A near Complete Adoption of Electronic Health Records System in the U.S. Lacks Interoperability and Physician Satisfaction

Raghid El-Yafouri[1] [a] and Leslie Klieb[2] [b]

[1]*Management Technology and Innovation, Grenoble Ecole de Management, Grenoble, France*
[2]*Business and Technology, Webster University Thailand, Bangkok, Thailand*

Keywords: Electronic Health Records, EHR, Health Information Technology, EHR Policy, Physician Attitude.

Abstract: In this position paper, the satisfaction of health care providers with electronic health record (EHR) systems is discussed. Based on a survey just before the deadline for EHR adoption incentive by the U.S. government, we conclude that too many physicians and medical care providers do not like the current state of the systems, feel forced to use them, and get insufficient benefits from them. We urge all involved parties to collaborate and design systems that are more in agreement with the practices of the different parties and specialties in the health care industry.

1 INTRODUCTION

It has been over ten years since the United States enacted the American Recovery and Reinvestment Act (ARRA) of 2009 which allotted about $20 billion for health care spending to modernize Health Information Technology (HIT) systems. The law included the Health Information Technology for Economic and Clinical Health Act, or the "HITECH Act," which established $35 billion programs under the Centers of Medicare and Medicaid Services (CMS) to provide incentive payments for the "meaningful use" of certified electronic health records (EHR) technology. The goal was to expand the adoption and use of HIT and benefit from a reduction in health care costs and improvement in quality of care.

The adoption rate did spike between 2009 and the deadline for the incentives in 2015, reaching over 80% for basic, but certified, EHR systems according to the CMS. Today, we stand close to 90% adoption of systems that meet "meaningful use" in major hospitals, with smaller and rural practices consistently less (CMS). A higher rate of adoption and a wider spread of EHR systems can mean better medical care for the patient (Gilmer, et al., 2012). However, for this to happen, the systems require data sharing and exchange with and between institutions, a criteria that only 12% of the systems meet (Rathert, et al., 2019).

Such discrepancy between individual facility setup and cross-facility medical data sharing questions the success of the national EHR implementation. An EHR is the comprehensive computerized record of one patient. It is composed of medical records from multiple Care Delivery Organizations (CDO) (Garets & Davis, 2006). In times like during the Covid-19 pandemic or with emergency medical needs, patients often visit the closest care providers regardless whether they are in their network or not. Real-time access to unified and comprehensive historical records, without the explicit release of data by individual physicians, is key in making the right diagnosis and recommending the right treatment.

Our position is that medical data transference from one provider to another and real-time access to the full historical records of a patient is a mandatory condition for a meaningful EHR adoption. The current official opinion about EHR adoption in the U.S. is misleading. The government and its policymaking alone are not sufficient to drive a beneficial adoption of the EHR technology in the U.S. Cooperation and collaboration with physicians, a primary and large EHR system user group (Kapoor &

---

[a] https://orcid.org/0000-0003-3735-5764

[b] https://orcid.org/0000-0002-0881-5330

Lee, 2013), is required to accurately assess the ease of capturing data in the system, the impact on workflow, the validity of cross-provider history, and the impact of EHR systems on the overall medical care quality, performance, efficiency, and cost.

2 ARGUMENT

2.1 Innovation in Health Care

The innovation implementation process of EHR systems in the U.S. health care industry is lengthy and complex, requiring multi-stage system setup, adoption, and integration (Rathert, et al., 2019; Kralewski, et al., 2008). It is promising to know work is being done to build assistive decision support using unstructured medical data (Barbantan & Potolea, 2016), leverage multiple view service-oriented architecture to conform medical applications of different types (França, et al., 2017), and learn from the application of a standardized information and communication infrastructure (Katehakis & Kouroubali 2019). But we are not there yet. The industry is composed of health care sponsors and providers of both public and private sectors. All of them bear responsibility for EHR system development and advancement. Addressing and resolving issues to reach mutually beneficial goals is needed (Katehakis and Kouroubali 2019).

As a public health care sponsor, the U.S. government supports the adoption of EHR technologies to achieve cost and quality benefits and has achieved a reduction in Medicare expenditures (Lammers and McLaughlin, 2017). However, the intentions of medical care providers have not been clear. Physicians and clinicians have divided opinions regarding EHR system's advantages (O'Malley, et al., 2010), and there is no consensus on how to achieve EHR system benefits across the U.S. health care system as a whole (Gaylin, et al., 2011). Furthermore, and contrary to the government's expectations, certain benefits of EHR systems like convenient access to tests, including electronic imaging results, seems to encourage physicians to increase their testing and imaging ordering, rather than reduce them (McCormick, et al., 2012).

2.2 Opinions of Physicians

In mid-2014, just before the deadline for incentives, we conducted a survey of 382 physicians (El-Yafouri & Klieb, 2014) across 47 different U.S. states with 54% (206) private practitioners and 46% (176)

associated with larger institutions like hospitals or public clinics to capture their attitudes and perceptions toward their EHR systems. Of the 382 respondents, 71% (271) were male and 29% (111) were female physicians. Linear regression analysis revealed that physicians' attitude is strongly affected by their perception of how EHR systems can benefit the industry, and attitude has the strongest effect on their intention to adopt and use EHR systems. This is confirmed by Hung (2019) where physicians' satisfaction and continuance intention to use EHR systems is highly impacted by their perception of the system's ability to improve patient care.
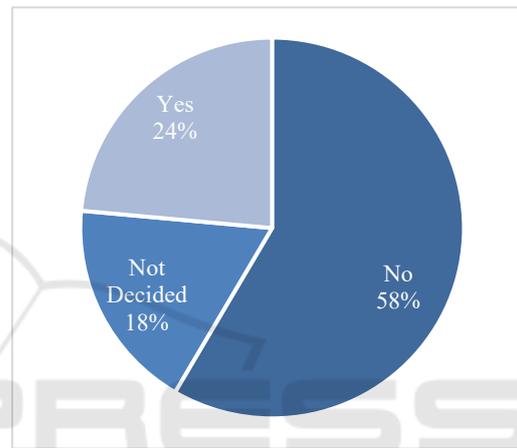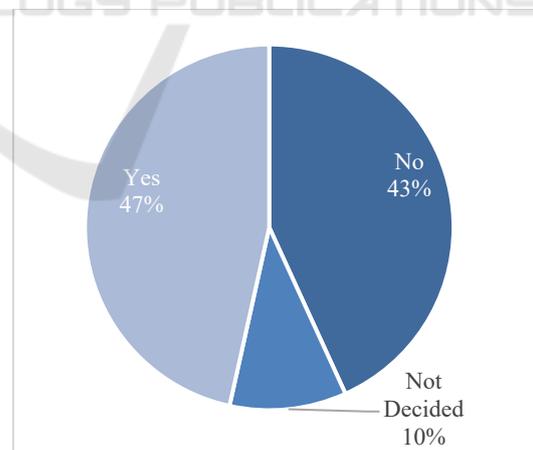

Figure 1: EHR Reduces Cost.

Figure 2: EHR Enhances Quality of Care.

Physicians opinions and satisfaction matter. Our survey showed that physicians are split in opinion and perception, with 58% of them believing that EHR systems will not reduce costs (Figure 1), and 43% of the physicians do not believe it will enhance quality of care (Figure 2). They referred to EHR systems as a

disaster and described them as a nightmare. They did not believe that EHRs are created or put in place for the betterment of health care or patient care; rather they are built for economic reasons and mainly to facilitate the billing and payments by the government and insurance companies.

67% of the participants agreed that the government policy and mandate was the primary reason for using the system (Figure 3), and 42% noted that it did not meet their expectations or take into consideration their needs as medical professionals (Figure 4). They saw the systems as sophisticated billing devices or glorified filing cabinets. Respondents felt that the standards of EHR systems, including the government's meaningful use, were too many – required by the government, but useless to medicine.
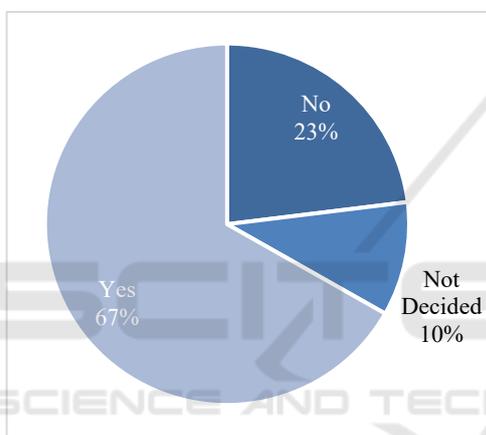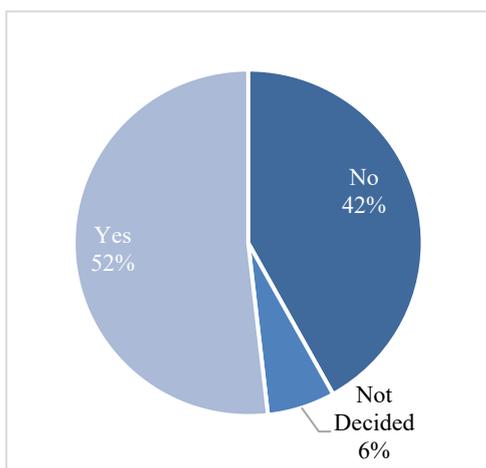
When it came to privacy and data security, 57% had concerns (Figure 5). They anticipated more fraudulent documentation, breach of data, and invasion to patient privacy. Physicians supported data exchange but only a third could confirm compliance with data exchange or ability to transfer records. They noted that although many vendors were certified by the government that their systems supported meaningful use and data sharing, it was misleading. Most systems were not compatible with each other and had not shown or proven that they could in fact share and exchange data with other EHR systems.
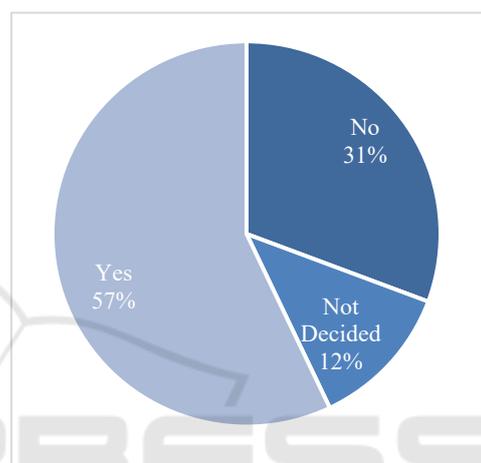

Figure 5: Privacy and Security Concerns.

Figure 3: Government Main Reason for Adoption.

Figure 6: EHR's Impact on Workflow.

Figure 4: EHR Meets Physicians' Expectations.
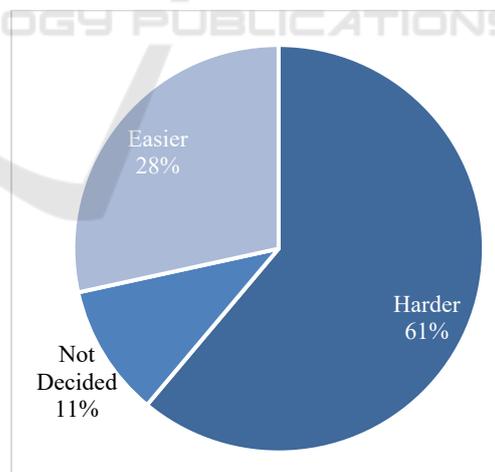
61% of the respondents said that their EHR system made their operations and workflow more difficult (Figure 6) – the system is not easy to use taking lots of time to capture information and worsening the doctor-patient relationship. Some physicians felt that the role of doctors and nurses had

changed to data entry clerks. Tai-Seale (2017) found that on average, physicians were spending more time practicing desktop medicine than face-to-face patient interactions and communications.

Finally, 41% of the physicians had no to moderate knowledge of EHR systems, their requirements, or their anticipated benefits to health care. That is a problem knowing that complex innovation integration, like EHR systems, requires knowledge creation and diffusion (Kukk, et al., 2015; Pombo-Juárez, et al., 2017).

The results show that physicians feel coerced to using EHR systems, a whopping 79% of the physicians described the decision to use the EHR system in their practice as mandated. They felt that EHR systems were forced on the medical community and enforced by those who are far from the medical industry. They added that most systems were designed and developed without the input of medical clinicians, and thus not intended to meet medical effectiveness.

The disconnect between the government's expectations and measure of success and the physicians' needs to do their jobs well has led to sub-par benefits of the EHR innovation for the patient as well as the industry. After more than a decade, practices continue to struggle today in supporting medical data transference and exchange due either to technical limitations, undeveloped privacy policies, or lack of trust of physicians in the captured information from other practices.

2.3 Collaboration for Adoption

Although, according to Watkins et al. (2015), governments have been known to "play a central orchestrating role in the generation and diffusion of innovation in a national economy" (p. 1408), it has not been effective in the U.S. In the EHR diffusion case, the traditional method of making policies to steer the adoption of innovation in industries like health care, may not be enough. Lack of standardization is the biggest challenge according to Rathert et al. (2019). And without standardization, data sharing cannot happen. Other recent literature shows that intermediary industry associations have an increasing involvement in cooperative relations between government and industry aimed at influencing an innovation's diffusion, adoption, training, and standards (Watkins, et al., 2015). These associations create and set industry protocols and common best practices to which physicians are driven to adhere, with an unbiased interests and proof that

the innovation can bring a clear advancement over the current state.

This requires acknowledging that the decision to diffuse electronic records is not held by the government or any one party. Work is needed to collaborate, converge the needs, and bridge the gap between the expectations of the payer, provider, public, and private groups, especially physicians. This complements – or becomes more prominent than – the method of passing laws. Specific roles and responsibilities must be identified and defined, and then, each group should be made aware of and experience the tangible benefits from the adoption of technology in health care. A proven balance between medical expenditure reduction, medical care quality improvements, end user's needs, and the patient's wellness is required to attain and sustain a national patient health system diffusion with an interoperability model.

3 CONCLUSIONS

The adoption rate of EHR in the U.S. according the CMS and the government may just be shy of 100% at this time, but this rate represents the technical and tactical implementation of the system in practices and medical facilities. It is reflective only of the decision made by hospitals, laboratories, clinics, and offices to install, use, and maintain the application at their individual CDOs. It does not however reflect the success of those separate systems to accurately and consistently share or exchange data between themselves or to tap into a central common repository of medical information. Nor does it reflect the support, satisfaction, and confidence of the physicians, one of the largest user group, in the system. The benefits have been one-sided. Billing and claim tracking may be easier for the payer, but care providers and physicians have yet to see the full value.

More importantly, patients who seek to visit multiple doctors, due to the need for different opinions or due to a geographical inconvenience, are still at the mercy of their physicians to transfer their medical history, be it a digital or paper record. An EHR system is meant to create an ecosystem in which medical information is accessible by licensed medical professional anywhere and anytime. Without this feature, we can hardly claim that we are near complete success. Success will require all parties, public and private, to play supportive, engaging, and cooperative roles and achieve genuine and unbiased

benefits to the industry. And that cannot be reached if the satisfaction and convenience of physicians are suffering.

REFERENCES

Barbantan, I., & Potolea, R. (2016). Learning Diagnosis from Electronic Health Records. *KDIR* (pp. 344-351).

El-Yafouri, R., & Klieb, L. (2014). Electronic medical records adoption and use: Understanding the barriers and the levels of adoption for physicians in the USA. *2014 IEEE 16th International Conference on e-Health Networking, Applications and Services (Healthcom)* (pp. 506-512).

França, J. M., Lima, J. D. S., & Soares, M. S. (2017). Development of an Electronic Health Record Application using a Multiple View Service Oriented Architecture. *ICEIS* (2) (pp. 308-315).

Garets, D., & Davis, M. (2006). Electronic medical records vs. electronic health records: yes, there is a difference. *Policy White Paper. Chicago, HIMSS Analytics*, 1-14.

Gaylin, D. S., Moiduddin, A., Mohamoud, S., Lundeen, K., & Kelly, J. A. (2011). Public attitudes about health information technology, and its relationship to health care quality, costs, and privacy. *Health Services Research*, 46(3), 920-938.

Gilmer, T. P., O'Connor, P. J., Sperl-Hillen, J. M., Rush, W. A., Johnson, P. E., Amundson, G. H., Asche, S. E., & Ekstrom, H. L. (2012). Cost-effectiveness of an electronic medical record based clinical decision support system. *Health Services Research*, 47(6), 2137-2158.

Hung, S., Nakayama, M., Chen, C. & Tsai, F. (2019) Physician perceptions of electronic medical records: the impact of system service quality, and generation/experience gaps, *International Journal of Healthcare Technology and Management*, 17(4).

Kapoor, R., & Lee, J. M. (2013). Coordinating and competing in ecosystems: How organizational forms shape new technology investments. *Strategic Management Journal*, 34(3), 274-296.

Katehakis, D. G., & Kouroubali, A. (2019). A Framework for the Consistent Management of eHealth Interoperability in Greece. *ICEIS* (2) (pp. 689-695).

Kralewski, J. E., Dowd, B. E., Cole-Adeniyi, T., Gans, D., Malakar, L., & Elson, B. (2008). Factors influencing physician use of clinical electronic information technologies after adoption by their medical group practices. *Health Care Management Review*, 33(4), 361-367.

Kukk, P., Moors, E. H. M., & Hekkert, M. P. (2015). The complexities in system building strategies—The case of personalized cancer medicines in England. *Technological Forecasting and Social Change*, 98, 47-59.

Lammers, E. J., & McLaughlin, C. G. (2017). Meaningful use of electronic health records and medicare expenditures: Evidence from a panel data analysis of US health care markets, 2010–2013. *Health Services Research*, 52(4), 1364-1386.

McCormick, D., Bor, D. H., Woolhandler, S., & Himmelstein, D. U. (2012). Giving office-based physicians electronic access to patients' prior imaging and lab results did not deter ordering of tests. *Health Affairs*, 31(3), 488-496.

O'Malley, A. S., Cohen, G. R., & Grossman, J. M. (2010). Electronic medical records and communication with patients and other clinicians: are we talking less?. *Issue brief (Center for Studying Health System Change)*, (131).

Rathert, C., Porter, T. H., Mittler, J. N., & Fleig-Palmer, M. (2019). Seven years after Meaningful Use: Physicians' and nurses' experiences with electronic health records. *Health Care Management Review*, 44(1), 30-40.

Pombo-Juárez, L., Könnölä, T., Miles, I., Saritas, O., Schartinger, D., Amanatidou, E., & Giesecke, S. (2017). Wiring up multiple layers of innovation ecosystems: Contemplations from Personal Health Systems Foresight. *Technological Forecasting and Social Change*, 115, 278-288.

Tai-Seale, M., Olson, C. W., Li, J., Chan, A. S., Morikawa, C., Durbin, M., ... & Luft, H. S. (2017). Electronic health record logs indicate that physicians split time evenly between seeing patients and desktop medicine. *Health Affairs*, 36(4), 655-662.

Watkins, A., Papaioannou, T., Mugwagwa, J., & Kale, D. (2015). National innovation systems and the intermediary role of industry associations in building institutional capacities for innovation in developing countries: A critical review of the literature. *Research Policy*, 44(8), 1407-1418.