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Commentary

An Analysis of Electronic Health Records in US Medical Practice by a Physician

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ABSTRACT

This commentary presents a point of view on how the arrival of electronic health records (EHR) in the United States (U.S.) has changed physicians' practice. EHR implementation has pros and cons. EHR systems have been a great asset during the pandemic and help with efficiency, safety, and cost reduction. Despite their benefits, healthcare providers and organizations still face challenges, including usability and interoperability across systems, contributing to physicians' burnout. Can physicians adopt new technologies and adapt to current challenges? Is it the right time for physicians to stop being observers and become active participants in the process of healthcare innovation and implementation?

Keywords
Physician; EHR; Implementation; Physicians' burnout.

My graduate school education in Health Informatics and Analytics provided me with a wide range of study, which gives me a broader frame of reference to understand and relate to my past clinical experience as a pediatrician and psychiatrist before and after EHR implementation. I would like to share my insights about the past and my hopes about the future of the medical practice in the United States (U. S.).

Electronic health records (EHRs) transformed health care in many ways. Unlike paper records, which were often illegible, incomplete, or unavailable, EHRs collect, store and supply patient information to providers when and where it is needed. EHRs use a computerized provider order entry system (CPOE), which involves entering and sending orders and treatment instructions electronically, rather than using paper, fax, or telephone. CPOE systems represent an essential tool for providing clinical decision support at the point of care, aiming to improve quality, safety, and healthcare delivery efficiency. In 1999 a study at Brigham and Women's Hospital, MA, USA, found that a CPOE system with decision support features reduced the incidence of serious medication errors by 86%.[1]

The Office of the National Coordinator for Health Information Technology (ONC), which resides within the Office of the Secretary of the U. S. Department of Health and Human Services (HHS), is at the forefront of the federal government's health IT efforts. It is driven by its vision to create a "l*earning health system where individuals are at the center of their care; where providers have a seamless ability to securely access and use health information from different sources; where an individual's health information is not limited to what is stored in EHRs, but includes information from many different sources (including wearable technologies) and portrays a longitudinal picture of their health, not just episodes of care; where diagnostic tests are only repeated when necessary because the information is readily available; and where public health agencies and researchers can rapidly learn, develop, and deliver cutting edge treatments.*"[2]

The National Institute of Standards and Technology (NIST) recognizes that technical standards are crucial for the innovation puzzle. NIST's focus is to streamline the federal government's participation in the private-sector-led standard system to enable two or more systems or components to exchange information and to use the information that has been exchanged. This process is defined as interoperability by the Institute for Electrical and Electronics Engineering (IEEE).[3]

True interoperability has yet to be realized due to a lack of coordination, lack of standards between EHR systems, and other barriers which hinder information exchange and sharing. Without interoperability, health information cannot become available to the right people, at the right place, at the right time. The coro-

navirus disease 2019 (COVID-19) pandemic triggered the rapid adoption of telemedicine, revealing a growing need for systems and platforms to support patient-centered care. COVID-19 tested EHRs' capabilities to integrate with telehealth.

In hindsight, during the pandemic, health care could have gone worse without EHRs. When the Institute of Medicine (IOM, 1991) published its landmark report, *The Computer-Based Patient Record: An Essential Technology for Health Care*, which called for the widespread adoption of computerized patient records (CPR's) as a precursor to what we refer to today as EHR systems IOM did not know that they were preparing healthcare for dealing with a future pandemic.

Imagine if the COVID-19 outbreak had occurred before the Electronic Health Records era. Without having remote healthcare delivery, controlling the spread of COVID-19 virus might have been impossible. Patients would have run the risk of getting infected during in-person medical visits unrelated to the pandemic. The health of many healthcare providers would have been endangered as well. Fortunately, we are in the position of being able to rely on remote-access patient visits during the pandemic.

Many other examples illustrate the value of EHRs to healthcare. However, it is essential to note that despite its benefits for quality, safety, efficiency, improved revenue, and cost reduction, it often has mixed or negative impacts on the provider and patient satisfaction.

For example, although physicians appreciate that they can access patient information remotely and provide improved patient care, they are nevertheless frustrated with its inflexibility regarding clinical workflow management. EHRs became an administrative tool to manage physicians'productivity using the "*one size fits all" approach. New patients are entitled to a 50-minute slot, and 20-minutes visits are reserved for returning patients regardless of what brings them to see a doctor. Unfortunately, EHR's do not solve a dilemma: "how can a child psychiatrist fully engage with a special needs child and their family traveling from out-of-state to discuss their concerns in just 20-minutes?*". Gains resulting from spending just a few minutes talking to youth about using drugs might have a more significant impact than any medicine. In short, how can this approach promote patient-centeredness, one of the Institute of Medicine's six core aims?

An additional problem is that diligent completion of EHR documentation leaves little time for physicians to engage their patients in conversations about their health, which would improve patient medical literacy skills. It is estimated that only 12% of American adults have health literacy skills proficient enough to successfully understand health information and navigate our demanding healthcare system.[4] Limited health literacy is associated with poor management of chronic diseases, suboptimal understanding and adherence to medication plans, increased hospitalizations, and poor health outcomes.[5]

There are other issues as well. Should the doctor look at a screen when evaluating a suicidal patient? What are the insights when a physician finds out that the patient was not taking their medications in the first place, only after placing a new order for a higher dose of the same medicine? What are ways to consider monitoring if patients are taking their medications correctly?

Some health insurances have invested in medication compliance programs because of the high cost of prescription medications. For example, in the treatment of hepatitis C, each pill can cost hundreds of dollars. When patients don't take medications, the health insurance industry loses billions of dollars. US health plan Cigna developed a novel monitoring system, aiming to apply machine learning to resolve this challenge by alerting doctors their patients may not be taking their prescribed drugs.[6] This tool, called Health Connect 360, aggregates patients' data from various sources and analytical tools into a dashboard accessible through an online interface to providers. *Via* the interface, doctors and nurses can keep an eye on patients' health. For example, an alert may be triggered if patients forget to pick up their prescriptions or miss an appointment.

For healthcare providers, strategies to address clinical problems with technological solutions remain limited. It requires time and effort to learn new skills. For example, application (APP) advisor was developed by the American Psychiatric Association (APA) as an educational tool to help psychiatrists learn about the efficacy, risks, and suitability of available mobile and online apps.[7] When asked about learning new technology skills, many doctors often comment that it is hard to justify investing their time and effort in innovation without evidence of recognized value. At the same time, they acknowledge the need to create innovative solutions to be better equipped for specific situations. For example, it is hard to reach depressed patients, who, by their condition, are at increased risk of dropping their self-care and avoiding self-advocacy when they need it the most. It is debatable if tracking patients' use of social media could fulfill this role.

Remote patient monitoring is a window into patients' lives and allows a provider to collect a wide range of health data and other forms of data. There are efforts to develop electronic platforms to engage patients through the use of wearables (e.g., Fitbit). However, physicians simply do not have time within their schedules to make sense of lengthy lists of numbers generated by wearables patients bring to their appointments. Many physicians have only 30-seconds to analyze data collected over weeks, with no tools to assist them. Concerns about patient privacy is also inherent with wearable technology.

Through the Health Insurance Portability and Accountability Act of 1996 (HIPAA), U. S. citizens have the legal right to request and receive copies of their medical records, including clinical notes.[8] The process of requesting records through a hospital can take time and effort, and patients must pay for the medium through which the medical records are delivered on (e.g., paper copies, compact disks (CDs), digital versatile disk (DVDs)).[9] Starting April 5, 2021, patients will have near-immediate access to most of their electronic medical records, including progress notes; when notes are shared, they become free.[10,11] The OpenNotes initiative

is a research initiative and international movement located at Beth Israel Deaconess Medical Center, which is affiliated with Harvard Medical School. Sharing notes with patients represents a culture shift and focuses on making health care more open and transparent encouraging patients to engage in healthcare decisions. Sharing clinical notes with patientsis made possible thanks to electronic health records in the U. S.

OpenNotes was first discussed in the Annals of Internal Medicine in 2018.[12] An accompanying editorial hypothesized the concept could result in an improved "*shared decision-making process… thereby (encouraging patients to) follow their physicians' advice*" and may save health systems billions of dollars on "*medication nonadherence.*"[13]

Unlike OpenNotes, OurNotes is a patient entered notes system. Patients have an option to add a history of present illness (HPI) and their own goals. It allows a patient to contribute to their medical record by updating their family and social history, write a concise, structured interval history, and propose a visit agenda. As a result of the COVID-19 pandemic, Beth Israel Deaconess Medical Center's pilot of OurNotes expanded to telemedicine delivery in mid-March 2020.

Despite the wide use of EHR systems, which have been a great asset during the pandemic, healthcare providers and organizations still face challenges, including usability and interoperability and usability across system, contributing to physician burnout. According to a recent study, burnout has reached epidemic levels, with the prevalence near or exceeding 50% among physicians in training (medical students, residents) and practicing physicians in the U. S.[11]

Physicians' burnout is like a straw that shows which way the wind blows. It suggests a much deeper and more complicated issue in society. It is time for physicians to come out of their offices, explore new ideas and learn new strategies. Physicians hold the knowledge that can only be acquired through practicing medicine. They need to share it readily with stakeholders who have the authority to make critical clinical and administrative decisions. They need to speak up about what is essential for them and their patients. I hope that technology will not compete with but enrich and empower individual patients, healthcare providers, and public health.

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