

1. In your own words, describe the main purposes of an EMR and identify types of information in the medical record. (5 pts)

An electronic medical record is a useful tool used by clinicians to track and monitor a patient's health care and health status over time. The chronological nature of the EMR is useful for legal purposes (in case of litigation) but also to guide a clinician's decision making. With a longitudinal overview of a patient's medical history available to them, they can better manage their care and work to improve patient outcomes. The EMR aims to facilitate patient care by providing accurate and easily accessible information, at the clinician's fingertips. Clinical data like immunization, medication, and order records, along with laboratory results, assessments and diagnoses are found in the EMR. The EMR also contains financial information on the patient and allows providers to manage billing/reimbursement.

2. When characterizing the medical record, define the concepts of **Completeness & Correctness**. (2 pts)

Completeness refers to the amount of clinical data that is documented in the EHR, while correctness looks at the accuracy of the data. If data is accurate but pieces are missing, then the data is correct but not complete. If nothing is missing but the data is not accurate, then the EHR is complete but not correct.

3. In your own words, briefly identify advantages of using a Computerized EMR and compare to the weaknesses of using paper records. (4 pts)

A computerized EMR has many benefits over paper records. For one, the EMR concentrates clinical data in a central location and reduces the risk of losing data, since paper records are more likely to go missing. The EMR also organizes data and can help clinicians gather data completely, through clinical decision support systems. Also, computerized systems prevent issues that arise with illegible handwriting, improving the correctness of clinical data. Improved completeness and correctness will improve patient care outcomes and provide health care delivery organizations with valuable data to quantify the quality of care they provide.

4. In your own words, briefly outline at least four considerations (technical, physical, emotional and/or financial) that an organization must account/prepare for when implementing an EMR. (4 pts)

Technical Considerations look at the hardware, software, and network capabilities of a healthcare delivery organization. These considerations determine the "minimum requirements" for the types of EHR systems HCOs purchase along with the mechanism of delivery (ie computers, laptops, tablets, smartphones, etc). Security and interoperability are also included as technical considerations and must guide the EHR implementation process.

Physical considerations include location, ergonomics, convenience, and safety. Administrators must check to see where the optimal place is to store EHR equipment, to promote usability and ergonomics while ensuring patient's safety and privacy.

Emotional considerations include fatigue from CDS alerts, irritability that arises when usability is not accounted for. If clinicians are experiencing undue burden at the hand of this new system, then a workflow analysis needs to be completed with a greater focus on understanding the negative emotional impact the new system is having.

Financial Considerations include costs associated with purchasing the EHR system, appropriate hardware, upgrades, infrastructure, training, technical support, and recruiting.

5. Identify and discuss an aspect of EMR user interface design you consider important to EMR user interface design that supports efficiency in EMR documentation. (2 pts)

I think that customizability is important for EMR user interface design since it allows clinicians the ability to place functions in locations they prefer. If a clinician has the ability to create custom order sets for common illnesses, or customize the layout of their EHR dashboard, they will be able to use the pertinent information to guide their decision making instead of wasting time or getting distracted trying to find the information they need.

6. Considering the topics of the Cyber Security Risk Assessment process & Security Programs, a control assessment is done to identify threats/impacts in various security domains. **Select one of the Physical or Technical Safeguard Security Areas to Consider and a corresponding Checklist tool.** design

From your selected Area/Tool, choose **two** assessment findings and discuss what Potential Security Measures could be used as mitigation strategies to address a "negative" assessment result for each selected finding (please also identify which tool and findings you are addressing in your answer) (6 pts)

To consider the physical safeguards that protect computer equipment and data-access points from unauthorized access, theft, and damage, the SRA has provided a corresponding "Physical Access Checklist" to assess physical security. One assessment is that, "Equipment located in high traffic or less secure areas is physically secured," since equipment that has not been secured would be vulnerable to theft or damage. If found, the hospital should find a way to secure that equipment or consider a workflow analysis that aims to provide some other mitigation strategy. Another assessment is that all devices containing PHI are inventoried and accounted for. This ensures that staff can quickly identify which items have been breached, in the case of unauthorized access or loss. If this assessment is "negative," the hospital staff should do a full inventory and develop a refined inventory management system to see tabulate the current number of devices and respond to future loss.

7. In terms of Key concepts for Cyber Security, **explain and give an example of each** of the following: **Vulnerabilities, Threats, Risks & Countermeasures.** (8 pts)

Vulnerabilities are weak points in a system that can be targeted in an attack. An example of a vulnerability is a weak user authentication system that does not require a strong password or other forms of identity verification.

Threats are direct dangers to a system that target vulnerabilities and use them against the system. An example of a threat would be a hacker who wants to steal patient data and sell it on the black market.

Risk is the potential for loss, damage, or destruction that occurs when a threat targets vulnerabilities in a system. For example, there is a risk of unauthorized access if a system does not require strong passwords.

Countermeasures are techniques used to prevent or respond to threats and mitigate risk. A countermeasure to the hacking threat would be to install some kind of biometric log-in system to make hacking more difficult for the hacker.

8. Identify and briefly explain at least three unique aspects of Health Care that must be considered when examining/analyzing Workflow. (6 pts)

Clinicians deal with people's lives, and their workflows must account for that. Although providers operate under the principle of "do no harm," if a provider makes a mistake, somebody could die. Workflow analysis must consider the redundancies and safety measures that must be taken to protect a patient's health, safety, and privacy.

Secondly, clinicians work in information-dense environments and use their extensive knowledge (of over 2 million facts), along with empirical data to guide their decision making. This imparts a large amount of cognitive burden on the provider and requires them to juggle the many sources of quantitative and qualitative information, at once. Workflow analysis must consider how these different sources of information come together to be synthesized by the clinician.

Thirdly, clinical routines are developed through years of trial and error and evidence-based practice guides many of these processes. Workflow analysis must consider whether these processes are optimal, or just the way they've always been done.

9. When considering Human Factors and the concept of failures/errors, **define and give an example** of an **Active Failure** and **Latent Conditions**. (4 pts)

Active failures are errors made by frontline operators, such as giving the right patient the wrong medication or amputating the wrong leg. Latent conditions are systemic inadequacies that exist within a system/workflow that increase the probability of errors occurring. For example, a poorly configured CDS intervention that causes alert fatigue would be a latent error that preconditions an active slip on the clinician's part.

10. Explain the original intended and current uses of ICD.10 codes as opposed to CPT codes. (4 pts)

ICD was originally developed by the WHO to standardize clinical research but is now used in a wide variety of applications, like reimbursement and to code/diagnose diseases, in the United States. ICD.10 codes are highly stratified and specific and can be combined to impart greater specificity to the diagnosis. For example, by combining ICD.10 codes, providers can communicate the difference between a "wrist fracture" and a "right ulna fracture, first encounter"

CPT was originally developed for reimbursement purposes but is now used in measuring quality and benchmarking. Category I codes are FDA approved for clinical efficacy, and Category II and III codes are more specific and are used to code for evaluation and management, surgery, laboratory and pathology, and radiology. For these types of procedures, CPT codes for the time, the nature of the problem and treatment, any concurrent critical illnesses, and highly complex decision-making processes.

While ICD can help explain the "what," CPT does a better job explaining the "how."

(OPTIONAL EXTRA CREDIT QUESTION)

Briefly discuss something you learned during this Course that you will apply professionally in your role as an informaticist (3 pts extra credit)

I learned about the 5 Rights of CDS in this class and will use pattern recognition and workflow analysis in my future career. For CDS to be effective, it must be presented the right information, at the right time in the workflow, to the right person, in the right format, via the right channel. Balancing these 5 rights are trickier than they seem, and require thoughtful workflow analysis and an open mind.