

Understanding the History and Stakeholders of Electronic Health Records (EHRs)

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## Goals of EHR

The primary goal of electronic health records (EHR) is to create a private, confidential, and secure record of patient information that supports patient care across legal, clinical, financial, and research spheres while maintaining integrity and accessibility. EHRs serve as a “communication tool that supports clinical decision making, coordination of services, evaluation of the quality and efficacy of care, research, legal protection, education, and accreditation and regulatory processes” (Harman et al., 2012). Prior to electronic health records, paper health records attempted to fulfill this role of a communication tool of a patient’s information. However, the relevance of paper health records began to dwindle as more stakeholders came to the table. There was a need for EHR because there were many more stakeholders that required access to health records, reviewers, and users involved in providing healthcare. EHRs address the limitations of paper health records in this way; they are widely accessible across multiple stakeholders, are standardized and legible, can be updated in real-time, and are under computational security measures. Furthermore, the government was much more involved in providing funding, and needed to review documentation such as health records in order to give such funding. Because of this, an electronic system was needed (Harman et al., 2012).

Different policies regulate *how* EHRs achieve their goals, and set a standard of how to secure confidential patient data in order to be an effective communication tool. For example, the National Institute of Standards and Technology sets regulations and guidance on measures that should be taken to protect data. The Health Insurance Portability and Accountability Act (HIPAA) and the Health Information Technology for Economic and Clinical Health (HITECH Act) both mandate following NIST information security guidelines (Harman et al., 2012).

## Key Stakeholders

There are multiple stakeholders involved in electronic health records, each stakeholder having a role in all throughout the process of creating, maintaining, updating, and utilizing these records. These stakeholders each have multiple goals—including improving their bottom line, simplifying diagnostic processes, and streamlining healthcare delivery—but the prevalent and underlying goal from the original policies is to improve patient care. Each stakeholder has multiple incentives to use electronic health records, but some benefit more at the expense of others.

### *Service Providers*

The first stakeholder, and arguably one of the most obvious stakeholders in electronic health records, are the EHR service providers or EHR vendors. These are the entities that develop, maintain, and distribute the service. They are also in charge of updating software related to EHRs, which includes implementing new features based on the needs of other

stakeholders, as well as being responsible for handling outages or any large-scale technical issues or breaches. EHR vendors are also responsible for providing training to physicians and other stakeholders on how to properly update them and use the tools available to them. At their core, though, they are a private business and are naturally profit driven to provide the best, *proprietary* technology, which is updated and accessible in real time, for all other stakeholders.

Another role that service providers play is regulating data access. One of the main advantages of electronic health records is the ability for it to be accessed by many people at the same time, regardless of geographic location or proximity. This also means that with the number of different stakeholders that use electronic records, regulating access and ensuring only relevant information to that stakeholder is accessible to them is incredibly important. Thus, service providers regulate access to information between other service providers, and regulate access of information across different stakeholders in the process of providing healthcare to patients in order to ensure that each stakeholder only has access to relevant information. EHR's are definitionally a patient's own record (outlined by HITECH), and they must approve information sharing to other physicians, etc. Yet, the extent of information shared across healthcare providers and EHR systems is not always consistent, which can ultimately hinder a streamlined process and introduce complex antitrust concerns.

There are a few service providers that dominate the electronic health record market. Epic, Center, and Allscripts are the largest three, with Epic holding 28% of market share in the hospital EHR market (Green, 2021). Epic also holds a similar market share in ambulatory EHR (Green, 2021). Indeed, by keeping patients within their system—where EHR data sharing is easiest and clearest, these service providers deliver the most value to their clients, large healthcare systems and private clinics. Ultimately, this process allows EHR service providers to have more control over what other stakeholders are financially benefiting.

Research has also been done emphasizing the importance of the role of the vendor in EHR success. KLAS, a research company focused on improving quality of healthcare, surveyed “35,000 inpatient physicians, over 56,000 ambulatory physicians, and over 70,000 nurses” in order to determine the most important factors in having successful use of electronic health records (Jaosn, 2021). According to the study, the most important features varied from type of caregivers - inpatient physicians strongly valued organization, IT delivery, and functionality towards specialty care were the most important features (Jason, 2021). On the other hand, ambulatory physicians valued specialty care functionality as well, but also had a strong preference towards fast system response time (Jason, 2021).

Due to the size and magnitude of larger EHR vendors, they are often the target of cyber attacks with one such example happening in 2021 at the University of Wisconsin health system (HIPAA Journal, 2021). The University of Wisconsin Hospitals and Clinics Authors found a breach in their Epic MyChart system and started an investigation. They found that roughly 4,318 patients within the health system were affected and unauthorized people had the ability to use the portal from December 27, 2020 to April 13, 2021 (HIPAA Journal, 2021). While UW Health sent notification letters to affected patients in June 2021, the unauthorized individuals had

accessed clinical information, demographic information, and even test results. Since then, UW Health has strengthened their MyChart security by implementing practices as 2-factor authentication, but the incident shows the vulnerabilities that even the largest service providers can have.

### *Insurance Companies*

The next key stakeholder is insurance companies. While they neither develop EHRs nor employ them for direct patient care, insurance companies can utilize medical records both when they are evaluating new customers and when they are determining medical procedures to cover. Indeed, moving records electronically had major implications for insurance companies.

For starters, paper records were cumbersome, and it is a major hindrance to locate and collect all necessary files. Beyond that, records were not always uniform, leaving insurance companies with stacks of paper to comb through to make an informed decision. With EHRs, records have become uniform, and now they are accessible in real time and more easily searched (Heintzman et al., 2015). Indeed, this helps insurance companies maintain a more holistic profile of their customers and details their resolving and current ailments. With this type of easily accessible information, they can make more informed decisions on which treatments—such as surgeries, non-invasive procedures, new medical tools, and prescriptions—are appropriate and necessary, allowing them to determine what will be covered. EHRs are a comprehensive, convenient tool to help insurance companies manage their customer base.

As a matter of fact, not only do EHRs improve data access for insurance companies, but they also lead to increased financial efficiency. Now, like other stakeholders, patients have real-time access to their health records. Therefore, it is not only easier for them to obtain health insurance—expanding insurance companies' customer base—but, importantly, they are able to validate their coverage online. Essentially, this removes the delay in connecting insurance companies to other health care providers, and it makes their jobs easier and more efficient (Heintzman et al., 2015). Thus, EHRs have helped insurance companies scale effectively.

Indeed, EHRs speed up the communication from insurance companies to other key stakeholders. As a result, there has been a reduction in delays following bills. The EHR system is an easy and secure platform that has facilitated an environment where patients and healthcare providers can manage their treatment and use online payment systems (Menachemi & Collum, 2011). At face value, faster payment is a clear benefit for insurance companies; however, it results in much larger implications. Keeping customers within the same EHR system, it is simpler for insurance companies to manage billing. Thus, they are incentivized to direct patients within one system (Adler-Milstein, 2017). Yet, it does not stop there. Insurance companies, through this system, have the ability to oversee the billing practices and treatment styles of many different physicians and health care providers. Therefore, they are not only motivated to direct patients to providers within the EHR system, but specifically are inclined to direct patients to the providers that will afford them the most profit (Adler-Milstein, 2017). Indeed, this is an immense

power that insurance companies have obtained through EHRs. As a private company, their key goal is to profit and satisfy shareholders, not necessarily provide their customers (patients) with the best treatment. This tension, though prevalent, has largely been alleviated by insurance companies prioritizing their business objectives, even if it may hinder patient care. Indeed, they may sever patient-physician relationships by bouncing patients around to different providers by altering their coverage, or alternatively, ignoring physician recommendations to other physicians outside their coverage bubble. Together, EHRs have helped grant insurance companies a stronghold on American healthcare through the ease of financial reimbursement and payment.

EHRs have been incredibly beneficial tools to insurance companies. As a key stakeholder, they have flourished under the efficiency and accessibility afforded by EHRs, both as it relates to data access and financial matters. In many ways, insurance companies owe their powerful oversight in healthcare delivery to EHRs, whose benefits have allied them to gain a strong influence over patients and health care providers.

### *Health Care Providers*

Along with the EHR providers and insurance companies, health care providers—both large scale health systems like Duke Health and one off private clinics—are another major stakeholder. At their core, EHR systems were meant to streamline medical care, for hospital systems and the physicians they employ. Thus, the introduction and increased prevalence of EHRs had a strong impact on health care providers.

To heal patients efficiently, health care providers often connect them to many different specialists and physicians. Using EHR systems, it is simple for a health care provider to share information within their sphere (Menachemi & Collum, 2011). For example, within Duke Health, a neurologist can seamlessly recommend a patient to a neurosurgeon. Importantly, their entire file will be shared, reducing redundant information collection and speeding up the treatment process. Yet, this benefit does not stop within a health care provider group. If two large providers share the same EHR system, then they can similarly refer and direct patients across large practices. In this sense, a cardiology patient at Duke Health could easily be referred to a heart surgeon at UNC Health, with the same efficiency (Menachemi & Collum, 2011). Together, this allows health care providers to operate efficiently. By sharing information through the same EHR system, physicians at the health care provider can quickly learn a patient's history and concerns, allowing care to be delivered quicker.

As discussed above, sharing records eliminates redundancy. If a patient is referred through the same EHR, they may technically be a *new* patient, but their record carries over. But beyond that, general information can be carried over in the system. EHR systems can de-identify patient information and allow for aggregation of medical data. Rather than sift through mass amounts of paper records and manually flag relevant files, EHRs allow for quick querying of different conditions or treatments, along with their outcomes. This allows health care providers, such as Duke Health, to facilitate large scale clinical studies and research (Menachemi &

Collum, 2011). Beyond that, they can contribute their information to global scale projects, securely and easily. The introduction of EHRs have made many life saving clinical studies increasingly more effective, by efficiently including thousands more data points. Ultimately, this has exponentially increased health care providers' ability to innovate medical treatment.

Indeed, beyond the benefits EHRs bring to a health care provider as it relates directly to medicine, they also have more concrete financial benefits. As with insurance companies, EHRs additionally allow health care providers to easily manage billing records and collect payment without delay (Menachemi & Collum, 2011). Thus, EHRs have a strong financial benefit towards health care providers. Naturally, a financial benefit is desired but it also puts pressure on health care providers to balance their profit and treatment. Of course, these objectives typically align together, and health care providers have classically been incentivized to keep patients within their system. Yet, with more concrete financial benefits, there has been less patient movement outside their provider sphere, and especially the EHR system (Adler-Milstein, 2017). When a physician may be best suited to treat a patient, but they are outside their system, a health care provider has to determine their overall objective. Indeed, it is often easier and more profitable to keep that patient within their system (Adler-Milstein, 2017). Similar to insurance companies, EHRs have awarded health care providers with great tools, empowering them throughout the healthcare sector.

Indeed, EHRs have allowed health care providers to care for patients efficiently, reducing redundant information collection. Within that, they are better suited to benefit global research goals that optimize treatment tools. And yet, these tools have not only increased their influence and power, but also presented them with a dynamic between their goals to cure and profit.

### *Physicians*

Physicians themselves experienced much of the direct impacts of switching from paper health records to electronic records. This is because physicians are often the individuals that are tasked with writing prescriptions, ordering medications, creating orders for tests, and scans, and thus, transitioned from a paper and clipboard along with endless file cabinets to a laptop or iPad that they carry around from room to room. Their role in interacting with electronic health records is, for many reasons, one of the most important ones because they play a primary role in updating electronic health records. Electronic health records proved extremely beneficial because it eliminated much of the misunderstanding from handwritten health records (which is quite necessary considering the handwriting that physicians are stereotypically said to have). Along with reducing misunderstanding, electronic health records are also widely cited for reducing other errors.

However, conversely, there is often greater room for error in situations where there is a learning curve, which there definitely is with electronic health records especially in using the software to update electronic health records, accessing the records appropriately, and sending specific information, such as prescriptions, to the right place. In fact, in one study that focused on

clinics “estimated a productivity loss of 20% in the first month, 10% in the second month, and 5% in the third month, with productivity subsequently returning to its original levels” (Menachemi & Collum, 2011). This can be a disincentive for physicians to use EHRs because it also can be a monetary setback due to the decrease in productivity - in the same study, “productivity resulted in lost revenue of US \$11,200 per provider in the first year” (Menachemi & Collum, 2011). Furthermore, electronic health records are not immune to flaws either; spelling errors quickly turn into typos, and oftentimes, data is also stored in the wrong place and can be difficult to locate later on.

Having an electronic mechanism to record patient information also can decrease the number of patients a physician can see day-to-day as a result of electronic health records facilitating more comprehensive notes.

Another important characteristic of electronic health records is that they are generally inoperable and not conducive to switching across service providers or vendors. As a result, not all physicians can treat all patients, as some patient’s records may be outside of their EHR system and there are not many financial incentives to switch or for EHR vendors to create a more streamlined transfer process (Adler-Milstein, 2017). As a result, when physicians give referrals or need to get procedures or diagnostic tests completed, they must consider how to best balance profit for their business and overall provider versus sending the patient to the best physician, who may be out of their EHR system (Adler-Milstein, 2017).

### *Patients*

The final stakeholder is arguably the most important in the EHR landscape: the patient. With the development of EHRs, patient access to medical records has simultaneously grown and shrunk. With online portals such as Epic’s MyChart, individuals are able to look at everything from immunization records to x-rays and additional information. It is easy to obtain copies of medical records without physically going to an office. Furthermore, automated messages and appointment reminders through EHR systems have increased vaccination rates in influenza and pneumococcal vaccines (Menachemi & Collum, 2011). Beyond health benefits, there are also tangible benefits to the patient’s pockets as studies have found that EHRs have resulted in decreased redundant medical testing in the emergency department. Physician error has also decreased for common illnesses as they adhere to proper protocols, and from a public health perspective, communicable diseases are also easier to track through information sharing.

Despite the benefits to patients, there are drawbacks as well. The technification of the health system has increased barriers between patients and physicians to where receptionists and other individuals are often roadblocks that have to be addressed before a patient can even interact with their physician. Furthermore, there is an increased risk of privacy violations. With private health information being shared electronically, patients' records are no longer stored in one place. While this makes their records potentially more vulnerable, legislators have recognized the trend toward EHRs and have expanded upon HIPAA’s protections through the HITECH and Cures

Act to expand protections for patient EPHI. Furthermore, as other stakeholders have gained influence in the healthcare sector, new challenges like information blocking and patient rerouting have emerged. While the prominence of EHRs has altered patient autonomy by limiting some of their agency in favor of other stakeholder needs, the primary goal of EHRs is ultimately improved patient care.

### **Conclusion**

Indeed, many of the original goals for EHR systems have been met. Through impressive technology, health records are more accessible and less redundant, and they help streamline many medical processes. Nevertheless, unintended consequences of current policies have arisen—including potential data security concerns and complex antitrust considerations around interoperability—which have altered the power dynamics in the healthcare sector. EHRs have helped establish EHR service providers and insurance companies within the treatment pipeline. Their influence, in part with the utility of EHRs, has interfered with traditional patient-physician relationships. Thus, new policies are necessary to restructure the healthcare delivery process and ensure patient care is the utmost priority.



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