President's Page

Expect disruption in the healthcare system

Health care is going through significant transformation in this decade. Some of this disruption may be positive in nature, but we are just at the beginning of this transformation.

Let us concentrate on just two topics that will change the way we practice medicine. This has to do with telehealth and with artificial (or augmented) intelligence (AI).

Telehealth vs. Telemedicine

There is a distinction between telehealth and telemedicine. Although the terms "telehealth" and "telemedicine" often are used in the same sentence, telehealth is broader. It includes telemedicine, but also other services that can be clinical and nonclinical, surveillance and even continuing medical education. Telemedicine is directed to the medical or clinical services directed at patient care. But telemedicine is not new — it started back in the mid-1950s. At that time some clinical information was being sent through telephone lines, more commonly with some cardiology and radiology services. With the advent of the internet, the use of telemedicine has improved and become more efficient. This has brought benefits to both patients and healthcare workers, but it also has the potential for disruption in the delivery of healthcare services. Patients have expressed the benefits of telemedicine, including less travel and expenses associated with medical appointments, less disruption in their daily responsibilities (work- and home-related), and better control of their life and privacy. Healthcare workers see the potential improvement of efficiency, delivery of better care to rural areas, less travel, and improved management of chronic disease. Both the federal government and state governments have approved telemedicine, although with some specific restrictions. The use of telemedicine is being reimbursed in multiple states and by private payers. Many startup companies offer their expertise to set up a telemedicine system.

Telehealth + AI

Now add to telehealth the application of artificial or augmented intelligence. This will be the real game changer in health care, and we are only at the tip of the iceberg. Millions of dollars are being invested in AI, and it has been calculated that in the next three years, investments will be close to $6.6 billion. Multiple projects are underway that use AI to improve the delivery of care, enabling physicians to get up-to-date information and clinical outcomes in a matter of minutes. The human mind cannot comprehend and digest the massive amount of clinical and research data being produced on a daily basis. The potential impact of this technology is amazing. This is no longer a dream or science fiction. The more focused and up-to-date approach to health care soon to be available will allow physicians to limit or avoid clinical mistakes, and prevent unnecessary testing. In addition, AI can gather and analyze information in minutes or seconds to provide faster access to current data — something impossible for humans to do.

AI will transform medicine because of its potential for constant learning and adjustments depending on information that researchers and clinicians program. This "machine learning" will use data from many sources. Visual pattern recognition already is transforming and

Ruben L. Velez, MD

improving care in multiple specialties, particularly in radiology, pathology, dermatology, and ophthalmology. Visual AI in this setting can make and improve the diagnosis accuracy, allowing physicians to diagnose and treat more quickly.

Multiple institutions and physicians are collaborating on AI projects all over the world. One of the most ambitious programs is the Human Diagnostic Project, better known as Human Dx, in which more than 7,500 clinicians and 500 institutions worldwide are involved in creating a massive data resource. This would lead to a worldwide cloud that many clinicians and researchers can access. This will also help predict trans-end disease and more focused treatments. It is being integrated into internal medicine programs in the United States.

Players in this field have included IBM with its Watson system, which is being used in multiple institutions. Other companies, such as Microsoft, have been involved with projects including Healthcare NExT, Azure, Microsoft Genomics, and Project Inner Eye. Microsoft also has an interesting development called Project Empower MD. This artificial intelligence system captures and summarizes physician and patient conversation in an electronic system. This system learns from listening to the physician and the patient during the visit and helps create an encounter note. So, no longer does a laptop

come between the physician and the patient. In effect, the laptop becomes an intelligent scribe with the potential to provide more time for the physician and patient encounter and less time with the computer.

Other projects include Deep Mind Health and DeepVariant supported by Google. Also, AiCure, supported by the National Institutes of Health, monitors patients' use of medications.

Many more types of AI are being developed and tested. We've seen the development of surgical robots, with the most well-known being the da Vinci surgical system. We see the future as having AI involved in robotic surgery or even using robotic techniques in surgeries, with the surgeon being in a different city or state.

One of the challenges to the future of AI is physicians. We never have appreciated being told what to do. Our

independence has been sacred. But we have to understand that computers and AI will not affect the compassion and empathy that physicians provide to patients. We are morally obligated to offer our patients the best care possible.

> *Without question, artificial intelligence will disrupt the provision of health care, but it is our job to make this disruption benefit patients and improve their care.*

It is our job to use AI wisely when it becomes available.

I will leave you with this vision of the exciting future of health care but also with more questions than answers. What will happen to the patient-physician relationship and the patient's satisfaction? What will be the impact to medical practices and hospitals in the delivery of good health care? Will AI improve care everywhere? What will the future physician be like? Without question, artificial intelligence will disrupt the provision of health care, but it is our job to make this disruption benefit patients and improve their care. **DMJ**