Electronic medical records – The good, the bad and the ugly

"Technology is wonderful and seductive, but when seen as more real than the person to whom it is applied, it may also suppress curiosity; and such curiosity is essential to active thinking and quality care."
– Dr. Faith Fitzgerald

Henry David Thoreau's prophetic statement in *Walden* (1854) - "*Men have become the tools of their tools*", has come to be completely realized in the 21st century, specifically concerning human interface with information technology. The interaction of physicians with electronic medical records (EMR) is the most relevant example of how our inventions have enslaved us. The focus is often on creating a perfect record on EMR, while patient interaction is relegated to the hazy periphery.

Evolution of Medical Records

Medical records have a history of 4000 years in evolution and, in some form, have existed since the beginning of the practice of medicine. Some of the first medical records date back to Hippocrates in the 5th century BC and medieval physicians.[1,2] Formal medical records appeared in the nineteenth century in Europe in major teaching hospitals and were quickly adopted across the world. The modern medical record was developed in the 20th century – data about each patient, including clinical data, was recorded, organized in a standardized format and stored.[2] Major problems with traditional paper medical records include lack of standardization across physicians and healthcare facilities, poor searchability and loss of information.

EMR has been in evolution for several decades now but continues to grossly miss the intended mark of efficient and personalized patient care. The first EMR was developed in 1972 by the Regenstreif Institute in the United States and was then welcomed as a major advancement in medical practice.[3] The uptake, however, was low, the cost being a major constraint. The vital push came through the American Recovery and Reinvestment Act 2009, spearheaded by Barack Obama, which envisaged incentives to EMR users.[3] Several EMR packages have since been developed and have become widely available across the world.

EMR – The Good

EMR is considered potentially one of the drivers for the transformation of healthcare. From a patient care perspective, EMR is expected to improve the accuracy of the information, support clinical decision-making and improve the accessibility of information for continuity of care.[4] From an operational perspective, EMR should generate essential health care statistics crucial to the planning and management of health care services.[4] User expectations from a good EMR are several – meticulous patient documentation, common templates and order sets, disease coding and billing, regulatory compliance, prevention of medication errors, clinical pathway utilization, optimized workflow, medico-legal defensibility, adaptive learning capability, simplicity, multiple input interfaces (notes, voice transcription, drawings, etc), incorporation of clinical images, seamless connectivity with clinical investigation platforms, input speed at the point of entry, and most importantly, data compilation for analysis and research, all with time-efficiency, and a user- and patient-friendly interface.[4,5] Ideally, EMR should be on a single platform nationwide to enable interoperability and portability horizontally and vertically across the referral chain.

Are computers and clinicians uneasy bedfellows? Probably not. Every sphere of life, including the practice of medicine, has seen extensive computerization and the present generation of doctors are extremely comfortable with digital technology. The uptake of EMR is on the rise and it is here to stay.[6,7] In the United States, ophthalmologists have almost quadrupled their EMR use, from 19% in 2008 to 72% in 2016.[7] The use of EMR is still in its infancy in India.[8] The Government of India intends to introduce a uniform system of EMR. An expert committee set up by the government has developed "Electronic Health Record Standards for India".[8] With this as the background, there is an immense nascent potential for EMR in India. With major Indian ophthalmic institutes having developed their EMRs and using them in their routine daily practice, and their residents and fellows having been "trained on EMRs", its use is only likely to increase.

EMR – The Bad and the Ugly

The chief complaint against EMR is that it has undermined personalized face-to-face patient care and the vital doctor-patient interaction - the very soul of medicine - into a new check box-based doctor-computer-patient interaction. Abraham Verghese calls this an "iPatient" phenomenon.[9] EMR was never designed to facilitate a personalized human narrative, logical thinking, and experience-based clinical analysis. Clinical reasoning being the backbone of a traditional doctor-patient interaction, "a medical record—whether paper or digital—must preserve the information that the physician carefully and thoughtfully elicits from the patient in a form that, above all, facilitates clinical reasoning."[1] Current EMRs do not.[1]

A new report from the National Academy of Medicine is revealing – on an average, nurses and doctors spend 50 percent of their workday treating the screen, not the patient, and the increased work burden associated with EMRs is one of the factors for physician burnout.[10] A study of emergency room doctors revealed that putting information into the computer consumed more of their time than any other activity. Using a "click" of the computer mouse as the standard of measure, a doctor needed to make 6 clicks of the mouse to order an aspirin, 8 clicks to get a chest x-ray, 15 clicks to provide a prescription, etc., Over 40% of a typical 10-hour emergency room shift was devoted to data entry and 4,000 clicks of the computer mouse.[11] Immense information on EMR results in high (data) noise to (clinical) signals ratio. Arnold Relman, former editor-in-chief of the *New England Journal of Medicine* and a physician with 6 decades of experience found EMR "lacking in coherent descriptions of his medical progress, or his complaints and state of mind" when he was a patient himself.[5]

EMRs seem to have adversely affected the clinical training as Ober and Applegate state, "Our residents often resemble

air traffic controllers, focusing more on the logistics of arrivals and departures than on understanding the patient's journey".[5] They go on to quote a resident, "Education, rapport, compassion, bedside clinical reasoning, the physical exam, all seem to take a back seat in the current system".[5] EMRs seem to be badly designed to the do the job they are meant to do and seem to have failed to make patient care better, more efficient, or more satisfying for the patient or the doctor.

Will We Ever Find the Gold? - Can there be a Perfect EMR?

As there can never be a perfect spouse, there can never be a perfect EMR. EMRs must evolve and the potential users synchronously need to retrain themselves and change their mindset until a sweet spot is reached. "To develop an EMR that meets the needs of the physicians who will use it, we need to better understand how the physicians work, and develop the software with an eye toward solving real problems in practices rather than developing a solution looking for a problem."[12] Fortunately, India seems to be leading in the development of stand-alone ophthalmology EMRs, and that too with significant contributions from the users' right at the stage of EMR development. Sankara Nethralaya and Tata Consultancy Services (TCS) have together developed a comprehensive EMR system from scratch. It is natural for people to forget, but Anthony Vipin Das must remember that it took us a lot of effort to initiate and carry forward an in-house coding and development of EMR at the LV Prasad Eye Institute (LVPEI) about 10 years ago. It was meant to be a smart EMR, developed by the ophthalmologists and for the ophthalmologists, appropriately called eyeSmart. I feel redeemed that the seed that I had a small part is sowing and initially nurturing has now grown to be a fruit-bearing tree and is seamlessly used across the LVPEI network for patient care, administration and research. The current issue of the Indian Journal of Ophthalmology carries an article from the LVPEI group reporting their 8-year experience with eyeSmart and the accompanying commentary puts things in perspective.[13,14]

Robert Wachter states in his book *The Digital Doctor – "One of the great challenges in healthcare technology is that medicine is at once an enormous business and an exquisitely human endeavor; it requires the ruthless efficiency of the modern manufacturing plant and the gentle hand-holding of the parish priest; it is about science, but also about art; it is eminently quantifiable and yet stubbornly not."* An ideal EMR should harmoniously bring together the soul of medicine and cutting-edge informatics.

Santosh G Honavar

Editor, Indian Journal of Ophthalmology, Centre for Sight, Road No 2, Banjara Hills, Hyderabad, Telangana, India.
E-mail: editorjournal@aios.org

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