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CMSC691

Medical Software Engineering

Homework 3

Shortliffe, Chapter 12, Questions 1, 2, 7 OR Questions 1, 5, 7

Chapter 12

1 – What is the definition of an EHR? Define an EHR system. What are five advantages of an EHR over a paper-based record? What are three limitations of an EHR?

An EHR is an electronic Health Record. More specifically this electronic record is a digital copy or version of a patient’s health record or medical charts. The goal of such a device is to replace the need for hard copies of such information. An EHR system is a computer system within a medical practice or hospital or series of such things that supports interacting with, or manipulation of electronic health records. Five clear advantages of an EHR over a paper-based record are as follows: 1) all forms of media are integrated seamlessly; 2) any authorized user can instantly access the record; 3) printed text is immediately legible; 4) any numbers in the records can be cross referenced against standard ranges; 5) restricted input fields can force a standardized medical jargon. Three fairly important limitations of an EHR are as follows: 1) training of all medical personnel is expensive; 2) all system users will be less productive and more error-prone initially; 3) information that is stored strictly on magnetic disk or other electronic format cannot be accessed without electricity – whereas paper copies can be accessed via candles.

5 – Would a computer scan of a paper-based record be an EHR? What are two advantages and two limitations of this approach?

Yes. Effectively a computer optical scan of a paper-based record is an EHR. The data can be accessed by those who need it; with a strong caveat. The text is displayed as handwritten, is not searchable and not comparable with other records in the system. Image files of scanned documents are also a magnitude larger than the file size of raw text. A second advantage of the system is that the source paper copy does not need to be kept and with the cost of digital storage on the decline and the cost of real estate on the rise this saves money.

7 – Identify four locations where clinicians need access to the information contained in an EHR. What are the major costs or risks of providing access from each of these locations?

1. At a primary care doctor’s office

The costs of the system will be felt quite a bit at this level, but there is somewhat less risk in keeping the information here. In a small primary care practice, there will be fewer patient records kept on the system which makes for a smaller target – from an information thief’s perspective. If a station is left unattended there are also fewer people with physical access.

1. At an emergency room

If information is accessed in a busy emergency room then there are more chances for unauthorized access or viewing of patient data. However, the costs of providing the access are low because it is likely covered by the hospital as a whole. Also, there is a major benefit to emergency room clinicians having access to patient records.

1. At a personal computer at a vacation house of the clinician

Having access to all of a patient’s data can make telemedicine possible in emergency situations. However, unless this clinician is rather rare this may be overkill. But, the cost of providing access to the information is a similar risk and cost to providing the information to the patients themselves. This cost is the price of security and privacy controls as well as bandwidth and server space. Because there’s an open portal to the information, credentials may be stolen. There is also the possibility that attackers will just attempt to brute force their way into the patient data collection. Also, because the data is kept in one location (possible as replicated data); compromising the server instead provides access to all contents (unless there are proper encryption keys in place). The cost is high and the risk is significantly higher than only providing access within the hospital, but the benefit can also be great.

1. At a distant hospital

Needs to access records stored at another facility somewhat seamlessly. To achieve this, hospitals need to agree on credentials and format of data, etc. The cost is high, but can be managed by splitting it among participating practices. The risk of unauthorized access increases by broadening the access points to include other physical locations.