterly* is an initial glimpse into the impact of digital technology on physicians at a highly technologically advanced community hospital in Toronto, Canada. In addition to using an electronic health record (EHR) for all in-patient and much of ambulatory care, Humber River Hospital (HRH) has taken digital technology to a higher level in the form of a command centre that tracks patient flow and possible harm events, network-connected clinical devices, dedicated communications technology and patient and staff tracking using real-time location systems (RTLSs). The pace of digital adoption at HRH has been fast and steady over the past 5 years, and the six papers in this issue give us insight into how technology has impacted our physicians as educators, clinicians, team members and researchers.

Benefits of Digital Healthcare Technology

The impact of healthcare technology on front-line physicians has been eloquently captured by Dr. Atul Gawande in his *New Yorker* article: "Why Doctors Hate Their Computers," in which he provides a commentary on the implementation of an EHR at a Boston teaching hospital (Gawande 2018). Without a doubt, EHRs are a major advancement in healthcare documentation over paper charts. Digital patient records greatly improve the accuracy and accessibility of patient information and result in improved efficiency, safety and patient-centredness as patients can access their own charts from anywhere in the world. Similarly, in the world of diagnostic imaging, digital Picture Archiving and Communications Systems (PACSs) have essentially eliminated looking for lost films and can allow for the reading of medical images from anywhere in the world with an Internet connection. Such systems also are a boon for research as huge amounts of information can now be searched, measured and analyzed (Jensen et al. 2012). Chart reviews involving actual paper charts are, fortunately, becoming a thing of the past. Indeed, in this issue of *Healthcare Quarterly*, Hagen et al. (2020) show the ease with which quality and

research data can be extracted from an EHR — something that would take months and considerable resources to perform in the paper chart era.

In addition to being a searchable repository for physician documentation, electronic reminders built into EHRs can also make it easier for the clinician to track important but less frequent interventions, such as vaccinations and cancer screening. If vital signs equipment is connected to the EHR, as has been done at HRH, simple but critical data, such as temperatures, blood pressures, pulse rates and oxygen saturation, can be uploaded into the patient chart instantaneously. HRH has taken this one step further by combining the components of the National Early Warning Score (NEWS) 2 for sepsis (Royal College of Physicians n.d.), taken from the EHR into a sepsis early warning system that sends messages to the clinical team when a patient begins to show signs of early sepsis. In a similar fashion, closed-loop medication systems such as the one at HRH can automatically document that a medication was given while at the same time verifying that it was given at the correct dose. All of these advances clearly have the potential to save valuable time and improve efficiency and have been widely supported by the medical staff.

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The Downsides of Digital Healthcare

In his article, Gawande (2018) acknowledged the benefits of digital information technology while also detailing the perhaps unanticipated, or at least underestimated, negative impact of such systems. Although physicians' notes and orders input into an EHR are readable and accessible, the time required to document in EHRs has significantly impacted physicians. This is especially true in the US, where documentation has both billing and medical legal implications that are more significant than in Canada. This impact has been so significant that EHRs are now considered the leading cause of the current epidemic of burnout affecting physicians (West et al. 2018). It has been shown that after a busy working day, clinicians frequently head home to complete their documentation in the evenings and on weekends (Gardner et al. 2019). Hospitals, including those in Canada, are now considering employing scribes who follow physicians and document on their behalf, especially in high-volume areas such as emergency departments (Graves et al. 2018). While having the potential to save hours of physician time each week, this approach also requires new resources to pay for the scribes and must awkwardly involve another person in the physician–patient relationship. For clinicians who are predominantly paid through a fee-for-service model, the introduction of electronic charting can negatively impact their income if they try to control the number of hours they work each week while also taking considerably longer to document their patient encounters. An added complication for Canadian physicians is that essentially all the EHRs used in Canada were designed for the American healthcare system and thus are not as tailored to our practice in a single-payer, less litigious system.

As one might hypothesize, these challenges have a generational component. In this issue, Nimjee et al. (2020) describe the generational differences at play when electronic charting is introduced into a busy urban emergency department. Perhaps not surprisingly, younger generations seem to be more accepting of EHRs; however, they also demand more customization than their predecessors. Given that the average age of Canadian physicians is in the mid-50s (CIHI 2018), Nimjee et al.'s study suggests that a large proportion of our doctors are going to struggle with the digital world over the coming decade. Miller et al. (2020) also show that learners (i.e., the youngest of doctors) generally adapt fairly well to EHRs. These two papers suggest that, fortunately, the negative impact of EHRs on physician wellness may lessen in time. The impact may be further helped by system upgrades that lead to more intuitive and user-friendly interfaces.

Electronic documentation has also disrupted physician–patient relationships: physicians can be seen as spending more time interacting with their computer screen than the patient in front of them, leaving patients feeling ignored (Gardam and John 2018; Toll 2012). Typing while interviewing a patient can be highly disruptive and off-putting to the patient, even if the physician has excellent typing skills. Voice recognition software has considerably improved over the past decade for those who eschew typing; however, the time required to review one's dictations when all notes are electronic can be considerable. Simply put, computer screens get in the way of connecting with patients and have the potential to make emotional and difficult encounters even more trying. Miller et al. (2020) report similar findings when studying the negative impact of EHRs on learners and the doctor–patient relationship. They concluded that provider practice has an important role in how intrusive the computer is in the doctor–patient interaction: the computer has the potential to interfere, but it does not have to. It is hoped that future generations of hardware, such as tablets and handheld devices, may lessen the intrusion of the computer screen. The lesson here is not to do away with the computer but rather to be mindful of its potential negative impact on the doctor–patient relationship and adapt one's practice.

EHRs have also disrupted hospital social networks: where in the past physicians would normally chart alongside nurses in the nursing station, they now often do so from another part of the hospital. Wachter described nursing stations devoid of human interactions with clinicians glued to their screens (Wehrwein 2015). In a similar fashion, PACSs have largely stopped what was once regular interactions between front-line clinicians caring for a patient and the radiologists who read the images. All of us who worked in the pre-PACS era can think of clinical puzzles that were solved during these sessions. The impact of this disruption is largely unknown; however, it cannot be negligible. The literature is clear on the importance of frequent and resilient interactions between individuals in creating high-functioning teams (Keller and Meaney 2017). What happens to such a team when its members become removed from face-to-face interaction because of digital technology and communicate through other means? Interestingly, Manocha et al. (2020) show in this issue that replacing pagers with smartphones, which are meant to improve team communication, are not that well liked by physicians but are appreciated by nursing staff. Physicians reported that, unlike a pager, which allowed them to respond when it fit their schedule, telephone calls were far more intrusive. In their feedback, they felt that secure texting would allow for more communication than traditional pagers but still allow for physicians to prioritize which issue to respond to first. In response to this, HRH is now trialling a novel communication application that will, hopefully, be better accepted and perhaps even preferred by the medical staff.

Computerized physician order entry (CPOE) and order sets also have the potential to be double-edged swords: theoretically, completing one's orders digitally should result in efficiencies as clicking on orders should be faster than remembering what to order and then writing it down. For simple clinical problems, however, requiring digital orders takes longer than writing them, and order sets may contribute to over testing and increased costs as they can make it easy to click on additional tests (Choi and Atlin 2018). Computerized order sets are also often used to drive physician prescribing and ordering practice, with the aim of standardizing practice to meet current guidelines. For example, post-myocardial infarction order sets will invariably include all of the current recommended treatments, whereas those for a hospital-acquired pneumonia will include the recommended antibiotic and duration of therapy. This is an important and laudable use of digital technology; however, physicians often state that it also hinders their ability to see patients as unique individuals and causes them to move toward a "one size fits all approach," which does not adequately acknowledge the complexities of clinical care and may paradoxically cause harm (Shah and Cifu 2018).

In their study of mostly new physicians, Fishbein et al. (2020) report in this issue that the majority found order sets to be helpful at improving efficiency, yet respondents also confirmed that physician judgment was still required. It is important to consider order sets as living documents that change as the recommendations change and that can be adapted in ways that best fit the users' practice.

RTLSs have emerged as an important technology in healthcare environments. Such devices can be used to find equipment such as beds, wheelchairs and dialysis machines, in addition to tracking patient and staff locations. In the case of patients, such systems can regularly update family members as a patient moves throughout the hospital (e.g., when moving from the preoperative area, to the operating room and to the post-anesthesia care unit), thus minimizing a major source of anxiety. For staff, such systems can provide an additional level of safety by enabling them to call for help at the push of a button and have responders automatically know their location. Of course, such systems can also engender concerns that hospital staff are being watched, which can undermine the organizational culture unless carefully managed. In this issue, Heller et al. (2020) describe a less than ideal surgeon experience with one such system that geolocates patients travelling through the surgical program. Although surgeons were generally very supportive of such a system in theory, in reality, system shortcomings made it sometimes hard for them to rely on the information reported. Families, on the other hand, generally liked the system but had no idea of the manual work going on behind the scenes to provide them with accurate information. Presumably, as the reliability of the system is improved, this technology would be welcomed in the operating room by the surgeons.

The intent is thus not to return to pen, paper and illegible handwriting but to move into the digital age with our eyes wide open.

Adaptability Is the Keyword

As the healthcare system adopts more digital systems, a dependency on such systems will inevitably develop. Nowhere is this more obvious than during system downtimes, both planned and unplanned. These events require considerable resources to enable clinical care to continue and are a shocking reminder of both how much digital systems have changed our work environment and how difficult it would be to turn the clock back to the analog past. Without our digital environment, all activities must be documented on paper, lab results must be faxed or conveyed by phone and extra staff are often required. Physicians dread downtimes, not only because of the immediate disruption but also because they precede system upgrades where they may be required to relearn and adapt to a new system.

Despite the aforementioned caveats associated with digital technology in healthcare, these systems are clearly a major

advancement over paper documentation, and their use is only going to increase. This is not a "flavour of the month": digital technology will continue to spread, supported by the overwhelming evidence that they offer tangible improvements, albeit with some real consequences to physicians. The intent is thus not to return to pen, paper and illegible handwriting but to move into the digital age with our eyes wide open. HRH has invested heavily into using this technology as it has the potential to positively transform how we deliver care, but we must anticipate the many bumps along the road. The experience of any early adopter of technology is that there will be some false steps, and there must be a willingness to learn from failure and try again. Furthermore, as with any change initiative, physicians need to be engaged at every step along the way and have a hand in creating the future. As administrators, we need to be sensitive to physician concerns and not simply ascribe them to physicians being change averse. The six articles in this issue of *Healthcare Quarterly* show a willingness by physicians to try new technology and indicate a requirement for those of us leading the change to understand how adoption can sometimes be challenging.

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