Paper based medical records **dis(advantages)**:
• Find the record (lost, being used elsewhere), Find data within the record (poorly organized, missing)
• Read data (illegible hand writing), Update data (manual)
• Record fragmentation, Moving records
• Redundancy (re-enter data in multiple forms)
• Statistics and Research (can not search across patients)
• Passive (no automated decision support)

Main Purpose of Documentation ليش قاعدين نوثق المعلومات بالله؟
•form basis for historical record (what you did and why)
•Support communication among providers عشرين شخص و تيمز مختلفين يمسكوا المريض يحتاجوا يعرفوا معلوماته و ايش سووا له
•Coding and Billing, Legal issues الكودنق تساعدنا بالاحصاء و البحث و بعدين نستفيد منها بالاشياء المالية
•Anticipate future health problems بناء على المعلومات الي عندي اقدر اتوقع ايش حيصير
•Record standard preventive measures
•Identify deviations from expected trends example; growth chart اقارن معلومات المريض بالنورمال رينج
•Support clinical research

Disadvantages
• Learning curve اي تقنية جديدة تصعب علينا تعلمها بالبداية و هذي مشكلة ان الي عندي مو عارفين
• Slower-time التوثيق ياخذ وقت ، و وقت العيادة محدود
• Security/privacy concerns كل مين يقدر يدخل على ملف المريض
• Cost, initial cost, running and maintenance الستمز هذي غالية طبعاً عشان المستشفى تشتريها و عشان صيانتها و استمرارها كله فلوس قاعدة تطير
• Upgrades and depreciation كل شوي لازم نحدث
• Computer-based systems have the potential for **catastrophic failures** that could cause extended unavailability of patients' computer records. However, these risks can be mitigated by using **fully redundant components, mirrored servers, and battery backup**

The Database Interface or Interface Engine may perform intelligent filtering, translating and alert functions الانترفايس هو الواجهة الي تجمع لي كل الداتابيسز من الصيدلية و المختبر و الاشعة و كل مكان و تربط لي المعلومات

Medical records serve a variety of functions for organizations **not** involved directly in care:
◦ **Insurers** (government and private) to justify payment for medical services rendered, and to detect fraud.
◦ **Quality reviews**, administrative reviews, and utilization studies to manage the business aspects of health care.
◦ Used for **societal purposes**, such as, **social service** and welfare system management
◦ **Medical research**, public health management
◦ **Education and medical training** احنا الطلاب نقدر نفتح الملفات و نتعلم منها

EMR (Electronic Medical Record) – the set of databases that contains the health information (Vertical information) for patients <u>within a given institution or organization</u>.

EMR Components هل الميديكال ريكورد فيه معلومات المريض بس؟ لا فيه اشياء ثاني رهيبة
• Results reporting
• Data repository
• Decision support
• Clinical messaging and communications; i.e. e-mail
• Documentation
• Order entry

Electronic Health Records (EHR) (also referred to as a computer-based patient- record system) : Longitudinal electronic record of patient health information generated by one or more encounters in any care delivery setting. Can be shared across multiple organizations from all sources over their lifetime

personal health record is managed by the patient هنا الي يعدل و يضيف المريض نفسه المسيكين يقعد يجمع بياناته من كل مستشفى

Functional Components of an Electronic Medical Record System (An EHR is not simply an electronic version of the paper record.)
نفس المكونات الي قلناها قبل تقريباً بس خلونا نعيدها
1. **Integrated** view of patient data (**Multiple** databases) الانتقريتد فيو زي الانتيرفيس الي قلناه قبل يجمع لي بيانات
المريض من كل مكان فأشوف صور اشعة و نتائج مختبر و أدويته و كل شي مرة وحدة
2. Clinician order entry **CPOE**
3. Clinical decision support (**CDSS**)
4. Access to knowledge resources (UptoDate and EBM)
5. Integrated communication and reporting support زي ماقلنا التواصل فيه اسهل و ارتب و اقدر اكتب تقرير عن المريض
و اوضح حالته عشان لما اسلمه لتيم ثاني يسمونها هاندز اوف يكون كل شيء واضح لهم

> hospital, and the emergency room should all be linked together **not** a technical challenge with today's Internet, but still an administrative challenge due to **organizational barriers**.

فيه كم شي نبغى نفصلهم

Integrated View of Patient Data: interface engines
Available at any time anywhere,
Clinical Data requires different format and terminology
Requires standards like **HL7** to integrate the clinical data

فيه مشاكل تواجهنا لما نجمع معلومات المريض منها ان بعضها
مو موجود بالسستم كان بالورق مسجل و منها ان مافيه تواصل
بين المستشفيات فاحنا نحتاج أشياء تسهل علينا هالشيء مثل
الالكترونك هيلث ريكورد النسخة الثانية و شي اسمه
Health Level 7 (hl7) messages

Local terminologies needs to be translated into standardized terminologies لان الكل بيستخدمه فيحتاج نوحد المفردات الي نستخدمها
Various views: Flowsheet, Chronological views, Summary Views
• Easier when organization owns EHR.

Clinician Order Entry: (computerized physician order entry CPOE)
Electronic order entry can improve health care at several levels provide assistance to:
-**Reduce errors and costs.**
-Deliver decision support at the point where clinical decisions are being made.الميزة الرهيبة ههههاي CDSS

Access knowledge resources: Some EHR systems are proactive and present short informational nuggets as a paragraph adjacent to the order item that the clinician has chosen. EHRs can also pull literature, textbook or other sources of information relevant to a particular clinical situation through an **Infobutton**

degree to which a particular EHR achieves benefits depends on: **(Enabling Factors)**

A-**comprehensiveness of information**: contain information about health as well as illness? Does it include information from all organizations and clinicians who participated in a patient's care?

B-**Duration of use and retention of data** :A record that has accumulated patient data over 5 years will be more valuable than one that contains only the last month's records.

C-**Degree of structure of data**: Narrative notes stored in electronic health records have the advantage over their paper counterparts in that they can be searched by word. EHR data require structured data. One way to obtain such data is to ask the clinical user to enter information through structured forms whose fields provide dropdown menus or restrict data entry to a controlled vocabulary

E-**Ubiquity of access**: system that is accessible from a few sites will be less valuable than one accessible by an authorized user from anywhere.

Fundamental Issues:

1- Data Capture

EHRs use **two** general methods for data capture:

(1) electronic interfaces **from systems**, such as laboratory systems that are already <u>fully automated</u>.

(2) direct **manual data entry**, when no such electronic source exists or it cannot be accessed.

2- Data Validation:

◦ **Range checks (out of range value)**

◦ **Pattern checks: To check over symbols or digits**

◦ **Computed checks (values have the correct mathematical relationship)**

◦ **Consistency checks: The data is consistent with what you're expecting (Comparing entered data by detecting errors)**

◦ **Delta checks (large and unlikely differences between the values)**

◦ **Spelling checks**

> the computer can increase the quality of data by applying validity checks as data is being entered. The computer can reduce typographical errors through restricted input menus and spell checking.

> Advanced web security features such as Transport Layer Security (TLS)—a revised designation for Secure Sockets Layer (SSL)—can ensure the confidentiality of any such data transmitted over the Internet.

3- **Data display:** Once stored in the computer, data can be presented in numerous formats for different purposes without further entry work أقدر أستعرض المعلومات بطرق كثيرة بكل سهولة منها الآتي

- Timeline graphs: spark lines
- Timeline flowsheet: radiology image report + radiology impression
- Summaries and Snapshots (Active allergies, Active problems, Active treatment, Recent observation)
- Dynamic Search (Search tools help the physician to locate relevant data.)

4- Query and Surveillance Systems اترصد للحالات و ابحث و اشوف و استخدمهم للبحث و للتقارير جودة الرعاية

◦ Find records of patients that satisfy pre-specified criteria and export selected data.

◦ Clinical care (screening exams such as immunization, pap smear and mammogram)

◦ Clinical research

◦ Quality reporting

◦ Retrospective studies

◦ Administration (e.g. resource consumption)

Barriers of EHR in Saudi Arabia يا ترى وش المشاكل الي تواجهنا فيه تطبيقه هنا مهم نعرف كل شيء يندرج تحت ايش:

1. Human Barriers: Lack of

◦ awareness of the importance and benefits of EHR,
◦ knowledge and experience of using EHRs,
◦ experience of computer applications .
◦ Negative beliefs and impressions about EHRs and about their ability to use EHRs السعاودة دايماً يفلمون

2. Financial Barriers:
◦ High initial cost of EHRs implementation.
◦ High operation and maintenance costs of EHRs.
◦ Lack of feasibility studies that show the benefits versus costs of implementing and using EHRs. مافي
دراسات تحفز رؤوس العمل المريشين انه ترى ماراح تخسر او يعني انت ادفع و بتستفيد بكرة

3. Legal and regulatory barriers:
◦ Lack of policies that govern EHRs on both hospital and national levels.
◦ Using EHRs may threaten confidentiality of health information.

4. Organizational barriers:
◦ Workflow needs redesign to match with EHRs. طريقة العمل القديم المغبر مايتماشى معاه لازم نغير
◦ Hospital management doesn't have the necessary experience to choose & implement the best
EHRs. ماعندنا الخبرة الكافية على المستوى الاداري
◦ Hospital management doesn't provide the necessary training for the staff on using EHRs. الادارات
الخايسة مو قاعدة توفر تدريب للطاقم

5. Technical barriers:
◦ Computers and networks have a lot of maintenance problems.
◦ EHRs are not satisfying different users' needs.
◦ The main difficulty with EHRs is data entry and data retrieval.

6. Professional barriers:
◦ Lack of motivation to learn and train on using EHRs.
◦ EHRs slows down work/decreases productivity.

Future Trends of EHR: هذي جاء منها بالكويز ههههههههههاي ركزوا حبيباتي
Patient access will increase المرضى راح يستخدمونه
Cloud technology for EHR. كانت هذي الاجابة
Movement toward a nationalized database. نبغى نوحد الداتابيس على مستوى المملكة
Mobile accessibility. ان شاء الله نقدر نفتحه من الجوال

Data may be entered as :
1. Narrative free-text   2. Codes   3. Combination of both
CODING FOR :
- Diagnosis   - Allergy   - Medications