

ELECTRONIC HEALTH RECORDS – BENEFITS, SAVINGS AND COSTS

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ABSTRACT

Background: The electronic health record is a systematic collection of electronic health information about an individual patient.

Research question: What are the costs, benefits and savings of electronic health records?

Method: Review of existing literature

Results: The Electronic health record offers physicians access patient information available in one place, with an easy to read unified structure.

Conclusions: Since 15.04.2013 Electronic health records are available in Bulgaria and can be accessed by patients via a personal 10 digit code.

Keywords: *EHR, Internet, patient information*

Background: The Electronic Health Record (EHR) is a secure, real-time, point-of-care, patientcentric information resource for clinicians An electronic health record is a representation of all the data a patient has that would originally be found in the paper based record. It contains a broad spectrum of health information – medical history, medication and allergies, immunization status, laboratory test results, vital signs, as well as demographic and billing data. The health record is not limited to text data only, it could have images from different specialities – radiology, pathology, ophthalmology.

The first ideas for electronic storage of medical information date back to 1960. The concept for electronic patient records was created in 1990 and its' aim is to help physicians cope with the increasingly complex medical care and give them constant access to up-to-date patient information. [10] Since their creation the content, structure, and technology of such records were frequently changed and adapted. The electronic health record of today is a systematic collection of electronic health information about an individual patient.

Before being implemented an electronic health record must respond to certain criteria accepted in the U.S. and European Union. [3,11]

The core requirements for any EHR include: use of computerized order entry for medication orders; implementation of drug-drug and drug-allergy checks; ability to generate and transmit permissible prescriptions electronically; ability to record demographics; maintain an up-to-date problem list of current and active diagnoses; maintain active medication list; maintain active medication allergy list; record and chart changes in vital signs; record smoking status for patients 13 years old or older; implement one clinical decision support rule; report ambulatory quality measures; provide patients with an electronic copy of their health information upon request; provide clinical summaries to patients for each office visit; capability to exchange key clinical information electronically among providers and patient authorized entities; protect electronic health information (privacy & security).

The menu requirements include: implement drug-formulary checks; incorporate clinical lab-test results into certified EHR as structured data; generate lists of patients by specific conditions to use for quality improvement, reduction of disparities, research, and outreach; send reminders to patients per patient preference for preventive/ follow-up care; provide patients with timely

electronic access to their health information (including lab results, problem list, medication lists, allergies); use certified EHR to identify patient-specific education resources and provide to patient if appropriate; perform medication reconciliation as relevant; provide summary care record for transitions in care or referrals; capability to submit electronic data to immunization registries and actual submission; capability to provide electronic syndromic surveillance data to public health agencies and actual transmission.

Before acceptance the electronic health record must possess all core requirements and at least five out of ten of the menu requirements.

Research question: What are the costs, benefits and savings of electronic health records?

Method: Review of existing literature

Results:

The term electronic health record (EHR) is widely used. It describes the concept of a comprehensive, cross-institutional, and longitudinal collection of a patient's health and healthcare data. It, therefore, includes data that is not only particularly relevant to a subject's medical treatment but also to a subject's health in general. The patient is regarded as an active partner in his/her treatment by accessing, adding, and managing health-related data, thereby supporting care [1]

The digital storage of medical information offers many advantages over the classic method of paper-based storage. Despite this the familiar paper-based record is relatively easy to use and has low initial cost, which is the reason for many physicians to still prefer and use it. This is offset however by the significant amount of storage space required compared to digital records. In the United States and European Union, physical records are held from three to seven years. The cost additionally rises from the usage of different storage media, such as film, while electronic storage media has minimum space requirements. [19]

Modern day health care requires physicians to access patient information which is differently structured, coded and presented, in both electronic and paper format, distributed in multiple locations. When paper records are stored in different locations, transferring them to a single location is associated with additional costs for copying, faxing, and transporting. This process is simplified by electronic record, as the only requirement is an active online connection. [6]

Patients' access to their electronic health record offers another benefit compared to traditional paper-based record. A more patient-centred approach can be used in the healthcare system allowing greater involvement of the patient in his treatment, these self-management programs improve the health outcomes of the chronically ill. [15]

Studies estimate an overall 6% improvement in efficiency, with average net benefit from using an electronic medical record for a 5-year period \$86,400 per provider. An in-depth analysis accounting for all factors shows a worst case scenario with \$2300 net cost, and a best case one with \$330,900 net benefit. [19,8]

Handwritten paper medical records can be associated with poor legibility, which can contribute to medical errors [13]

Standardized forms, terminology and abbreviations, and data input in Electronic records help with data collection for clinical studies and research. In addition, data from an electronic system can be used anonymously for statistical reporting in matters such as quality improvement, resource management and public health communicable disease surveillance. [7]

Despite the many benefits of digital based records paper-based records are still by far the most common method of recording patient information for most hospitals and practices in the U.S. [14] In the last decade there is a large increase in the usage of electronic health records, from fewer than 10 percent of all U.S. hospitals in 2006 [20] to nearly 50 percent at the end of 2009 [4]

While the benefits that electronic health records offer over paper-based records are undisputed there barriers for their implementation. [12]

Studies show that Doctors quickly become ardent users of electronic medical records if the software is sufficiently helpful in the care of their patients, yet there is still a significant part that finds using electronic medical records time consuming, and unhelpful due to the complexity of the system. [2]

Studies examining patient information recorded in the EMRs show that only about 44% of it is present in the EHR. This shows that EMRs are not very efficient most of the time. [18]

Aside from the usability of the electronic health record the costs are a major barrier for EHR adoption. The start-up, maintenance and training cost are significantly larger than those of traditional paper-based records and while theoretically they should be offset by the improved efficiency, EHR have not existed long enough to be proven practically.

A 2011 survey estimated a cost of \$32,000 per physician in a 5-physician practice during the first 60 days of implementation [9] One case study by Miller et al. of 14 small primary-care practices found the average estimated maintenance cost was \$8500 per year. [16] The same research show that the average practice paid for the initial and ongoing costs within 2.5 years. [16] Additional concern arises from the fact that, software technology advances at a rapid pace. Most software systems require frequent updates, often at a significant ongoing cost. Some types of software and operating systems require full-scale re-implementation periodically, which disrupts not only the budget but also workflow.

With the implementation of EHR current employees must be trained in their usage, new employees, permanent or temporary, will also require training as they are hired. This can drastically increase the ongoing cost of the practice. [17]

One of the major problems that still exists as a barrier to EHR implementation is the need for interoperability between different EHR systems. Creating a centralized interoperable national system creates a major privacy threat. Issues of privacy and security in such a model are the main reason the model has been poorly received [21,22]

Conclusions: Electronic health records offer many benefits and improvements to the health care systems, at the same time they are dependant of the current state of technology of the country they are implemented in. To maximise those benefits wide computer and internet access is required. Physicians who use electronic health records report that these system improve the quality of care and are generally satisfied with the systems. Electronic systems adoption is still relatively low and has only just begun to increase and spread. [17] Since 15.04.2013 Electronic health records are available in Bulgaria and can be accessed by patients via a personal 10 digit code.

Literature:

1. Ball M, Smith C, Bakalar RS. Personal Health Records: Empowering Consumers. *Journal of Healthcare Information Management* 2006; 21 (1): 76–86.
2. Bleich H, Slack W, "Refelctions on electronic medical records: When doctors will use them and when they will not". *International Journal of Medical Informatics* Volume 79, Issue 1, January 2010, Pages 1–4
3. Blumenthal, D.; Tavenner, M. (2010). "The "Meaningful Use" Regulation for Electronic Health Records". *New England Journal of Medicine* **363** (6): 501–504.
4. Chun-Ju Hsiao, Esther Hing, Thomas C. Socey; Bill Cai Electronic Medical Record/Electronic Health Record Systems of Office-based Physicians: United States, 2009 and Preliminary 2010 State Estimates NCHS Health E-Stat
5. DesRoches C, Campbell E et al Electronic Health Records in Ambulatory Care — A National Survey of Physicians *N Engl J Med* 2008; 359:50-60 July 3, 2008

6. Dipak Kalra, David Ingram Electronic Health Records Information Technology Solutions for Healthcare Health Informatics 2006, pp 135-181
7. EHR Definition, Attributes and Essential Requirements" (PDF). Healthcare Information and Management Systems Society. 2003.
8. Evans DC, Nichol WP, Perlin JB (April 2006). "Effect of the implementation of an enterprise-wide Electronic Health Record on productivity in the Veterans Health Administration". *Health Econ Policy Law* 1 (Pt 2): 163–9
9. Fleming, N. S.; Culler, S. D.; McCorkle, R.; Becker, E. R.; Ballard, D. J. (2011). "The Financial and Nonfinancial Costs of Implementing Electronic Health Records in Primary Care Practices". *Health Affairs* 30(3): 481–489.
10. Häyrynen K, Saranto K, Nykänen P Definition, structure, content, use and impacts of electronic health records: a review of the research literature. *International Journal of Medical Informatics* [2008, 77(5):291-304]
11. Hoerbst A.; Ammenwerth E. Electronic Health Records A Systematic Review on Quality Requirements Methods *Inf Med*. 2010;49(4):320-36. doi: 10.3414/ME10-01-0038. Epub 2010 Jul 6.
12. Iakovidis I. Towards personal health record: current situation, obstacles and trends in implementation of electronic healthcare record in Europe. *Int J Med Inform* 1998; 52 (1–3): 105–115.
13. Institute of Medicine. "To Err Is Human: Building a Safer Health System (1999)". The National Academies Press. Retrieved 2006-06-20
14. Jha, Ashish K.; et al. (2009). "Use of Electronic Health Records in U.S. Hospitals". *New England Journal of Medicine* 360 (16): 1628–1638.
15. Lorig, Kate R., Ritter, Philip et al Chronic Disease Self-Management Program: 2-Year Health Status and Health Care Utilization Outcomes *Medical Care*: November 2001 - Vol 39 - Iss 11 - pp 1217-1223
16. Miller, R. H.; West, C.; Brown, T. M.; Sim, I.; Ganchoff, C. (2005). "The Value of Electronic Health Records in Solo or Small Group Practices". *Health Affairs* 24 (5): 1127–1137.
17. Parish, Colin (March 20, 2006). Edging towards a brave new IT world. *Nursing Standard* 27:15-16
18. Roukema, J.; et al. (2006). "Paper versus computer: Feasibility of an electronic medical record in general pediatrics". *Pediatrics* 117 (1): 15–21
19. Samuel J. Wang, Blackford Middleton et al. A cost-benefit analysis of electronic medical records in primary care *The American Journal of Medicine* Vol 114, Iss 5 , Pg 397-403, 1 April 2003
20. Smaltz, Detlev and Eta Berner. *The Executive's Guide to Electronic Health Records.* (2007, Health Administration Press) p.03
21. Wager, K.; Lee, F.; Glaser, J. (2009). *Health Care Information Systems: A Practical Approach for Health Care Management* (2nd ed.). Jossey-Bass. pp. 253–254.
22. Walker J, Pan E., *The Value Of Health Care Information Exchange And Interoperability HEALTHTRACKING MARKETWATCH* 19 January 2005