

Advantages and Limitations of EHRs: A Global
Perspective

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I. INTRODUCTION

Electronic health records (EHRs), also known as electronic medical records (EMRs), are computerized medical documents.¹ Perhaps more appropriately, they are also referred to as a “repository of electronically maintained information about an individual’s lifetime health status and health care.”² Advocates of EHRs believe that the coordination of care can be improved through their use.³ There is, however, debate as to whether the current use of EHRs improves health care and better facilitates coordination.⁴ By taking a comparative view of EHRs in a global context, better arguments can be made as to their effectiveness.

Despite the fact that American patients have better access to medical care than many other countries, physicians in the United States lag on EHR use.⁵ Particularly telling is that “[a]mong all major segments of the U.S. economy, health care has lagged in realizing benefits from information technology,” and unlike other industries, such as manufacturing, finance,

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1. Menachem M. Meller., *EMRs: Confronting the Challenge*, AAOSNOW, Feb. 2011, at 38 [hereinafter Meller].

2. Sharona Hoffman, *Employing E-Health: The Impact of Electronic Health Records on the Workplace*, KAN. J. L. & PUB. POL’Y, 409, 412 (2010).

3. Ann S. O’Malley et al., *Are Electronic Medical Records Helpful for Care Coordination? Experiences of Physician Practices*. 25 J. GEN. INTERNAL MED. 177, 177 (2009).

4. *Id.*

5. Doug Trapp, *U.S. physicians lag on EMR use*, AMERICAN MEDICAL ASSOCIATION (2009), <http://www.ama-assn.org/amednews/2009/11/16/gvdsd1119.htm>.

and retail that have been automated through information technology, health care disproportionately relies on paper flowing through and being stored within organizations.⁶

During a 2009 survey of doctors in Australia, Canada, France, Germany, Italy, the Netherlands, New Zealand, Norway, Sweden, the United Kingdom, and the U.S., the U.S. reported the second lowest use of EHR systems for more than just billing purposes.⁷ In contrast, the Scandinavian countries have nearly 100% adoption of EHRs.⁸ Because Sweden, Finland, the Netherlands, and Denmark utilize EHRs at rates of 100%, 99%, 98%, and 95%, all of these countries are referenced for the purpose of this study.⁹ In addition, the U.K. has a current EHR adoption rate of 90%, due to its National Health System.¹⁰

Although social, economic, and political differences may exist between these countries and the U.S., a study of EHRs in these foreign countries can help identify ways of overcoming barriers and other strategies that may aid in the adoption of EHRs in the U.S. With this in mind, this article will first explore the benefits and address the concerns of EHRs. In an effort to identify best practices, it will then look at the success and failure of EHR utilization in the Scandinavian countries and the U.K. This article will then address the state of EHRs in the U.S. and possible improvements.

II. OVERVIEW OF EHRs

Before beginning to discuss how EHRs are better utilized, a discussion of the reasons for and against their presence in U.S. healthcare is needed.

6. Greg R. Vetter, *Slouching Toward Open Innovation: Free and Open Source Software for Electronic Health Information*, 30 WASH. U. J.L. & POL'Y 179, 199 (2009).

7. Trapp, *supra* note 5.

8. Daniel Castro, THE INFO. TECH. & INNOVATION FOUND, EXPLAINING INTERNATIONAL IT APPLICATION LEADERSHIP: HEALTH IT 9 (2009) [hereinafter Castro].

9. *Id.*

10. *Id.*

During the initial development of EHRs, the Institute of Medicine hoped that EHRs would be “an electronic patient record that resides in a system specifically designed to support users through availability of complete and accurate data, practitioner reminders and alerts, clinical decision support systems, links to bodies of medical knowledge, and other aids.”¹¹ These qualities are striving to make EHRs a tool to reduce practice costs, limit clutter, and accelerate transfer of medical charts between practices.¹²

Proponents of EHRs also argue that this technology may significantly reduce clinician workload and limit medical errors.¹³ As of 1999, an estimated 44,000 to 98,000 people die each year in the U.S. due to medical errors.¹⁴ As a result of EHR implementation, some believe that their use can lead to an improvement in the coordination of care.¹⁵ Unlike paper-based medical records, EHRs allow more than one doctor or specialist to view a medical record at any given time.¹⁶ Improved coordination of care can also be achieved, as health care providers are able to electronically access the entirety of a patient’s electronic medical history.¹⁷ Perhaps most importantly, EHR systems can directly limit medical errors through automatic alerts for “patient allergies, appropriate diagnostic tests, potential drug interactions, and other matters.”¹⁸

Despite the benefits that EHRs can provide, they are not perfect. Chief among the concerns about EHRs are the cost of implementation. While the

11. *Id.*

12. *See* Meller, *supra* note 1.

13. *See* Sameer Kumar & Krista Aldrich, *Overcoming Barriers to Electronic Medical Record (EMR) Implementation in the US Healthcare System: A Comparative Study*. HEALTH INFORMATICS J., 16(4), 306-318 (2010).

14. Castro, *supra* note 8, at 11.

15. O’Malley, *supra* note 3, at 177.

16. Vetter, *supra* note 6, at 201.

17. *Ortega v. Colorado Permanente Grp, P.C.*, 265 P.3d 444, 447 (Colo. 2011), *reh’g denied* (Dec. 5, 2011).

18. Sharon Hoffman, *Employing E-Health: The Impact of Electronic Health Records on the Workplace*, 19 KAN. J. L. & PUB. POL’Y 412 (2010).

belief is that EHRs will eventually decrease the costs of medical treatment, implementing the system is very costly. Cedars Sinai Medical Center in Los Angeles recently implemented a \$34 million physician order entry order system.¹⁹ Despite this large cost, physicians were overwhelmed with the daily electronic alerts and several hundred refused to even utilize the system; as a result, the EHR program was canceled by the hospital administration.²⁰

Because EHRs are a developing technology, physicians have expressed concerns about their functionality. The software requires mastering new technology, time-consuming data entry, and expensive computer programming.²¹ This problem is exacerbated, however, due to evolving software technology. Specifically, EHR software involves “preexisting technologies, evolving hardware and software platforms, user requirements, business process demands, interoperability and availability needs, standards entanglements, and licensing methods.”²²

Another complaint by physicians is that EHRs currently increase the daily workload. A study at Oakland-based Kaiser Health Plan found that doctors had to spend an extra thirty to seventy-five minutes per day after the implementation of the Clinical Information System.²³ Specifically, doctors have complained that the systems are “over-engineered.”²⁴ Even with a training program, doctors complain that EHR programs are not natural and require clicking and scrolling through unneeded screens and windows.²⁵ “A typical EHR system contains hundreds and hundreds of screens that need to

19. John B. Smelcer, Hal Miller-Jacobs, & Lyle Kantrovich, *Problems with Electronic Medical Records*, 2 J. USABILITY STUD. 72 (2009).

20. *Id.*

21. Meller, *supra* note 1, at 38.

22. Vetter, *supra* note 6, at 181.

23. Smelcer, *supra* note 22, at 72.

24. *Id.*

25. *Id.*

be accessed through the system's navigational scheme using tabs, buttons, and hyperlinks. Learning the right path takes time."²⁶ Like all software, EHRs also include delayed system response time, the requirement to log in and out when changing workstations (or in this case, exam rooms), and screens packed with information.²⁷

EHRs are also limited if they cannot adapt to a specialist's needs. If an EHR system relies on text, specialists that require drawings or different forms of inputting are restricted.²⁸ Despite the belief that EHRs will reduce errors, there is also the possibility that other types of errors may develop. Depending upon the physician's usual task flow, a physician may enter notes into the EMR software while the patient is present.²⁹ This results in longer and unnecessary use of the patient's time. On the other hand, a physician with a demanding workload may wait until the end of the day to input data into an EHR, thereby relying on human memory.³⁰ Additional errors occur when a clinic's standing orders and EHRs contradict each other. For example, one observation found that errors occurred when nurses were required to log into an EHR system and order labs and procedures, because those labs and procedures were then sent to the ordering nurse instead of the physician.³¹ Additionally, until a complete transition to EHR use occurs, physicians also have the burden of dealing with "hybrid" record environments that include both paper and electronic records.³²

26. *Id.* at 73.

27. *Id.*

28. *Id.* at 77.

29. *Id.* at 75.

30. *Id.*

31. *Id.* at 74.

32. IRON MOUNTAIN, A SMOOTH TRANSITION TO AN EFFECTIVE TO AN EFFECTIVE ELECTRONIC MEDICAL RECORDS SYSTEM (2012) [hereinafter IRON MOUNTAIN], <http://www.ironmountain.com/Knowledge-Center/Reference-Library/View-by-Documents-Type/General-Articles/A/A-Smooth-Transition-to-an-Effective-Electronic-Medical-Records-System.aspx>.

Like all medical records, there are privacy concerns when dealing with EHRs. Some doctors fear that their patients may not be as forthcoming due to privacy and security concerns of this technology.³³ Conversely, there are concerns that the use of EHRs may make it easier for employers to obtain personal health information and possibly lead to discriminatory decisions, privacy threats, and associated litigation.³⁴

The Health Insurance Portability and Accountability Act (HIPAA) is designed to protect any and all medical information “whether oral or recorded in any form or medium” to regulate health information.³⁵ Despite concerns over patient record privacy, advocates of EHRs actually argue that records are more secure because “deploying EHR systems with robust technical controls, including encryption, electronic identification, and audit logs can improve the privacy and security of personal medical data.”³⁶

III. EHRs IN FOREIGN COUNTRIES

The rate of adoption of EHRs varies drastically between different countries, and there is the inference that “progress is not limited by the costs, quality or usefulness of the technology, but rather by other factors that nations can influence.”³⁷ Scandinavian countries, such as Denmark, Finland, and Sweden, “are definitely ahead of the United States and most other countries in moving forward with their health IT systems.”³⁸

Unlike the U.S. approach of attempting to build the EHR network from the bottom up, “Denmark, Finland, and Sweden have all implemented

33. Meller, *supra* note 1, at 38.

34. Hoffman, *supra* note 2, at 410.

35. South Carolina Med. Ass’n v. Thompson, 327 F.3d 346, 353 (4th Cir. 2003) (quoting 42 U.S.C.A. § 1320d(4) (West 2010)).

36. Castro, *supra* note 8, at 3.

37. *Id.* at 1.

38. *Id.* at 7.

national-level strategies. . .”³⁹ These countries also have the benefit of single-payer health care systems and government-run hospitals.⁴⁰ Countries such as Denmark and Norway have also spurred EHR growth by mandating e-prescriptions.⁴¹

Developed countries such as Denmark, Sweden, and Finland also have an advantage of having a “relatively technologically sophisticated population. . .”⁴² This aspect not only raises patient expectations, but also enables better access and care through networks.⁴³ Amplified by the sophisticated population, Swedish health professionals also have access to Sjunet to coordinate care. Sjunet, the national broadband network in Sweden, enables “the secure exchange of health information” among health centers.⁴⁴

The United Kingdom also has an advanced system of EHR use.⁴⁵ Although EHRs are emerging technology, the idea of collective public health care in the U.K. dates back to medieval times.⁴⁶ Needless to say, the cost of healthcare has increased dramatically since that time.

Compared to the per capita cost of \$7,421 that the U.S. spends on healthcare, the U.K. system only spends \$2,317 per person per year.⁴⁷ One advantage that the U.K. has to decrease per capita cost and more effectively utilize EHRs is the centralized health care system known as the National Health Service, thus creating an easier route for coordination.⁴⁸ Because

39. *Id.* at 1.

40. *Id.* at 2.

41. *Id.*

42. *Id.* at 3.

43. *Id.* at 2-3.

44. *Id.*

45. *Id.* at 7.

46. John Middleton, *Healthy People, Healthy Lives. The English Public Health White Paper: Risks and Challenges for a New Public Health System*, 11 *CLINICAL MED.* 430, 430 (2011) [hereinafter Middleton].

47. Smelcer, *supra* note 19, at 71.

48. Castro, *supra* note 8, at 2.

the system is centralized, it does not have to face the many challenges of a fragmented health care industry. As “one of the world’s largest employers with over 1.3 million individuals on its payroll,” the NHS can also provide influential financial incentives.⁴⁹ The NHS National Programme for IT created a budget representing approximately 0.08% of the nation’s entire GDP.⁵⁰

Despite the presence of the NHS and extensive EHR utilization, the U.K. still has pressing health concerns. Specifically, the country has one of the “worst levels of obesity in the world.”⁵¹ Smoking-related deaths total 80,000 lives per year.⁵² Additionally, British citizens who live in the poor areas are expected to live up to seven fewer years than those in affluent areas.⁵³

Like the Scandinavian countries, the U.K. emphasizes “e-health” by providing patients with 24/7 health care information through the web or phone.⁵⁴ NHS Direct, the nation’s e-health portal, “was designed to point people in the right direction for the most appropriate form of treatment and encourage the best use of health services.”⁵⁵ Moreover, fifty percent of all of the NHS referral activity goes through another e-health portal known as NHS Choices where patients can obtain “information on medical conditions, treatment options, and drug information.”⁵⁶ These tools also provide the resources for patients to research a variety of health care providers.⁵⁷ It is useful to keep these tools in mind when beginning to consider health care in the U.S.

49. *Id.* at 28.

50. *Id.*

51. Middleton, *supra* note 46, at 430.

52. *Id.*

53. *Id.*

54. *Id.* at 15.

55. *Id.* at 17-18.

56. *Id.* at 18.

57. *Id.*

IV. THE STATE OF EHRs IN THE U.S.

Though it is well known that the United States spends more per capita on health care than other countries, “[w]hat may be less known is that the United States still has one of the highest growth rates in health care spending.”⁵⁸ A 2009 survey by *The New England Journal of Medicine* found that just 1.5% of U.S. hospitals have a comprehensive electronic records system and only 7.6% have a basic system, with EMR present in at least one clinical unit.⁵⁹ The U.S. attempted to improve these numbers and facilitate the use of EHRs through the Health Information Technology for Economic and Clinical Health Act (HITECH Act).⁶⁰ The HITECH Act, enacted on February 17, 2009, expressed Congress’s goal that health care providers would use EHRs by 2014.⁶¹ The American Recovery and Reinvestment Act (ARRA) authorized \$19.2 billion to spur the use and adoption of EHRs to help the “ultimate purpose of the legislation [to] improve the healthcare of patients.”⁶² Additionally, “financial penalties for non-compliance in the form of decreased Medicare reimbursement of anywhere from 1% in 2015 to a full 5% by 2019” may be assessed against any practice in the U.S. that is not fully digital by each yearly threshold.⁶³

Before the HITECH Act was enacted in 2009, “only 1.5% of U.S. acute care general hospitals had comprehensive EHR systems and that an

58. See KAISER FAMILY FOUNDATION, HEALTH CARE SPENDING IN THE UNITED STATES AND OECD COUNTRIES (2011), available at <http://www.kff.org/insurance/snapshot/chcm010307oth.cfm>.

59. A.K. Jha et al., *Use of Electronic Health Records in U.S. Hospitals*, 360 NEW ENG. J. MED. 16, (2009).

60. *Hegmann v. Sebelius*, No. 09 Civ. 5880 (BSJ), 2010 WL 2643301, at *1 (S.D.N.Y. May 13, 2010); HITECH Act, 42 U.S.C. §17931 *et seq.* (2009).

61. *Id.*

62. Ethan Katsh et. al., *Is There an App for That? Electronic Health Records (Ehrs) and A New Environment of Conflict Prevention and Resolution*, 74 L. & CONTEMP. PROBS. 31, 36 (2011).

63. Anthony Papillion, *Purchasing electronic medical records software with economic stimulus funds*, HELIUM (2009).

additional 7.6% had basic EHR systems in 2008.”⁶⁴ The adoption of EHRs fail in countries like the U.S. because of the fragmentation of the health market.⁶⁵ In a comparison of EHR use in England, Scotland, and Denmark, it was noted that the use of EHRs had been consistent with the growth of EHRs in other European countries.⁶⁶ The very centralized health system in the European countries may be a contributing factor to the growth of EHRs in those countries.⁶⁷ In addition to the strong national network, there is an early emphasis on EHRs by health professionals and professional colleges.⁶⁸

One way to promote a national health IT system in the United States, according to Daniel Castro, the author of the Informational Technology and Innovation Foundation Report, is the adoption of e-prescriptions.⁶⁹ E-prescriptions are prescriptions generated electronically through computers, digital assistants, or mobile phones.⁷⁰ As previously discussed, government mandates of e-prescriptions helped EHR growth in countries like Denmark and Norway.⁷¹ Although the use of e-prescriptions has increased from two percent of all prescriptions in 2007 to seven percent in 2008, this is still a relatively small amount.⁷² By increasing the use of e-prescriptions, EHRs not only become more familiar to health care providers, but it reduces demands on doctors and pharmacies. The traditional pen and paper, faxes, and telephones “account for up to 20 percent of the time of the staff at a

64. Dukyong Yoon, et al. *Adoption of electronic health records in Korean tertiary teaching and general hospitals*, 81 INT’L J. MED. INFORMATICS 196, 197 (2012).

65. Denis Protti, et al., *Primary Care Computing in England and Scotland: A Comparison with Denmark*, 14 INFORMATICS PRIMARY CARE 93, 98 (2006).

66. *Id.*

67. *Id.*

68. *Id.*

69. *See* Castro, *supra* note 8, at 13-14.

70. *Id.* at 13.

71. *Id.* at 2.

72. *Id.* at 15.

doctor's office and 25 percent of the time of pharmacists.”⁷³ It is the aim of e-prescriptions to reduce this time drain.

One factor of EHR implementation that has been argued as both an advantage and disadvantage of EHR implementation is the population of the country.⁷⁴ Economies of scale suggest that EHR implementation would be cheaper on a pro rata allocation.⁷⁵ Under this theory, the cost of EHR implementation can be spread across a larger pool of shareholders. On the other hand, smaller populations tend to result in easier coordination between health providers.⁷⁶ Given the advantages and disadvantages of each, it is difficult to argue population size for either position.

The financial incentive for health care providers to invest in EHR technology is also blurred. Because of the “asymmetrical relationship between costs and benefits” of EHR systems, some of the financial benefits pass over the health care provider who invested in the technology and end up in the hands of health insurers and patients.⁷⁷ As a result, additional financial incentives, such as payment bonuses for providers may need to be created by the U.S. government through efforts similar to the American Recovery and Reinvestment Act.⁷⁸

V. CONCLUSION

Although evidence exists that “about 75% of information system implementations in health care have failed,” case studies have been able to identify best practices to implement and expand the use of EHRs.⁷⁹ As seen in this article, Denmark, Finland, Sweden, and the U.K. have been able to

73. *Id.* at 14.

74. *Id.* at 2.

75. *Id.*

76. *Id.*

77. *Id.* at 28.

78. *Id.* at 29.

79. Marie-Pierre Gagnon et. al., *Implementation of an electronic medical record in family practice: a case study*, 18 *INFORMATICS PRIMARY CARE*, 31, 37 (2010).

implement successful EHR policies.

It is noteworthy, however, that no single metric of progress is determinative of the success for EHR utilization. Although Finland has no e-prescription technology, the country has the highest adoption rate of EHRs among all of the countries in the ITIF study.⁸⁰ A further illustration of this is that the U.S. has a “high 5-year cancer survival rate but a low 5-year kidney transplantation survival rate.”⁸¹

Nonetheless, an exploration of policies in foreign countries can help the U.S. improve its own system by identifying best practices. This idea is supported by the Information Technology and Innovation Foundation recommendation that the United States borrow “policies from leading nations to help spur EHR adoption.”⁸² Because a strong correlation exists between EHR use and elements of effective clinical care, the U.S. has incentive to increase its use of the developing technology.⁸³

If done properly, the U.S. will feel immediate benefits of “accurate medication lists, legible notes and prescriptions, immediately available charts, decreased chart pulls, lower transcription costs, medical error reduction and improvement in quality care and patient safety.”⁸⁴ Implementing an EHR system, however, is challenging due to the planning, management, leadership, and training that is required.⁸⁵ Nonetheless, by gleaned information and techniques from foreign countries, it is believed that EHRs can improve U.S. healthcare.

80. Castro, *supra* note 8, at 9.

81. *Id.*

82. Bob Brewin, *U.S. Lags Behind in Adopting Electronic Medical Records*, NEXTGOV (Sep 22, 2009), http://www.nextgov.com/ng_20090922_4329.php?oref=topstory.

83. See Smelcer, *supra* note 19.

84. Faustine Williams et. al., *The role of the electronic medical record (EMR) in care delivery development in developing countries: a systemic review*, 16 *INFORMATICS PRIMARY CARE* 139, 142 (2010).

85. *Id.*