Electronic Health Record

Amr Jamal, *MD, SBFM, ABFM, MRCGP, GCMI*

Assistant professor and consultant
Family physician and clinical informatician
Deputy chair of medical informatics and e-learning unit

King Saud university, School of medicine

Learning Objectives

The participant will be able to:

- Define an EHR

- Explain similarities between paper record and EHR

- List 5 benefits of an EHR

- Identify truth behind perceived barriers when implementing an EHR

History and perspective of the medical record

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

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

Terminology of the medical record

* Electronic health record (EHR) – subsumes (in general terms):
  * Electronic medical record (EMR)
  * Computer-based patient record (CPR)
* Other terms of note:
  * Practice management system (PMS)
  * Patient registry
 * Personal health record (PHR)
  * Problem-oriented medical record (POMR)

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 format, not individual problems

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)
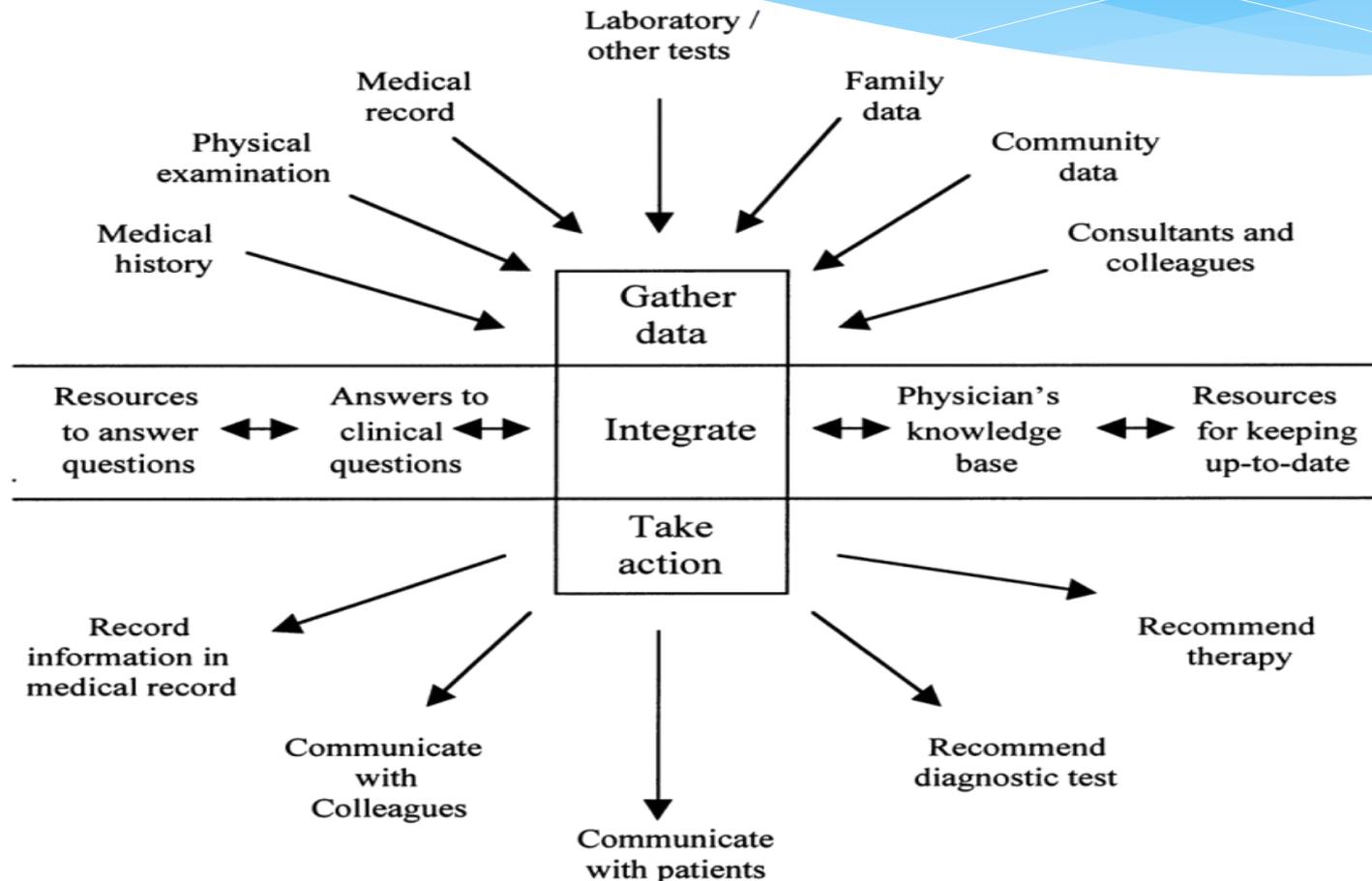
Some limitations of the paper-based record

* 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 Medical Records?

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

* "a longitudinal collection of electronic health information for and about persons

* Immediate electronic access to person- and population-level information by authorized users;

* Provision of knowledge and decision-support systems that enhance the quality, safety, and efficiency of patient care and

* Support for efficient processes for health care delivery."

Meaningful Use: Core Set Objectives

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*

US EMR Adoption Model^{SM}

Stage	Cumulative Capabilities	2011 Q2	2011 Q3
Stage 7	Complete EMR; CCD transactions to share data; Data warehousing; Data continuity with ED, ambulatory, OP	1.1%	1.1%
Stage 6	Physician documentation (structured templates), full CDSS (variance & compliance), full R-PACS	4.0%	4.4%
Stage 5	Closed loop medication administration	6.1%	7.1%
Stage 4	CPOE, Clinical Decision Support (clinical protocols)	12.3%	13.2%
Stage 3	Nursing/clinical documentation (flow sheets), CDSS (error checking), PACS available outside Radiology	46.3%	46.1%
Stage 2	CDR, Controlled Medical Vocabulary, CDS, may have Document Imaging; HIE capable	13.7%	12.6%
Stage 1	Ancillaries - Lab, Rad, Pharmacy - All Installed	6.6%	5.9%
Stage 0	All Three Ancillaries Not Installed	10.0%	9.6%

Data from HIMSS Analytics^{TM} Database © 2011   N = 5,310   N = 5,299

* **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

Canada EMR Adoption Model[SM]

Stage	Cumulative Capabilities	2011 Q2	2011 Q3
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	**0.2%**	**0.2%**
Stage 4	CPOE, Clinical Decision Support (clinical protocols)	**1.7%**	**2.3%**
Stage 3	Nursing/clinical documentation (flow sheets), CDSS (error checking), PACS available outside Radiology	**33.2%**	**34.5%**
Stage 2	CDR, Controlled Medical Vocabulary, CDS, may have Document Imaging; HIE capable	**23.9%**	**22.0%**
Stage 1	Ancillaries - Lab, Rad, Pharmacy - All Installed	**12.2%**	**14.4%**
Stage 0	All Three Ancillaries Not Installed	**28.3%**	**26.2%**

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