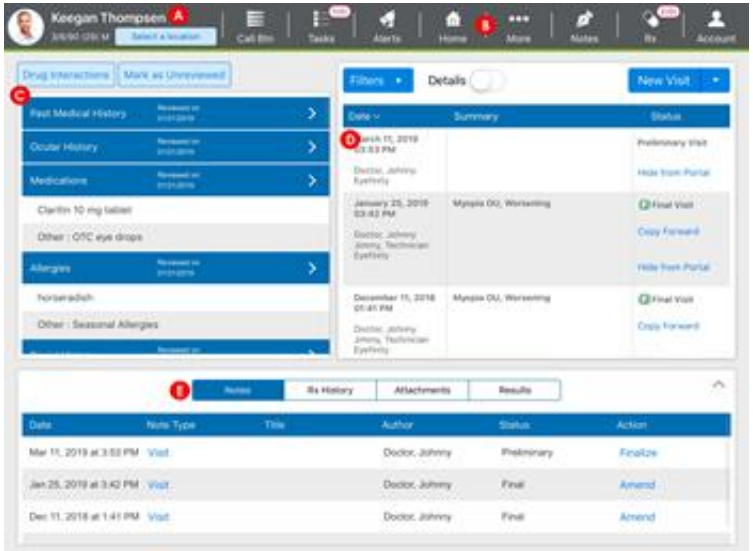
Electronic Health Records (Part 1)

Learning Objectives

- Understand what a medical record is
- Define and identify clinical data
- Identify common medical ontologies
- Define an electronic medical record
- Critically evaluate a thin-EMR

Paper -> Electronic



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What is a medical record?

Medical Record: contains communications related to a patient's health or condition that are recorded in any form or medium and that are maintained for patient diagnosis or treatment, including medical records that are prepared by a health care provider or by other providers.

In the US, the medical record is a critical legal document:

- Legible
- Sufficient information to identify the patient
- Support of the diagnosis and justification of the treatment
- Document the results
- Indicate advice and warnings provided to the patient
- Sufficient information for another practitioner to assume continuity of the patient's care at any point in the course of treatment.

Medical Record: the documentation of a single patient's medical care over time, typically within one health care organization. The record includes a variety of types of "notes" entered by healthcare professionals, recording observations and administration of drugs and therapies, test results, x-rays, reports, etc.

Typical note in a medical record:

- Chief complaint
- History of the present illness
- Past medical history
- Review of systems
- Physical examination
- Testing – lab, x-ray, other
- Assessment and plan

Chief Complaint: a concise statement in English or other natural language of the symptoms that caused a patient to seek medical care.

Ex: The inside of my left knee hurts

History of Present Illness: A description of the development of the patient's present illness.

Example: The pt is a 34yo M, px with a slight limp of the L leg. 3wks while swimming with fins, noticed a slight pain (pt report pain 5/10). The following morning +swelling, +reduced range of motion, -instability. Ice and rest reduce pain. Activity returns s/s.

Past Medical History: A description of the patient's health status prior to current illness. It may include past conditions, hospitalizations, surgeries, family history, social history, medications, allergies and much more.

Example:

- MedHx: Melanoma (21yo), ADHD
- SurgHx: Latarjet (27yo), Appendectomy (19yo)
- Meds: None / Allergies: None
- FamHx: HTN (Father), T2DM (Mother)

Review of Systems: A systematic inquiry of the subjective complaints of a patient organized around organ systems.

Eyes: No blurred or accuity issues

Cardio: No SOB, palpitations

GI: No abd pain, no weight loss

Neuro: No loss of sensation, no peripheral pain

Psych: Difficulty sleeping

Respiratory: No SOB, no cough, no wheezes

Physical Exam: The examination of a patient by a medical professional for signs and symptoms of a condition or medical illness.

Example:

L knee: Pain on palpation, moderate swelling. Decreased ROM (-20 degrees compared to R knee). - Crepitus, clicking.. - Anterior Drawer Test, - Lachman Test, - Posterior Drawer Test, - External Test. + Instability on Valgus Stress

Test Records: Screening and diagnostic results performed during medical encounter

X-Ray: Normal

Assessment and Plan: Includes a discussion of the differential diagnosis and supporting history and exam findings. The plan is typically broken out by problem or system.

Example: The most likely dx is an MCL sprain secondary to a non-contact injury, due to px S/S and lack of exam findings. Also considered are MCL tear, ACL tear, meniscus injury. F/U to include MRI of L knee, rest, ice for 6wks, return for follow up. Will consider PT and surgery depending on imaging and follow up.

Clinical Data

Clinical data are the collection of observations about a patient*

Minimum Elements:

- Patient (James Dickhoner)
- Attribute (Heart Rate)
- Attribute Value (58bpm)
- Time (3:35pm on 9/16/21)

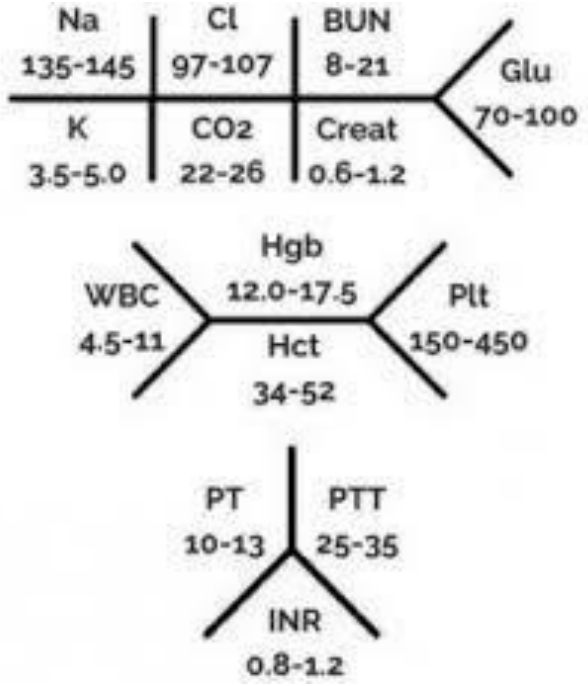
*Data is plural of datum...

Narrative Data: brief summary of specific events experienced by patients

Example: Dylan, a 26 year old male, presents with a complaint of an ‘painful stomach’ secondary to drinking sweetened soda water owith onset yesterday evening within 15 minutes of ingestion.

Can be written, audio recording, dictated.

Numerical Data: Empirical values recorded as numbers as opposed to natural language.



Coded Data: Selected information from a controlled terminology system (also known as an ontology)

International Standards:

- ICD-10: International Classification of Diseases
- SNOMED CT: Clinical Terms
- LOINC: Logical Observation Identifiers Names and Code (Lab Values)
- RxNorm - US Centric Drug Database

ICD-10: V97.33XD: Sucked into jet engine, subsequent encounter.

ICD-10: Y93.D: Activities involved arts and handcrafts.

ICD-10: V91.07XD: Burn due to water-skis on fire, subsequent encounter.

ICD-10: W55.41XA: Bitten by pig, initial encounter.

thrillist

Instagram Model Bitten on the Butt by Wild Beach Pig During Photo Shoot

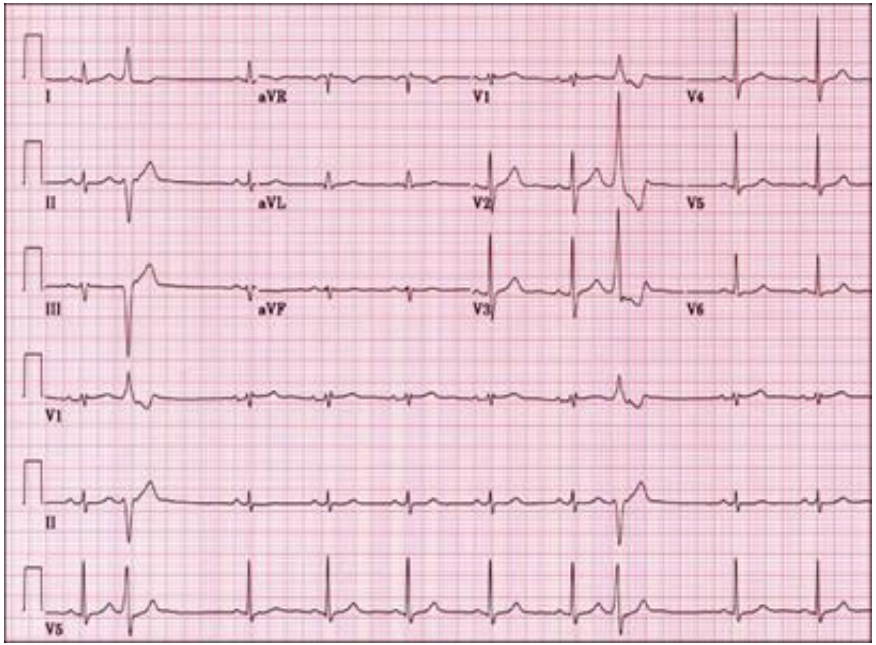
It's natural to feel envious of people on Instagram. After all, there's a whole class of folks whose entire job is to make you jealous of their Valencia-filter-perfect lives. But as old saying goes no one is above getting bit by a wild pig.

Textual Data: Results reported in a text format, typically not from the primary treating clinician.

Examples:

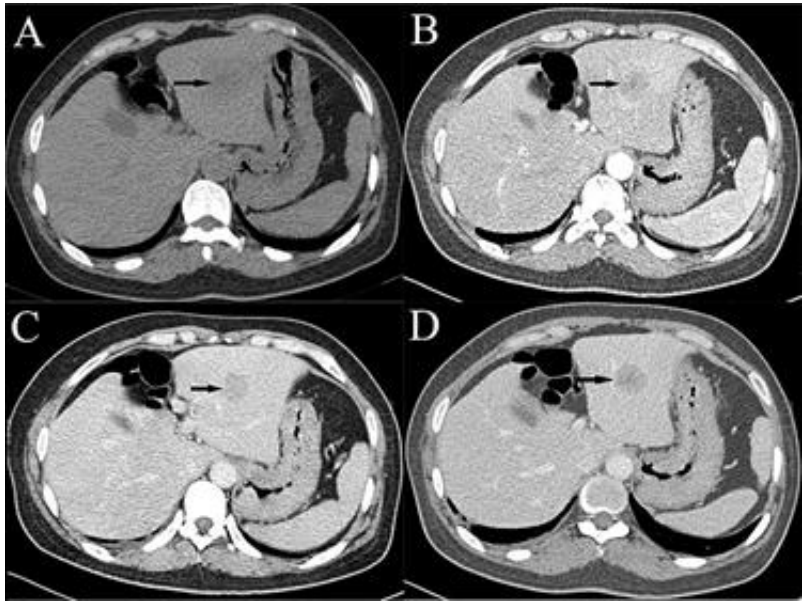
- Diagnostic Radiology Report
- Genetic Consult Report

Recorded Signals



Examples: ECGs, EEGs

Images



Ex: CT Scan, MRI, Photography, X-Ray

Generally speaking, the creator of the medical record is assumed to be the “owner”. The patient can request access via provisions in HIPAA.

- 21 US States (including California) clearly specify the creator is the own.
- New Hampshire is the only state that gives the patient ownership.

Is there a standard in Armenia for ownership of health records?

Capabilities of EMR

Electronic Medical Record (EMR): a digital version of a patient's paper chart. EMRs are real-time, patient-centered records that make information available instantly and securely to authorized users.

EMRs allow clinicians to:

- Track data over time
- Easily identify which patients are due for preventive screenings or checkups
- Check how their patients are doing on certain parameters—such as blood pressure readings or vaccinations
- Monitor and improve overall quality of care within the practice

Capabilities of an EMR:

- Health information and data
- Result management
- Order management
- Decision support
- Electronic communication and
- connectivity
- Patient support
- Administrative processes
- Reporting and population health
- management

Activity

Go to Simple.org

Activity

Step 1: Watch Demo Video

Step 2: Identify the types of data collected and what parts of the patient assessment are present

Activity

Step 3: Read Medium Article on “What we are learning by creating an Ultra-Thin EMR”

Step 4: Share the design requirements for the Simple EMR (e.g. must be accessible offline)

Does Simple include any of the following:

- ☐ Health information and data
- ☐ Result management
- ☐ Order management
- ☐ Decision support
- ☐ Electronic communication and
- ☐ connectivity
- ☐ Patient support
- ☐ Administrative processes
- ☐ Reporting and population health
- ☐ management

HL7 - FHIR

Health Level Seven International - Fast Healthcare Interoperability Resources

- Describes data formats and elements (known as "resources") and an API for exchanging electronic health records.
- Allows for the ability to exchange health records between different systems.

Purported Benefits of FHIR

1. Simplified data model, every resource is linked with a unique identifier.
2. Developer Friendly.
3. The specification is Free for Use.
4. Supports RESTful Architecture.
5. Fast and Easy to Implement.
6. Cost Savings Approach.
7. The concept of Resources.
8. FHIR suits well for mobile.

Break

Activity

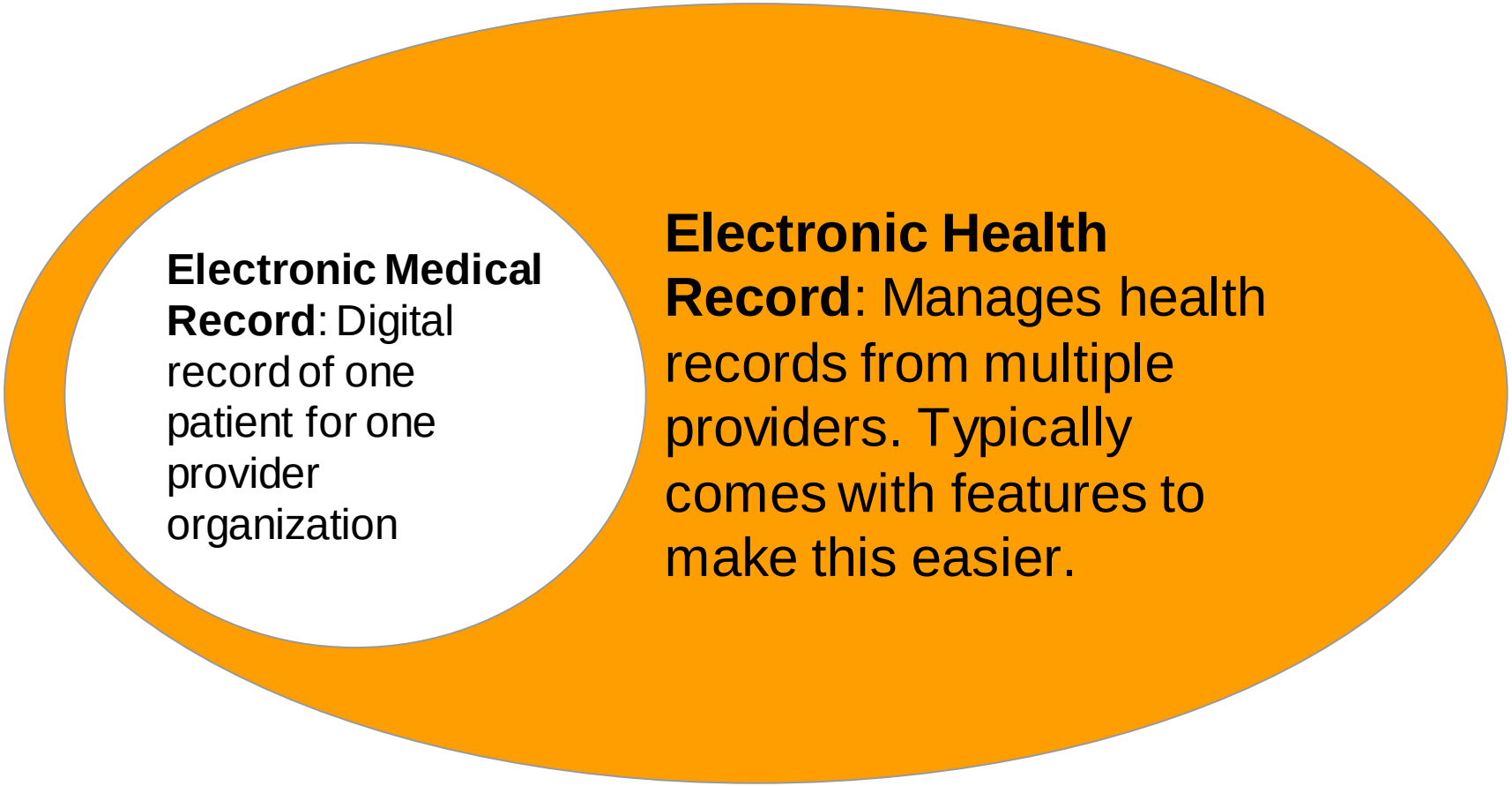
Case Study

Activity

Questions:

1) How would you get EKGs and previous diagnosis for a patient that was treated at another hospital?
2) How might you improve the process without using EHRs?
3) What role would an EMR play in this?

EMR v EHR v PHR


Electronic Medical Record: Digital record of one patient for one provider organization
Electronic Health Record: Manages health records from multiple providers. Typically comes with features to make this easier.

Benefits of an EHR:

- Multi-user ubiquitous access to patient
- data
- Multiple views of data
- Better communication with other
- providers and with patients
- Re-uses of clinical data

Challenges of an EHR:

- Data quality
  - Documentation not always a priority for clinicians leading to incomplete, inaccurate, and inaccessible data
- Data usability
  - Inadequate adherence to standards, resulting in lack of interoperability
  - Much data “locked” in clinical narrative

Medical Record - EMR v EHR v PHR

	EMR	EHR	PHR
User	Healthcare provider within one organization	Patients and Healthcare Providers	Healthcare Consumers / Patients
Information	Electronic version of the traditional medical note. Might also include limited patient view.	Comprehensive health record (goes beyond just the medical chart)	Typically information entered or attached by the patient
Ownership	Creator (e.g. Healthcare Provider)	Shared between healthcare organizations that contribute	Healthcare Consumer / Patient. Will control access to information.

PHR

Difference between patient and consumer

Patient:

- Sick, injured or ill
- Requires treatment or intervention
- Often comes with passive connotations

Healthcare Consumer:

- Planning for medical services
- Compares cost and quality
- Actively selects providers

Personal Health Record: Electronic lifelong resource of health information needed by individuals to make health decisions (per AHIMA)

- Individuals own and manage informations which comes from providers
- Individual determines rights of access
- Does not replace the legal medical record which is maintained by the provider

US Healthcare consumers want access to their information (Deloitte Study)

- 60% of want online access to medical records, test results and online appointment scheduling
- 1 in 4 patients would pay for this service
- 3 out of 4 patients want more in home monitoring devices and tools to allow them to be more active in their care.
- 1 in 4 consumers maintain a personal health record

Tethered

- Stored in single healthcare provider's EHR
- Often allows communication with provider
- May allow patient to add information

Interconnected or integrated

- Like a tethered PHR but will work across multiple systems

Standalone

- Isolated application on individual computer, may use mobile device or Web site

Typical functions include:

- Allow viewing of patient's data in EHR
- Patient able to communicate with healthcare provider for appointments, refills, and non-urgent questions
- Provide access to consumer-oriented library of health information
- Usually browser-based, but increasingly on mobile devices

Stand alone PHRs: patients fill in information from their own records, and the information is stored on patients' computers or the Internet.

Failures:

Google Health

Microsoft® HealthVault™

Success:

Health