Electronic Health (medical) Record

For any mistakes contact informatics team leader
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- Doctor's notes = in a black box
- Mentioned by the doctor from slides = underlined
- Important = red

Informatics Team Notes

History and perspective of the medical record

* **Data can be organized as**
  * Physician-centered
  * Patient-centered

A doctor used to write in his/her own file about each patient

It then changed to patient-centered : a file for each patient → allow more than one person to use the record

* **Orientations (not mutually exclusive) include**
  * Time-oriented –organized chronologically
  * Department-oriented –organized by department
  * Problem oriented organized by focus on problems

The oldest from these three , still widely used

Newest, & best

Patient's file is divided into sections , each one is about a specific disease or health issue of the patient e.g. obesity section, migraine section …etc all in one file

History and perspective (cont.)

* Earliest medical records were physician-oriented
* Hippocrates said over 2,500 years ago that the medical record sho uld
  * Accurately reflect course of disease
  * Indicate possible causes of disease

* Before era of widespread medical diagnostic testing, record consisted mostly of observations

Terminology of the medical record

You should know the terminology

- Electronic health record (EHR) – subsumes:
  - Electronic medical record (EMR)
  - Computer-based patient record (CPR)
- Other terms of note:
  - Medical records system / Chart management
  - Hospital information System (HIS)
  - Practice management system (PMS)
  - Patient registry
  - Personal health record (PHR)
  - Problem-oriented medical record (POMR)

What is the difference between EMR & EHR?
EMR→ in single organization unlike EHR which is related to more than one organization.
However, EMR ,EHR & CPR are all practically the same .

Skeleton of the hospital system

Focuses on the disease. E.g. DM registry . Includes all patients with the disease

Available for the patient. He/She can enter it & see appointments, link it with another program

Problem-oriented medical record

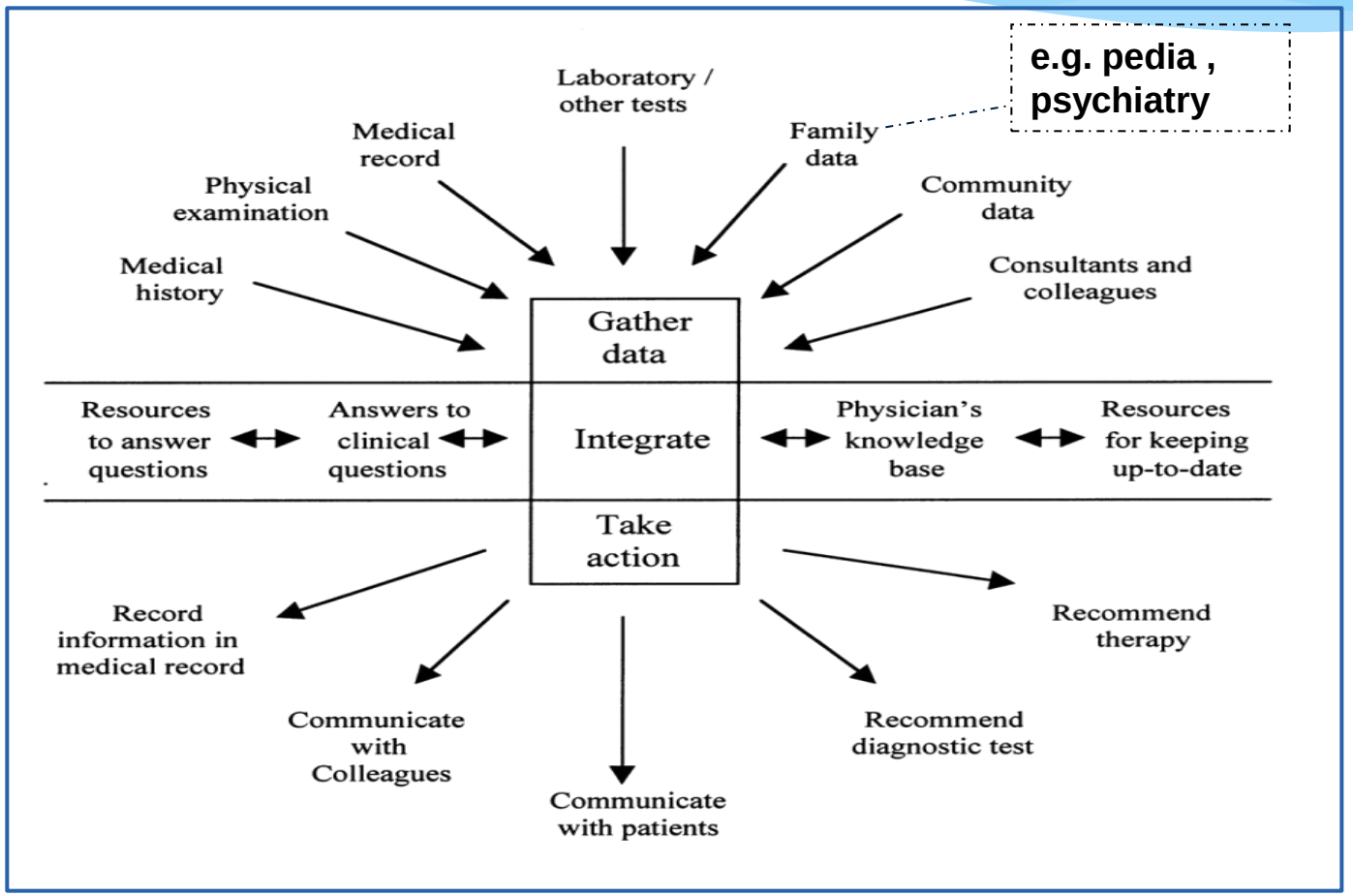
* Proposed by Weed (1969)
* All entries grouped under **particular problems**
* An encounter for each problem is organized under four headings
  * Subjective –what patient reports
  * Objective –what clinician observes or measures
  * Assessment –what clinicians assesses
  * Plan – what clinician plans to do
* Most common usage is to have entire encounter organized by SOAP for mat, not individual problems

Each problem should have a single SOAP notes

The modern-day medical record

* Mixture of patient-and problem-oriented approaches
* In general, each provider or institution maintains its own record
* The creator of the medical record is assumed to be its "owner"
* It is still predominantly paper-based
  * Or even worse, it is **"hybrid,"** with some data on paper, some electronic , and some on both media

Flow of information in primary care practice (Bates, 2002)

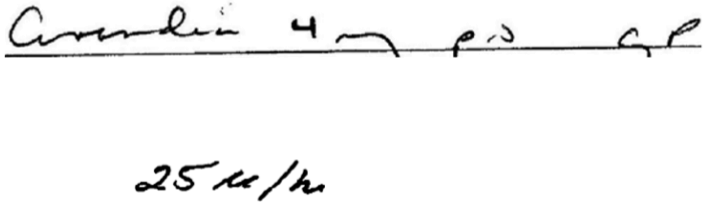


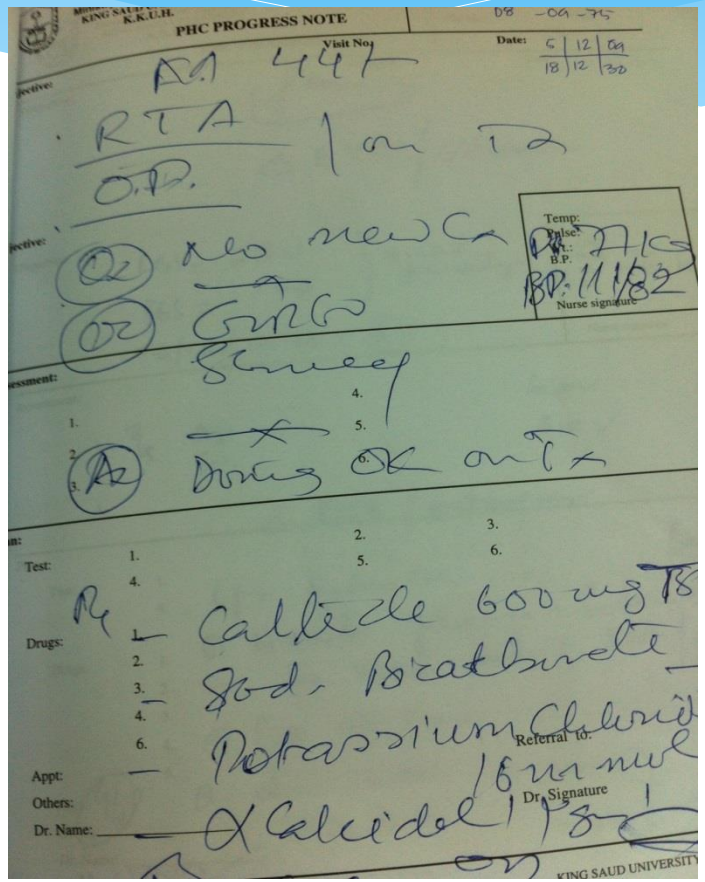
Some limitations of the paper-based record

* **Single user** –one person at a time
* **Disorganized** – especially for complex patients
* **Incomplete** –reports missing or lost,
  some providers not sharing their reports with the rest
* **Insecure** –**no audit trail**, easily copied or stolen
* **Source of infection transmission**
* **Handwriting ambiguity**

Can you decipher these orders?

* Coumadin vs. Avandia
* 25 U/hr vs. 25 cc/hr vs. ???



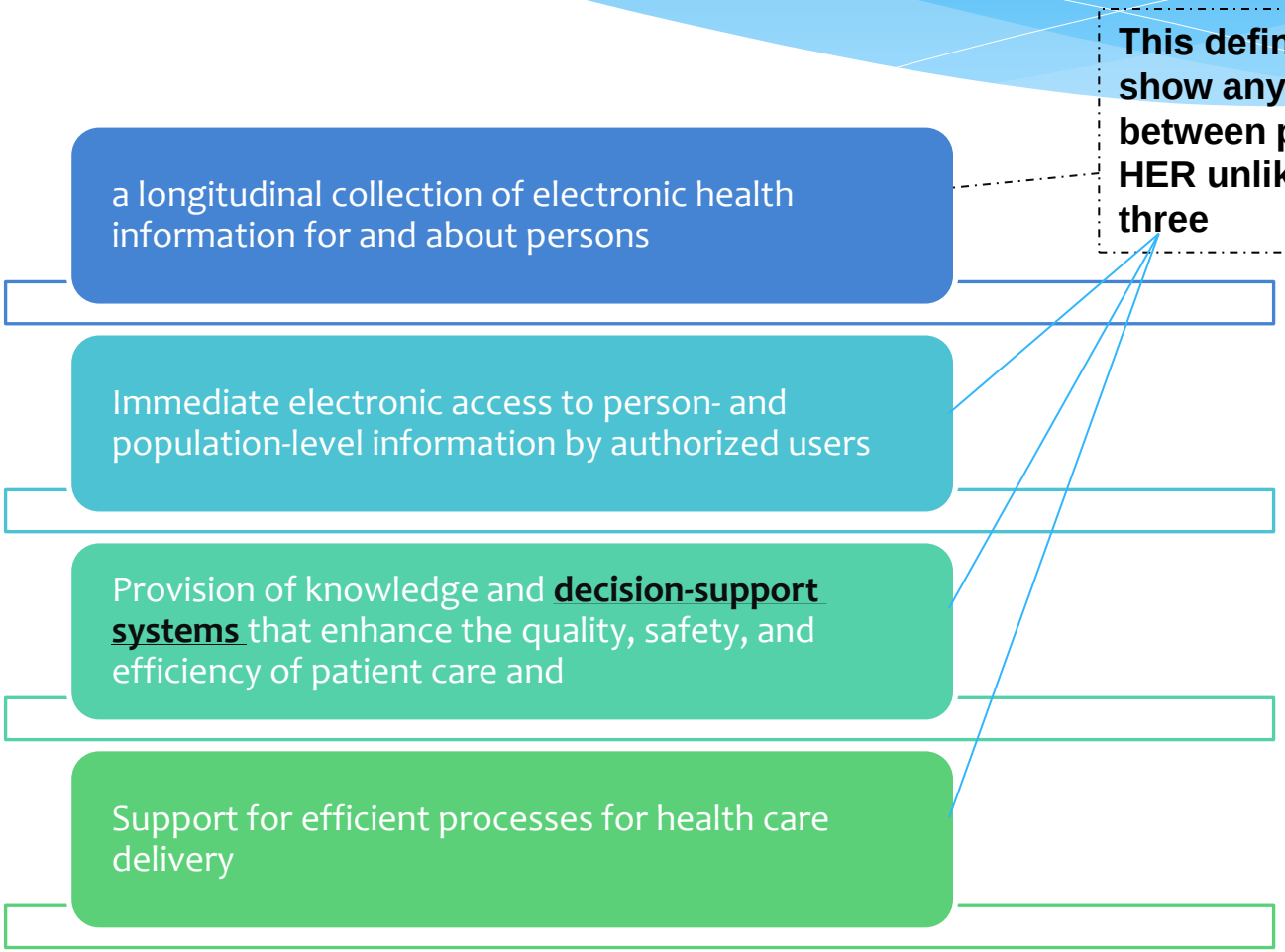


Go from Paper to Digital

Have patient information at your fingertips.

What are Electronic Health Records?

The IOM 2003 Patient Safety Report describes an EHR as encompassing:



This definition doesn't show any difference between paper based & HER unlike the remaining three

HIT Functionality Measures

What is this slide about ?

To encourage hospitals to use EHR , there were rewards for organizations applying it under certain terms (on a meaningful use "MU" = must apply 20-25 objectives which you can find in the next 2 slides)

* Eligible Professionals (EPs) must report on 20 of 25 Meaningful Use (MU) objectives with associated measures
  - Core set of 15
  - Menu set of 10
* An EP must successfully meet the measure for each objective in the core set and all but five in the menu set
  - Some MU objectives are not applicable to every provider's clinical practice. In this case, the EP would be excluded from having to meet that measure.
    - ✓ e.g., Dentists who do not perform immunizations and chiropractors who do not have prescribing authority

Meaningful Use: Core Set Objectives

"You don't have to memorize them , just orient yourself about them" Doctor

I've underlined the ones the doctor has mentioned.

15 Core Objectives

- **Record demographics**
- **Record and chart changes in vital signs**
- **Computerized physician order entry (CPOE)**
- **E-Prescribing (eRx)**
- Report ambulatory clinical quality measures
- Implement one clinical decision support rule
- Provide patients with an electronic copy of their health information, upon request
- Provide clinical summaries for patients for each office visit
- **Drug-drug and drug-allergy interaction checks**
- Maintain an up-to-date problem list of current and active diagnoses
- Maintain active medication list
- Maintain active medication allergy list
- Record smoking status for patients 13 years or older
- Capability to exchange key clinical information among providers of care and patient-authorized entities electronically
- Protect electronic health information

Meaningful Use: Menu Set Objectives

10 Menu Objectives

* **Drug-formulary checks**
* Incorporate clinical lab test results as structured data
* Generate lists of patients by specific conditions
* Send reminders to patients per patient preference for preventive/follow up care
* Provide patients with timely electronic access to their health information
* Use certified EHR technology to identify patient-specific education resources and provide to patient, if appropriate
* Medication reconciliation
* Summary of care record for each transition of care/referrals
* Capability to submit electronic data to immunization registries/systems*
* Capability to provide electronic syndromic surveillance data to public health agencies*

HIT Resources

skip it!

http://www.healthit.gov/providers-professionals/how-attain-meaningful-use

https://www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/downloads/EP-MU-TOC.pdf

US EMR Adoption Model℠

Stage	Cumulative Capabilities	2012 Q1	2012 Q2
Stage 7	Complete EMR; CCD transactions to share data; Data warehousing; Data continuity with ED, ambulatory, OP	1.2%	1.7%
Stage 6	Physician documentation (structured templates), full CDSS (variance & compliance), full R-PACS	6.2%	6.5%
Stage 5	Closed loop medication administration	9.4%	11.5%
Stage 4	CPOE, Clinical Decision Support (clinical protocols)	13.2%	13.3%
Stage 3	Nursing/clinical documentation (flow sheets), CDSS (error checking), PACS available outside Radiology	43.9%	42.4%
Stage 2	CDR, Controlled Medical Vocabulary, CDS, may have Document Imaging; HIE capable	12.1%	11.7%
Stage 1	Ancillaries - Lab, Rad, Pharmacy - All Installed	5.5%	5.1%
Stage 0	All Three Ancillaries Not Installed	8.4%	7.9%

Data from HIMSS Analytics™ Database © 2012 N = 5,318 N = 5,303

IMP to know stages

Slides 18 & 19 have detailed info about each stage

* **CDR: Clinical Data Repository**
* **CMV**: Controlled Medical Vocabulary (e.g. MeSH)
* **CDO**: Care Delivery Organizations;
* **SEHR**: Shared EHR (= EMR)
* **ICEHR**: Integrated Care EHR (= EHR)
* **LIS**: Laboratory Information System
* **RIS**: Radiology I S
* **PIS**: Pharmacy I S
* **PACS: Picture Archiving and Communication System**
* **CDSS: Clinical Decision Support System**
* **CPOE: Computerized Physician Order Entry**
* **MAR**: Medication Administration Record
* **HCO**: Health Care Organization
* **eMAR**: Electronic Medication Administration Record

Found in notes

Stage 0: Some clinical automation may be present, but all three of the major ancillary department systems for laboratory, pharmacy, and radiology are not implemented.

Stage 1: All three of the major ancillary clinical systems (pharmacy, laboratory, radiology) are installed.

Stage 2: Major ancillary clinical systems feed data to a CDR that provides physician access for retrieving and reviewing results. The CDR contains a controlled medical vocabulary, and the clinical decision support/rules engine for rudimentary conflict checking. Information from document imaging systems may be linked to the CDR at this stage.

Stage 3: Clinical documentation (e.g. vital signs, flow sheets) is required; nursing notes, care plan charting, and/or the electronic medication administration record (eMAR) system are scored with extra points, and are implemented and integrated with the CDR for at least one service or one unit in the hospital. The first level of clinical decision support is implemented to conduct error checking with order entry (i.e., drug/drug, drug/food, drug/lab conflict checking normally found in the pharmacy). Some level of medical image access from picture archive and communication systems (PACS) is available for access by physicians via the organization's intranet or other secure networks outside of the radiology department confines.

Stage 4: Computerized Practitioner/Physician Order Entry (CPOE) for use by any clinician is added to the nursing and CDR environment along with the second level of clinical decision support capabilities related to evidence based medicine protocols. If one patient service area has implemented CPOE and completed the previous stages, then this stage has been achieved.

Stage 5: The *closed loop medication administration environment* is fully implemented in at least one patient care service area. The data flows of the CPOE, pharmacy, and the eMAR applications are tightly coupled and integrated with bar coding technology (or RFID technology) for the nurse, patient and medication to support the five rights of medication administration, thereby maximizing point of care patient safety processes.

Stage 6: Full physician documentation/charting (using structured templates) is implemented for at least one patient care service area. Level three of clinical decision support provides guidance for all clinician activities related to protocols and outcomes in the form of variance and compliance alerts. A full complement of radiology PACS systems provides medical images to physicians via an intranet and displaces all film-based images.

Stage 7: The hospital has a paperless SEHR environment with a mixture of discreet data, document images, and medical images. Clinical information can be readily shared via electronic transactions or exchange of electronic records with all entities within a regional health information network (i.e., other hospitals, ambulatory clinics, sub-acute environments, employers, payers and patients). This stage allows the health care organization (HCO) to support the true ICEHR as envisioned in the ideal model.

Stages of EMR complexity

EMR Adoption Model, 2006 Trends

CDR is the central pivot

		2006 Data Sets Final	3rd Q	1st Q
Stage 7	Medical record fully electronic; CDO able to contribute to ICEHR as byproduct of SEHR	0.0%	0.0%	0.0%
Stage 6	Physician documentation (structured templates), full CDSS (variance & compliance), full PACS 3	0.1%	0.1%	0.1%
Stage 5	Closed loop medication administration	0.5%	0.5%	0.6%
Stage 4	CPOE, CDSS (clinical protocols) 2	3.0%	2.7%	2.5%
Stage 3	eMAR Clinical documentation (flow sheets), CDSS (error checking), PACS available outside Radiology 1	18.0%	14.2%	11.2%
Stage 2	CDR, CMV, CDSS inference engine, may have Document Imaging 0	38.8%	42.9%	46.7%
Stage 1	Ancillaries – Lab, Rad, Pharmacy	18.9%	21.8%	19.8%
Stage 0	All Three Ancillaries Not Installed	20.7%	17.9%	19.0%

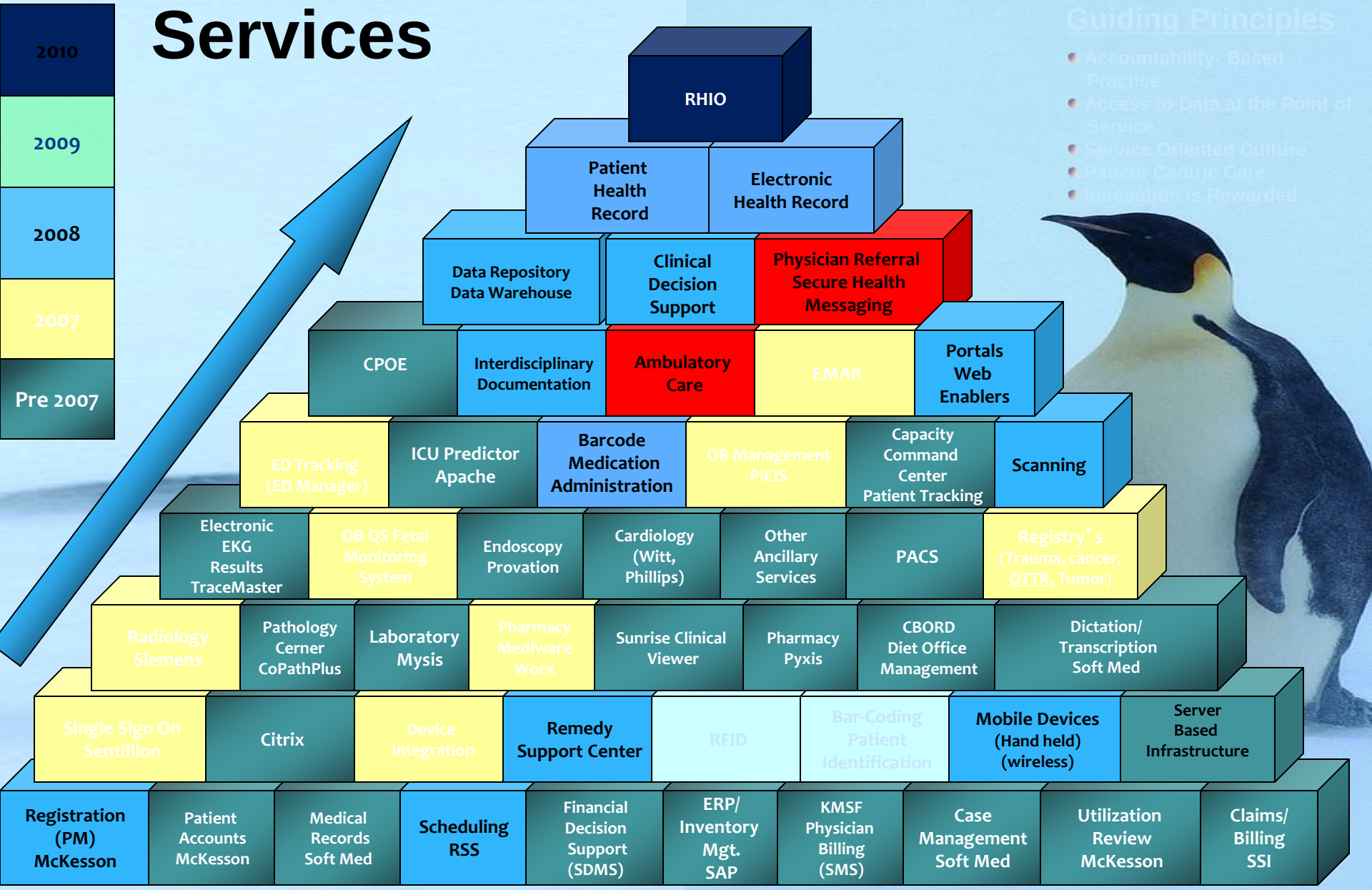
Data from 2006 HIMSS Analytics™ Database (derived from the Dorenfest IHDS+ Database™)

Canada EMR Adoption Model[SM]

Stage	Cumulative Capabilities	2012 Q1	2012 Q2
Stage 7	Complete EMR; CCD transactions to share data; Data warehousing; Data continuity with ED, ambulatory, OP	0.0%	0.0%
Stage 6	Physician documentation (structured templates), full CDSS (variance & compliance), full R-PACS	0.5%	0.5%
Stage 5	Closed loop medication administration	0.3%	0.3%
Stage 4	CPOE, Clinical Decision Support (clinical protocols)	2.5%	2.5%
Stage 3	Nursing/clinical documentation (flow sheets), CDSS (error checking), PACS available outside Radiology	36.2%	34.1%
Stage 2	CDR, Controlled Medical Vocabulary, CDS, may have Document Imaging; HIE capable	21.9%	24.6%
Stage 1	Ancillaries - Lab, Rad, Pharmacy - All Installed	15.2%	15.0%
Stage 0	All Three Ancillaries Not Installed	23.5%	23.0%
Data from HIMSS Analytics™ Database © 2012		N = 639	N = 639

KKUH → stage 3
KFSHRC→ stage 6

UK HealthCare Information Technology Services



Guiding Principles

- Accountability- Based Practice
- Access to Data at the Point of Service
- Service Oriented Culture
- Patient Centric Care
- Innovation is Rewarded

Why the reluctance by clinicians to adopt IT systems

* Main reason, they were not involved in the decision of implementation
* May partially be a generational issue
* Main reason may be that so far EMR has not delivered time savings for physicians and nurses, in fact, in many circumstances when not fully deployed, costs time
* Main justification may be in addressing cost, quality and safety issues

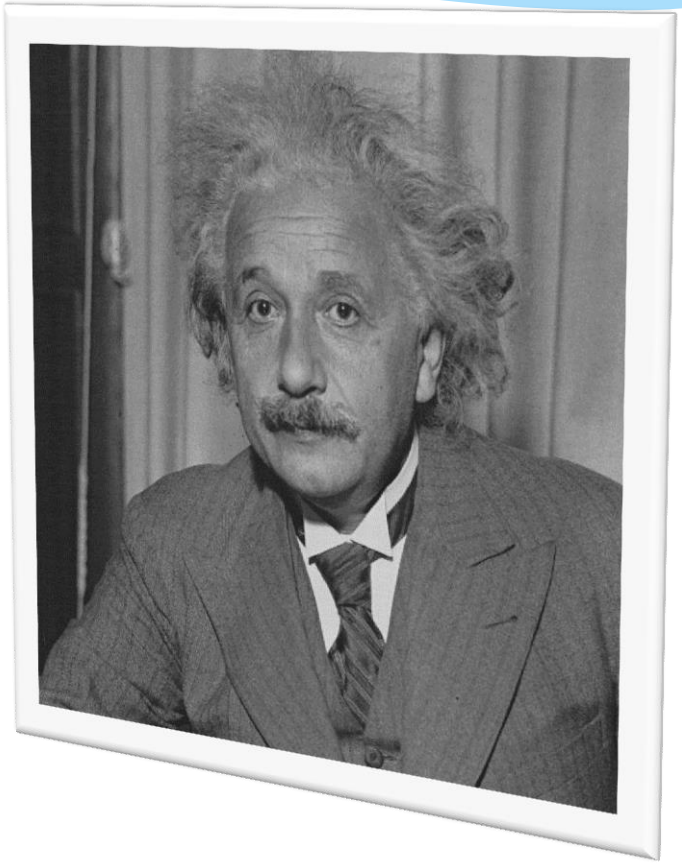
Conclusion

EMR is ultimately geared towards reducing errors, improving safety and care and cutting costs of healthcare

Conclusion

* *"We can't solve problems by using the same kind of thinking we used when we created them."*

-Albert Einstein



Test yourself

Q1: For the primary purpose of secure medical billing in the United States, HIPAA (Health Insurance Portability and Accountability Act) motivated large numbers of physicians to move towards using which of the following?

A. Electronic Medical Record

B. Biomedical research engines

C. Clinical databases

D. Health Informatics system.

Q2: Which of the following can be used to improve security of an Electronic health record

A. Sanitization

B. Audit trail

C. menu---driven

D. Retrieval system

Q3. A clinician is looking at his patient's record. He asked himself ‘ How accurate is patient reporting’
Which measurement device is used". Based on the scenario above, which of the following is the complication of data that can be found in patient's record?

A. Time of data collection
B. Circumstances of observation
C. Uncertainty of data

Ans:
1- A
2- B
3- C

Q4: A hospital with none of ancillaries services such as radiology and pharmacy are electronic is most likely to be at what stage in the HIMSS EMR Adoption Model?

A. Stage 0

B. Stage 2

C. Stage 4

D.Stage 6

Q5: Which of the following is NOT a commonly acknowledged problem of the paper-based medical record:

A. can only be used by one or a small number of people at a time.

B. may not be available when needed.

C. takes too long for clinicians to enter notes.

D. virtually no security or audit trial

Q6: KKUH ,What stage in the HIMMS EMR adoption Model is this hospital?

A. Stage 1

B. Stage 3

C. Stage 5

D. Stage 7

Ans:
4- A
5- C
6- B

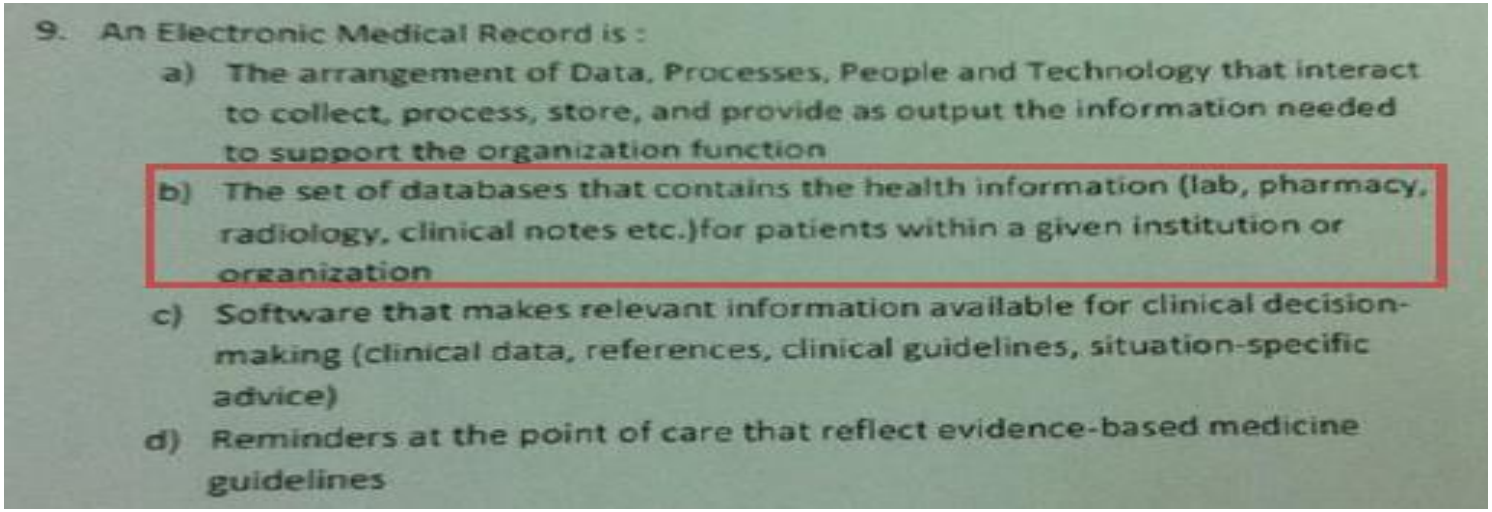
Q7-A hospital has a complete paperless EMR, clinical documents transactions to share data, data warehousing, and data continuity with emergency department and outpatient clinics. What stage in the HIMSS EMR Adaption model in this hospital:

A. Stage 1

B. Stage 3

C. Stage 5

D. Stage 7



9. An Electronic Medical Record is :
   a) The arrangement of Data, Processes, People and Technology that interact to collect, process, store, and provide as output the information needed to support the organization function
   b) The set of databases that contains the health information (lab, pharmacy, radiology, clinical notes etc.)for patients within a given institution or organization
   c) Software that makes relevant information available for clinical decision-making (clinical data, references, clinical guidelines, situation-specific advice)
   d) Reminders at the point of care that reflect evidence-based medicine guidelines

Ans:

7- D