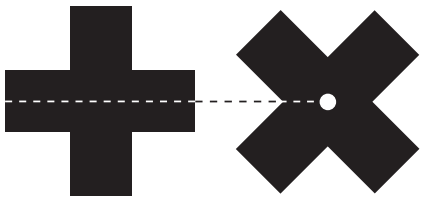
Electronic Health Records Are Hobbling Health Care



$100 billion bought a patchwork of clunky, vulnerable, and inefficient platforms

BY ROBERT N. CHARETTE | ILLUSTRATION: EDMON DE HARO

Cheryl Conrad no longer seethes with frustration when she has to interact with the health care system. Cheryl's husband, Tom, has a rare genetic disease that causes ammonia to accumulate in his blood. Two decades ago, during an emergency room visit, Cheryl told the doctors Tom needed an immediate dose of lactulose to avoid going into a coma, but they refused to medicate him until his primary doctor confirmed his medical condition hours later.

As I described in "Dying for Data," a 2006 article in *IEEE Spectrum*, what made the situation more vexing was that Tom had been treated at the same facility for the same problem just a few months earlier, and yet no one could locate his medical records. After Tom's recovery, Cheryl vowed to always have immediate access to them. She no longer needs to do that. "Happily, I'm not involved anymore in lugging Tom's medical records everywhere," Cheryl says. The two medical facilities where Tom is treated use the same electronic health record (EHR) system, allowing doctors at both facilities to access his information quickly.

How did that change come about? EHR usage in the United States got a big boost in 2004, when President George W. Bush set an ambitious goal for all U.S. health care providers to transition to EHRs by 2014. Electronic health records, he declared, would transform health care by ensuring that a person's complete medical information was available "at the time and place of care, no matter where it originates."

As of 2021, nearly 80 percent of physicians and almost all nonfederal acute-care hospitals deployed an electronic health record system.

Over the next four years, a bipartisan Congress approved more than US $150 million to set up EHR demonstration projects and create the necessary administrative infrastructure.

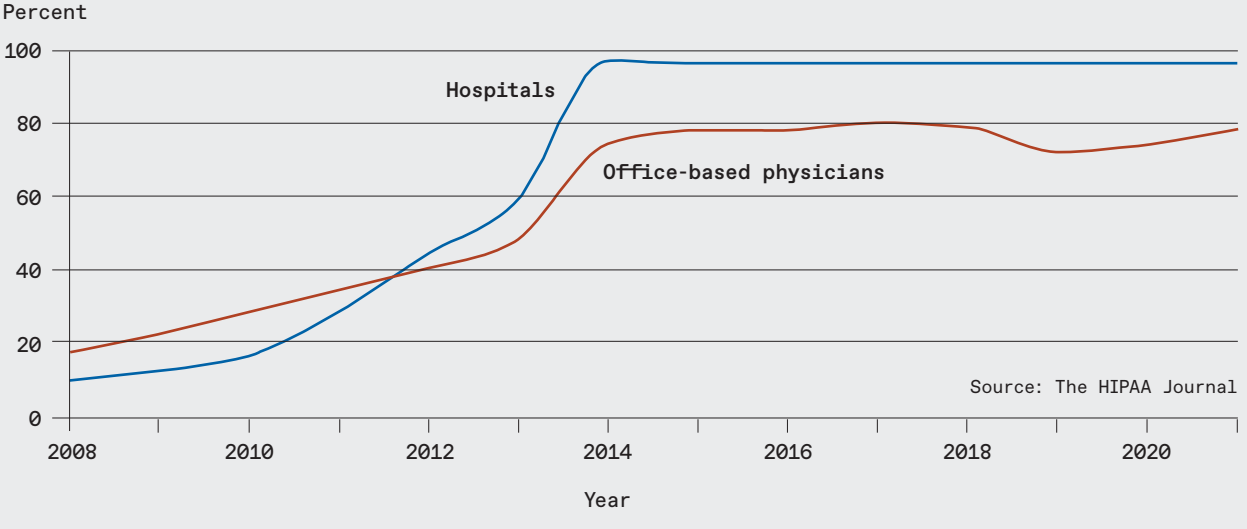
Then, in 2009, to mitigate the financial crisis, newly elected President Barack Obama signed the $787 billion economic stimulus bill. It included the Health Information Technology for Economic and Clinical Health Act, also known as the HITECH Act, which budgeted $49 billion to promote health information technology and EHRs in the United States.

As a result of these investments, Tom, like most Americans, now has an electronic health record that provides immediate access to all his medical treatment and test information. As of 2021, nearly 80 percent of physicians and almost all nonfederal acute-care hospitals had deployed an EHR system.

The problem is that many millions of Americans have multiple electronic health records that aren't connected to one another. On average, patients in the United States visit 19 different kinds of doctors throughout their lives. So instead of a plethora of fragmented medical record silos on paper, patients have a plethora of fragmented electronic medical record silos. And health care providers are burdened with costly, poorly designed, and insecure EHR systems that have exacerbated clinician burnout, led to hundreds of millions of medical records exposed in data breaches, and created new sources of medical errors.

And that is the paradox of EHRs in the United States today: We have EHRs, yes, but we still don't yet have a complete, secure, easily accessible, and seamlessly interoperable lifetime EHR. Here's why.

Trends in Hospital and Physician Electronic Health Record (EHR) Adoption



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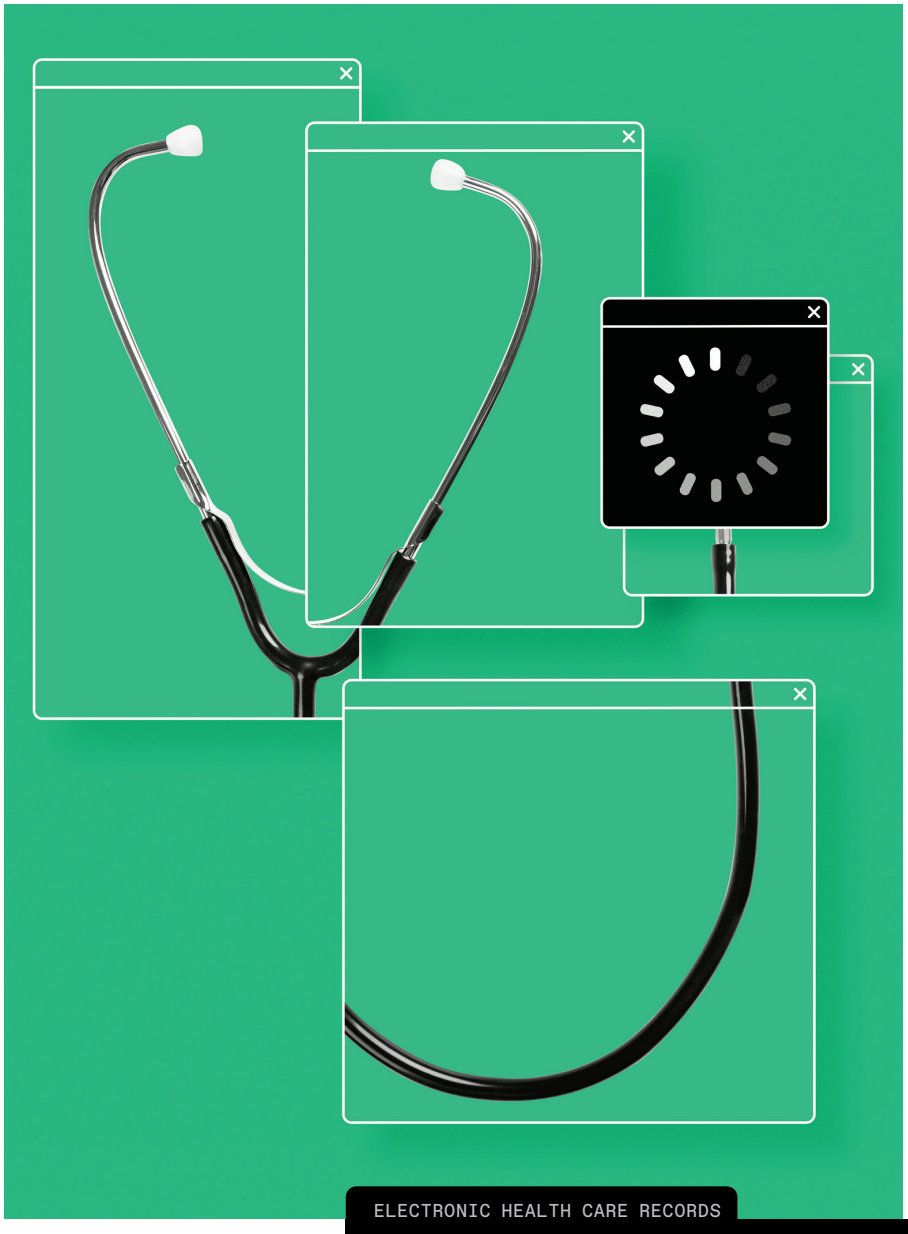


ELECTRONIC HEALTH CARE RECORDS

“THE EHR VENTURE HAS PROVED TROUBLESOME THUS FAR. THE TROUBLE IS FAR FROM OVER.”

—JOHN LESLIE KING, UNIVERSITY OF MICHIGAN PROFESSOR EMERITUS

In the early 2000s, when the Bush administration launched the first big push toward universal EHRs, putting that kind of government pressure on the health care industry made sense. Health care in the United States was in deep trouble. Spending had increased from $74 billion in 1970 to more than $1.4 trillion by 2000, 2.3 times as fast as the U.S. gross domestic product. From just 1990 to 2000, health care costs grew at three times the rate of inflation, surpassing 13 percent of GDP.

Meanwhile, two major studies by the Institute of Medicine in 2000 and 2001, titled *To Err Is Human* and *Crossing the Quality Chasm*, concluded that the accessibility, quality, and safety of U.S. health care was deteriorating. Of particular concern were needless medical treatments, duplicated diagnostic tests, underuse of effective medical practices, misuse of drug therapies, and poor communication between health care providers.

And health care’s administrative side was characterized by one health economist as a “monstrosity,”

Illustration by Edmon de Haro

with huge transaction costs associated with an estimated 30 billion health care–related communications each year, conducted by mail, fax, and telephone.

Health care experts and policymakers concluded that improvements in health care delivery and reductions in costs were possible only by deploying health information technology such as electronic prescribing and EHRs. In an influential 2005 study, the RAND Corp. estimated that adopting EHR systems in U.S. hospitals and physician offices would cost $98 billion and $17 billion, respectively. But after the move to digital records, the report estimated, they would save at least $77 billion a year, while the U.S. government would save $346 billion per year. Michael O. Leavitt, then the Secretary of Health and Human Services, saw the projected savings as "a key part of saving Medicare." With baby boomers set to begin retiring en masse in the early 2010s, and Medicare funding projected to run out by 2020, cutting health care costs was a political imperative.

To be sure, some doubted that the EHR revolution would bring about these health care improvements and cost reductions, or that it could be achieved within 10 or 20 years. The Congressional Budget Office, for one, argued that the RAND report overstated the potential savings and benefits of EHR systems and ignored peer-reviewed studies that contradicted it. The CBO also pointed out that RAND assumed EHR systems would be widely adopted and effectively used, even though there were very few commercially available systems that were effective.

The lack of meaningful systems engineering in health care IT was captured in the 2005 National Academy of Sciences report *Building a Better Delivery System: A New Engineering/Health Care Partnership.* The report noted that innovative systems-engineering approaches needed to be developed across the entire health care system. The scale, complexity, and extremely short time frame for attempting to transform the health care environment demanded a robust "system of systems" engineering approach, the report stated.

Other experts worried about the human impacts of automation on health care professionals and patients. Researchers warned that ignoring the interplay of computer-mediated work and existing conditions in health care practices would result in unintentional and undesirable consequences.

Additionally, without standards for making EHR systems interoperable, many of the expected benefits would not materialize. As David Brailer, the first National Health Information Technology Coordinator, stated, "Unless interoperability is achieved... potential clinical and economic benefits won't be realized, and we will not move closer to badly needed health care reform in the U.S."

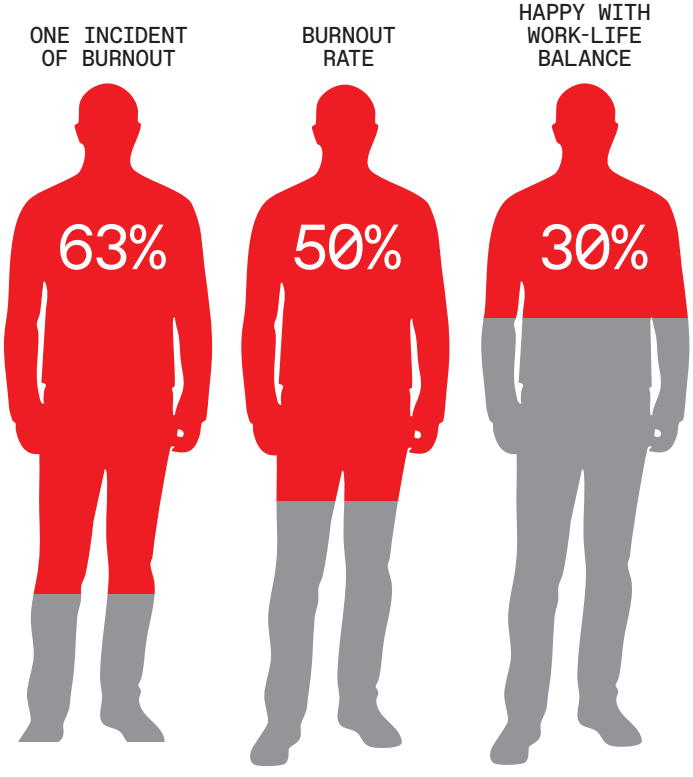
The rush to roll out EHRs pushed many of these concerns to the side. Policymakers in the Obama administration, for instance, thought it was unrealistic to prioritize interoperability. They feared that defining interoperability standards too early would lock the health industry into outdated information-sharing approaches. Further, the existing business model actively discouraged providers from sharing information. If patient information could easily shift to another provider, what incentive would the provider have to share it?

Instead, policymakers decided to push for EHR systems to be deployed as widely and quickly as possible during the five years in which the HITECH Act provided incentives for EHR adoption. Tackling interoperability would come later.

Existing EHR system vendors were making $2 billion annually at the time, and they viewed the HITECH incentives as a once-in-a-lifetime opportunity to increase market share and revenue. Like fresh chum to hungry sharks, the subsidies also attracted a host of new EHR technology entrants eager for a piece of the action. The resulting feeding frenzy pitted an IT-naïve health care industry rushing to adopt EHR systems against a horde of vendors willing to promise (almost) anything to make a sale.

M.D. Burnout

Half of U.S. physicians are experiencing burnout, with 63 percent reporting at least one manifestation in 2022. The average physician works 53 hours weekly (19 hours more than the general population) and spends over 4 hours daily on documentation.



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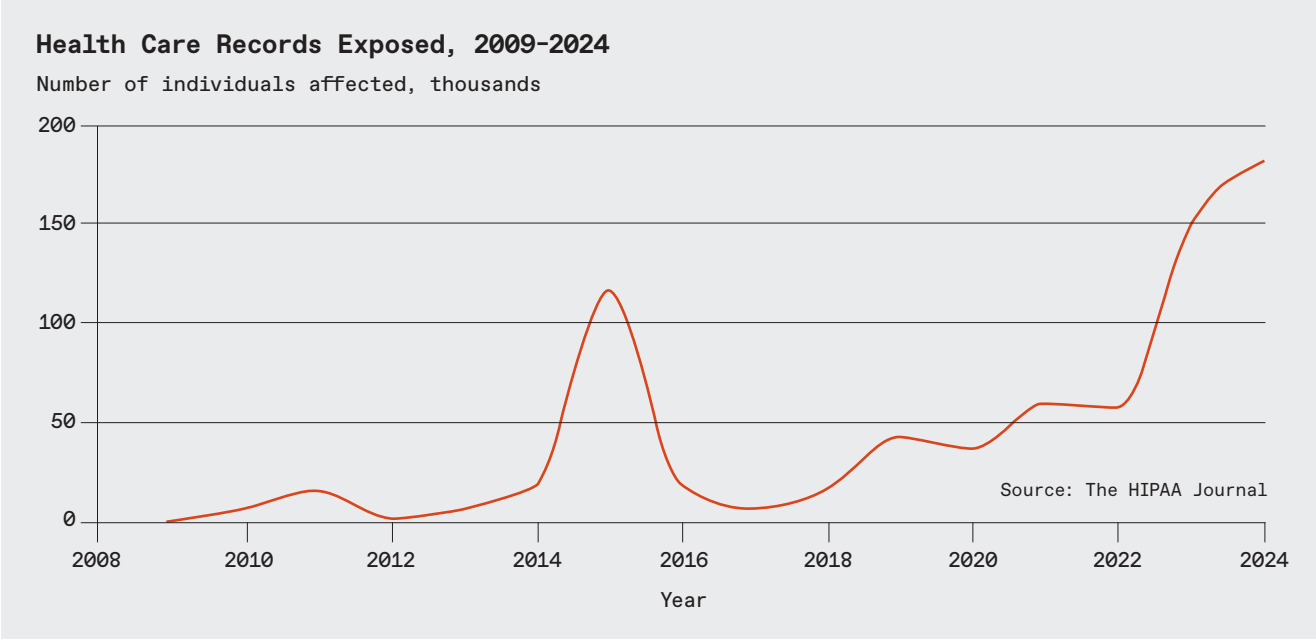

The HITECH program also ignored the warnings about the need for systems engineering and the harmful impact of automation on the human-centered aspects of health care delivery.

Sadly, the lack of attention to these concerns still affects EHR systems. In a 2018 study by Stanford Medicine, nearly 70 percent of health care professionals expressed satisfaction with their EHR system, and more than 60 percent thought the system had improved patient care. But 54 percent of physicians felt their EHR system detracted from their professional satisfaction, and a concerning 59 percent felt it required a complete overhaul.

The poor usability of EHR systems had surfaced early in the HITECH program and continues as a main driver for physician dissatisfaction with the technology. Some of the problems in usability include laborious data entry, obstacles to face-to-face patient communication, and information overload, with clinicians having to wade through an excess of irrelevant data when treating a patient. A 2019 study in *Mayo Clinic Proceedings* compared EHR system usability to other IT products like Google Search, Microsoft Word, and Amazon; it placed EHR products in the bottom 10 percent.

Electronic health record systems were supposed to increase productivity, but for many clinicians, they are instead productivity vampires, as John Leslie King, an expert on system–human interactions at the University of Michigan, has called them. Researchers have found that doctors spend 4.5 hours on average filling out their patients' digital health records. That leaves less time to meet with patients: An *Annals of Internal Medicine* study reported that doctors in outpatient settings spend only 27 percent of their work time face-to-face with patients. And patients often complain that their doctors spend too much time staring at their computers during visits. To address this issue, U.S. health care providers now employ more than 100,000 medical scribes—about one for every 10 U.S. physicians—to record documentation during office visits.

With 700 rural hospitals at risk of closing due to severe financial pressures, investing in EHRs has not proved to be a financial panacea.

What's more, physicians are spending more time dealing with EHRs because the government, health care managers, and insurance companies are requesting more patient information for billing, quality measures, and compliance. Patient notes are twice as long as they were 10 years ago.

"A phenomenon of the productivity vampire is that the goalposts get moved," explains King. "With the ability to better track health care activities, more government and insurance companies are going to ask for that information in order for providers to get paid."

Robert Wachter, chair of the department of medicine at the University of California, San Francisco, and author of *The Digital Doctor: Hope, Hype, and Harm at the Dawn of Medicine's Computer Age* (McGraw Hill, 2017), sees EHRs as "an enabler of corporate control and outside entity control."

"It became a way that entities that cared about what the doctor was doing could now look to see in real time what the doctor was doing, and then influence what the doctor was doing and even constrain it," Wachter says.

Federal law mandates that patients have access to their medical information contained in EHRs—which is great, says Wachter, but this also adds to clinician workloads, as patients now feel free to pepper their physicians with emails and messages about the information. "What we've essentially done

TOP: THE HIPAA JOURNAL, 2023

Robert Wachter is chair of the department of medicine at the University of California, San Francisco.

is created 24/7/365 access to clinicians with no economic model for that: The doctors don't get paid," Wachter says. His doctors' biggest complaint is that their EHR email in-boxes are overloaded with patient inquiries. Some doctors report that their in-boxes have become the equivalent of a second set of patients.

EHRs also promised to reduce stress among health care professionals. Numerous studies have found, however, that EHR systems worsen clinician burnout. Burnout is lowest among clinicians who work either with highly usable EHR systems or in specialties that have the least interaction with EHR systems, such as surgeons and radiologists. Conversely, physicians who make, on average, 4,000 EHR system clicks per shift, like emergency room doctors, report the highest levels of burnout.

Aggravating the situation, notes Wachter, is "that the doctors feel like they're spending all this time entering data in the machine [but] getting relatively little useful intelligence out of it."

Poorly designed information systems can also compromise patient safety and reduce the likelihood of catching medical errors. According to a study funded by the U.S. Agency for Healthcare Research and Quality, EHR problems were involved in the majority of malpractice claims over a six-and-a-half-year period of study ending in 2021. Sadly, the situation has not improved since then.

What of EHR interoperability? Recent government data indicates that 70 percent of hospitals sometimes exchange patient data, but only 43 percent regularly do. System-affiliated hospitals share the most information, while independent and small hospitals share the least.

Exchanging information using the same EHR system helps, but it's not always enough. Even when two hospitals use the same EHR vendor, communicating patient data can be difficult if each hospital's system is customized. Studies indicate that patient mismatch rates can be as high as 50 percent, which often leads to duplicate patient records that lack vital information and can result in avoidable patient injuries and even deaths.

Other countries that use advanced EHRs, including Estonia, Israel, and Singapore, assign a unique patient identifier (UPI), which simplifies the sharing of information and makes interoperability easier, says Christina Grimes, digital health strategist for the Healthcare Information and Management Systems Society (HIMSS). But Congress has forbidden the use of UPIs since 1998, she notes.

A single-payer health insurance system, which most countries with advanced EHR systems have, would also make sharing patient information easier. It would also decrease time spent on EHRs and reduce clinician burnout. But a single-payer system has been a nonstarter in the United States.

Interoperability is made even more challenging because the average U.S. hospital uses 10 EHR vendors to support more than a dozen health care functions. Grimes says only a small percentage of U.S. health care providers use a fully integrated EHR system that covers all functions.

Reductions in health care costs have likewise not materialized. Indeed, these costs continue to rise. The United States spent an estimated $4.8 trillion on health care in 2023, or 17.6 percent of GDP. And no rigorous quantitative studies at the national level show the tens of billions of dollars of savings that RAND had predicted in 2005.

What the research does show is that many health care providers have struggled to save money by using EHR systems. For example, one 2022 study found that rural U.S. hospitals don't enjoy cost savings from EHR systems, unlike their urban counterparts. With 700 rural hospitals at risk of closing due to severe financial pressures, investing in EHRs has not proved to be a financial panacea.

One important cost of EHRs that wasn't even mentioned in the 2005 RAND study is cybersecurity. Experts warned that cybersecurity was being given short shrift in the rollout of EHRs, especially the multitude of new cyberthreat access points that would be created and potentially exploited. But vendors, providers, and policymakers paid scant attention. As with many IT systems, "security was an

CHRISTOPHER MICHEL/WIKIPEDIA

afterthought" with EHRs, says Tom Leary, senior vice president and head of government relations at HIMSS. "You have to make sure that security by design is involved from the beginning, so we're still paying for the decision not to invest in security."

He's not kidding: From 2009 to 2023, a total of 5,887 health care breaches involving 500 records or more were reported to the U.S. Department of Health and Human Services Office for Civil Rights. The breaches resulted in some 520 million health care records being exposed. Health care breaches have also caused widespread disruption of medical care in various hospital systems, sometimes for over a month. In 2024, the average cost of a health care data breach was just shy of $10 million.

This year may see the first major revision since 2013 to the Health Insurance Portability and Accountability Act (HIPAA) Security Rule. The proposed rule outlines stronger cybersecurity measures for protecting electronic health information. If it's adopted, it will likely force health care providers and EHR vendors to make cybersecurity investment a much higher priority.

Where does that leave us? To date, the U.S. health care industry has spent more than $100 billion on EHRs, but few providers are fully meeting President Bush's vision of seamlessly interoperable and secure digital health records.

Many past government policymakers now admit they failed to understand the complex business dynamics, technical scale, or time needed to create such a nationwide system. Seema Verma, former administrator of the Centers for Medicare and Medicaid Services, told *Fortune*, "We didn't think about how all these systems connect with one another. That was the real missing piece."

Over the past eight years, successive administrations and congresses have taken actions to try to rectify those early oversights. The 21st Century Cures Act, passed in 2016, prevents EHR system vendors and providers from blocking the sharing of patient data, and it spurred them to start working in earnest to create a trusted health information exchange. The Cures Act also mandated standardized application programming interfaces (APIs) to promote interoperability.

Meanwhile, the Trusted Exchange Framework and Common Agreement (TEFCA), published in 2022, aims to facilitate the secure exchange of health information. In late 2023, the first Qualified Health Information Networks (QHINs) were approved. These seven QHINs allow thousands of health providers to more easily exchange information, as outlined by TEFCA. This development, plus the emerging consolidation at hospitals around three EHR vendors—Epic Systems Corp., Oracle Health, and Meditech—should improve interoperability in the next decade.

These changes, says Leary of HIMSS, will help give "all patients access to their data in whatever format they want with limited barriers. The health care environment is starting to become patient-centric now. So, as a patient, I should soon be able to go out to any of my health care providers to really get that information." Hopefully, that will include consolidation of the patient portals for accessing test results and communicating with doctors. "Patients really want one portal to interact with instead of the number they have today," says HIMSS's Grimes. And, of course, it's too soon to know whether Donald Trump's administration will continue the momentum toward increasing interoperability.

In 2024, the Assistant Secretary for Technology Policy's Office of the National Coordinator for Health IT, the U.S. entity that oversees EHR adoption and standards, was reorganized to focus more on cybersecurity and advanced technology like AI. There is hope that AI can help overcome problems like clinician burnout and interoperability issues like patient matching. Wachter is impressed with the new AI medical scribes, which listen to patient visits, transcribe them, and then create documentation. "I can now have a conversation with my patient and look the patient in the eye. I'm actually focusing on them and not my keyboard. And then a note, formatted correctly, just magically appears. This new set of AI technologies may well solve some of the problems that the last technology created."

It remains to be seen whether other types of health care AI will live up to the hype or exacerbate the rampant feeling among providers that they have become tools of their tools and not masters of them.

As EHR systems become more usable, interoperable, and patient-friendly, the underlying foundations of medical care can be finally addressed. Only about 10 percent of the care patients receive today is backed by high-quality evidence. One of the great promises of digitizing health records is to discover what treatments work best and why. While this is an active research area, more research and funding are needed.

Twenty years ago, Tom Conrad, himself a senior computer scientist, told me he was skeptical that having more information meant that better medical decisions would be made. He pointed out that when doctors' earnings are related to the number of patients they see, there is a trade-off between the better care that EHRs provide and the sheer amount of time required to review a more complete medical record. Today, the trade-off is not in the patients' or doctors' favor. Whether it can ever be balanced is one of the great unknowns.

Obviously, no one wants to go back to paper records. But it would be foolish to think it will be smooth sailing from here on out. "The way forward involves multiple moving targets due to advances in technology, care, and administration," says John Leslie King. "Most EHR vendors are moving as fast as they can."

"The EHR venture has proved troublesome thus far," he adds. "The trouble is far from over." ■

$100 BILLION
Amount spent by the U.S. health care industry on EHRs to date