COMP3342:
Health Systems Interoperability and Integration

Electronic Health Records and Related Standards

Time: **Tuesday+ Thursday: 11:25-12:40**

Location: **Masri204**

Section: **1**

HiCure
Excellence in Health Informatics Integrated Curricula

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Medical Terminologies: Coding Standards

Learning Objectives:

1. Understand healthcare environment elements, clinical care processes and workflows,
2. Understand EHRs objectives, EHR requirements and the difference between different EHR standards
3. Understand EHRs structural/framework standards.
4. Identify and understand the purpose EHR related standards and their purpose:
    1. CEN 13940
    2. openEHR and CEN 13606

RECALL: Types of Health Standards

1. Medical terminology/vocabulary or coding standards
   - Define standard code-sets for generally used concepts, terms, entity names, disease names, procedures, laboratory tests, observations, clinical findings, body structure names, etc.
   - e.g. ICD9/10, SNOMED-CT etc.
2. **Electronic Health record or Data–model standards**
   - Define system modules and module structures, the interfaces between modules, and operations/processes
   - openEHR/CEN 13606, etc.
3. **Health data exchange or messaging standards**
   - Provide a comprehensive framework for **exchange, integration, sharing, and retrieval** of electronic health information
   - E.g. HL7 v2.x/v3.0, ISO/HL7 27931 etc.

RECALL: Types of Health Standards

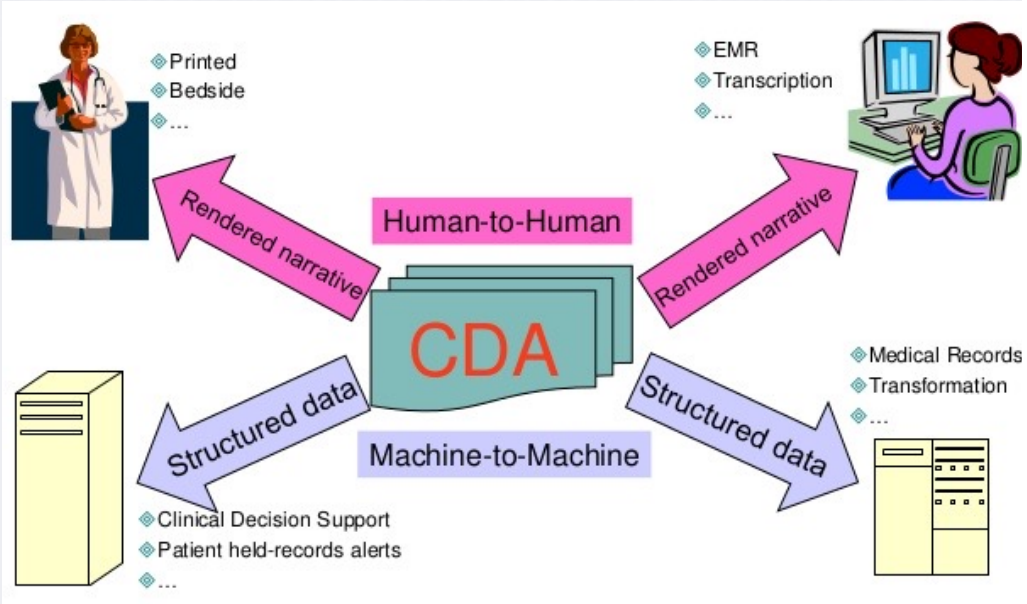
4. Architecture or Model-oriented System standards
   - Define elements of a health system architecture to support different health functions
   - e.g. ISO 12967, ISO 10781, ENV 12443, etc.
   - **e.g. CDA: Clinical Document Architecture**
5. Data formats standards
   - Define data formats for different types of health data for laboratory data, medical images
   - e.g. DICOM etc.
6. **Workflows and Process-oriented standards**
   - describe the semantics of **clinical concepts & processes** to support **continuous care** of an individual within an organization and Across organizations
   - CEN 13940 etc.

RECALL: Clinical Data Terminology/Vocabulary/Coding Standards

- Controlled Medical Terminology/Vocabulary:
  - ICD9/ICD10 (International Classification of Diseases, ver. 9/ver. 10)
  - SNOMED -CT (Standardized Nomenclature of Medicine, Clinical Terms)
  - LOINC (Logical Observation, Identifiers, Names and Codes) – Lab results
  - RxNorm (normalized naming system for generic and branded drugs)
  - RCT (Read Codes Terms, ver. 2.x, ver. 3.x) – specific to the UK
  - NLM UMLS (Unified Medical Language System): inclusive of all coding systems, and mapping between them

RECALL: Clinical Data model and exchange Standards

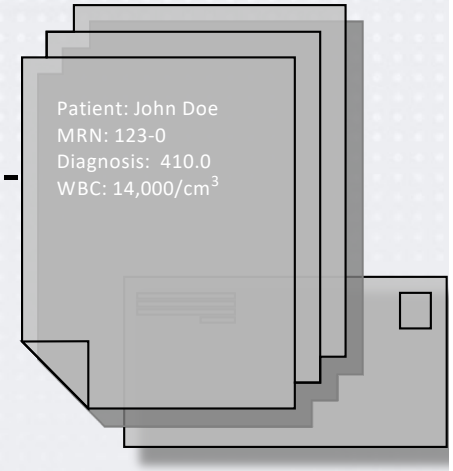
- Data-model and Architectural standards:
  - **CDA** (Clinical Document Architecture)
  - **CEN 13606 [~openEHR]** (EHR communication standard)



- Data Exchange standards:
  - **HL7** (Health Level 7, v 2.x, v 3.x)
  - **CCR** (Continuity Care Records)

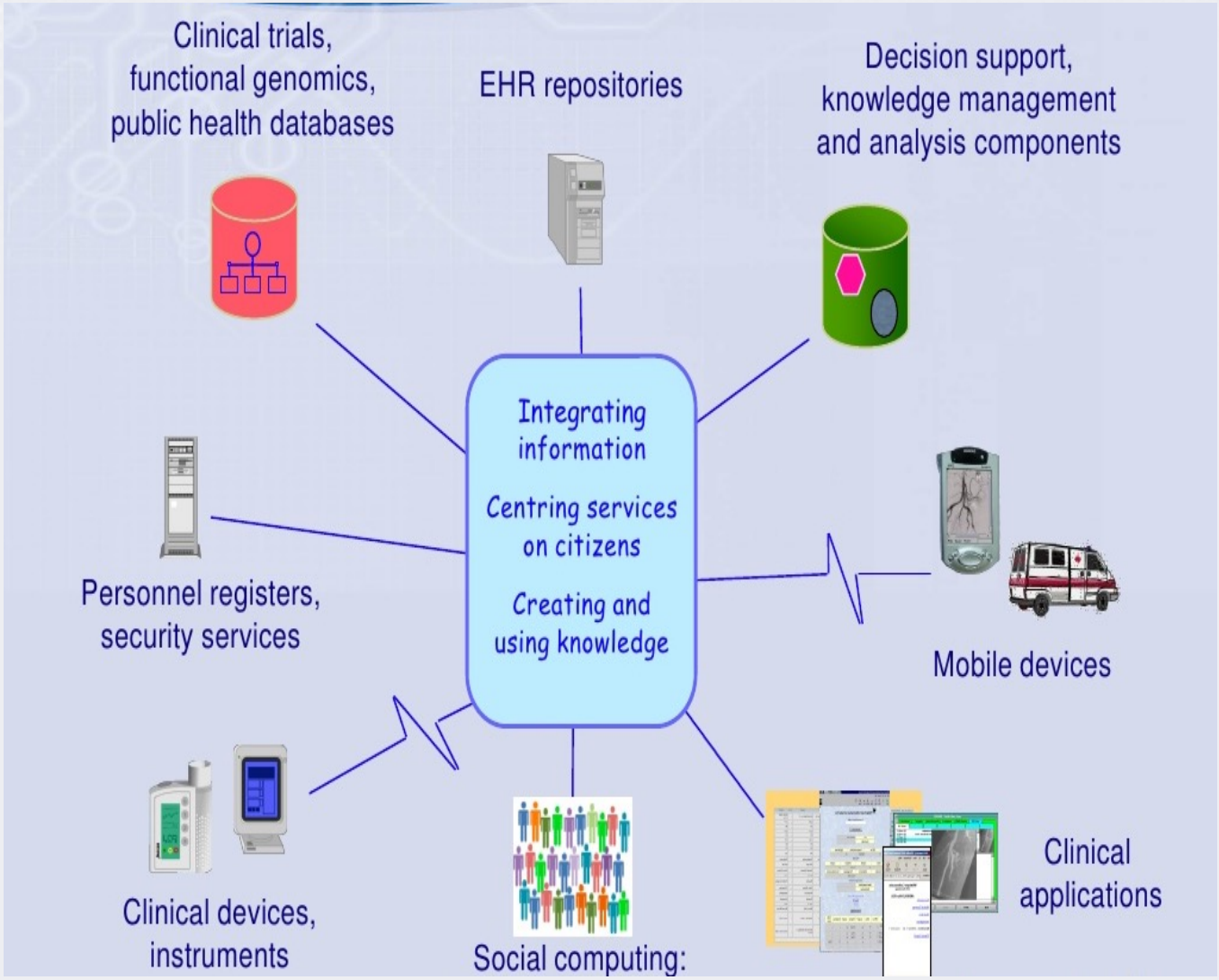
RECALL: Clinical Data format and Privacy Standards

- **Data Format standards:**
  - DICOM (Digital Imaging and Communications in Medicine)- messages for images



- **Privacy and Confidentiality:**
  - **HIPPA** (Health Insurance Portability and Accountability Act)

Electronic Health Records Land escape



Source: Eurorec

RECALL: EHR System objectives

- The EHR should enable the consistent capture, processing, retention, protection and communication of health information such that interoperability is achieved in support of shared care, improved quality of care, effective resource management, providing evidence of actions taken in health(care), and in support of the uses of anonymised information for health system management.

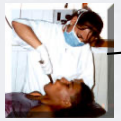
- The EHR should enable authorised users to access health information that is relevant, intact, appropriate to their permissions and within a timeframe that is appropriate to the context.

- The EHR should enable the communication (or exchange) of all health information between care settings, subject to appropriate consent and access rights, to a sufficient quality to support safe shared clinical care.

[ISO 18308]

Types of health standards






STANDARDS

DATA

Analysis

- Statistics
- Research
- Clinical Trials
- Surveillance

KNOWLEDGE

PROCESS

- Patient Safety
- Quality
- Low cost
- Accessible

- Public/Private Partnership
- Vendor/Provider Partnership

Privacy, Security, Trust, Integrity

Standards relevant to the EHR

Business requirements	**ISO 18308 EHR Architecture Requirements** HL7 EHR Functional Model ISO EN 13940 Systems for Continuity of Care ISO EN 12967-1 HISA Enterprise Viewpoint
Information models	**EHR system reference model *open*EHR** **EHR interoperability Reference Model ISO/EN 13606-1** **HL7 Clinical Message Interoperability** **HL7 Clinical Document Architecture (CDA)** **Clinical content model representation *open*EHR ISO/EN 13606-2 archetypes** ISO 21090 Healthcare Datatypes ISO EN 12967-2 HISA Information Viewpoint
Computational services	EHR Communication Interface Specification ISO/EN 13606-5 ISO EN 12967-3 HISA Computational Viewpoint HL7 SOA Retrieve, Locate, and Update Service DSTU
Security	EHR Communication Security ISO/EN 13606-4 ISO 22600 Privilege Management and Access Control ISO 14265 Classification of Purposes of Use of Personal Health Information
Clinical knowledge	Terminologies: SNOMED CT, etc. Clinical data structures: Archetypes etc.

CEN/TC EN 13940

Standardisation of Clinical Processes and Workflows

Defines System of Concepts to Support Continuity of Care

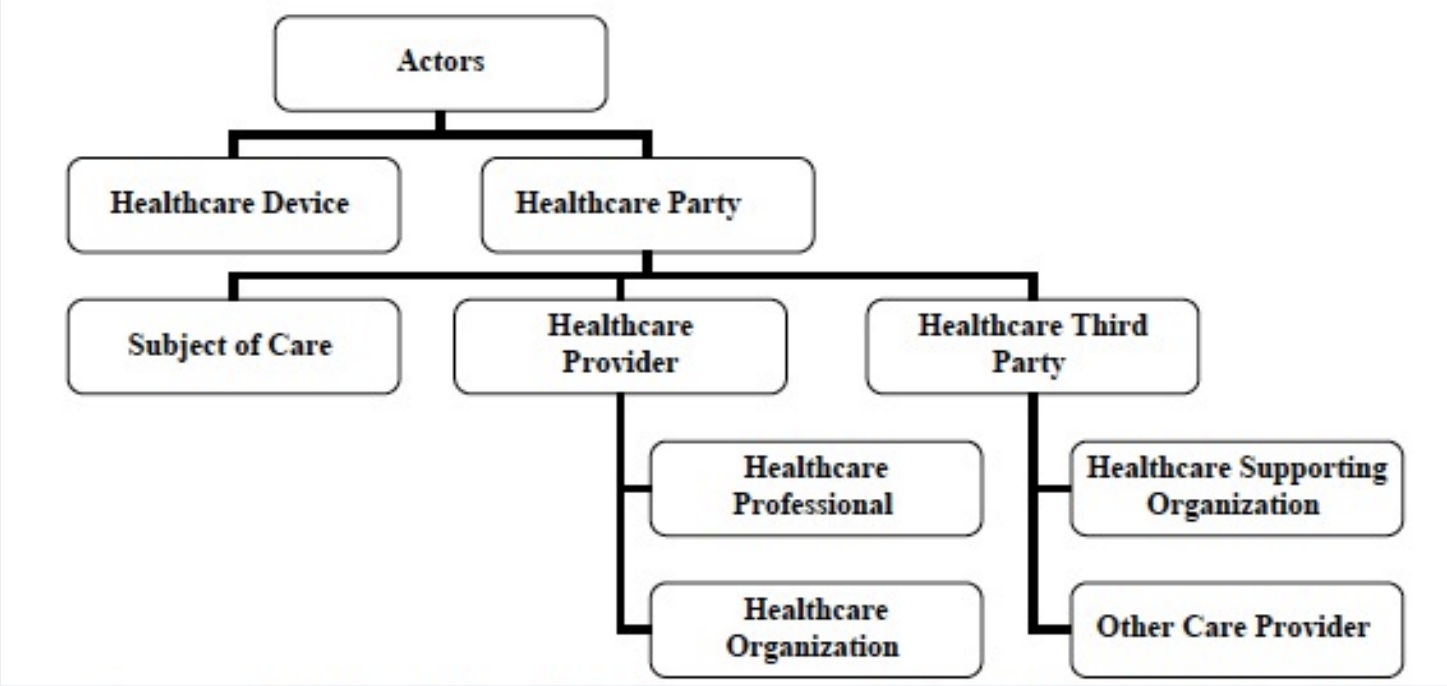
CEN/TC EN 13940

- **CEN 13940** standard describes the semantics of **clinical concepts & processes** to support **continuous care** of an individual/patient within an organisation and across organisations
  - CEN 13940 main goals:
    - Standardisation of concepts, processes, & workflows in healthcare
    - Facilitate interoperability between health Information systems used in organisations.
- CEN/TC standard has two parts:
  - **Part 1 (EN 13940-1):** describes the **basic concepts** within healthcare settings
  - **Part 2 (EN 13940-2):** describes various **core processes** involved in healthcare as well as **process workflows** for different scenarios.

CEN/TC EN 13940-1: Basic Concepts

- The basic concepts of **CET/TC EN 13940-1** consists of the following:

1. **Actors in continuity of care**
   - Entities involved in healthcare activities
   - Actor might be a **healthcare device** or **healthcare Party**



CEN/TC EN 13940-1: Basic Concepts

2. Health issues and their management

- Refers to **health problem** of a subject of care (patient) identified by a **healthcare party** (doctor or hospital).
- The **interpretation** of health issues can change over time depending on **efforts/actions** taken to solve these issues.
  - Health issues can be referred to in none or many health situations and have different interpretations
  - Example
    - "An accident" issue can further be interpreted as "fracture" in diagnosis process.

CEN/TC EN 13940-1: Basic Concepts

3. **Concepts related to health mandates**
   - **Health mandate** ➔ The authorisation given to a healthcare provider for treating a health issue of a patient.
   - Health mandates are categorised into:
     - **Demand mandate** ➔ a patient has demanded the care
     - **Care mandate** ➔ the authorisation given to a healthcare provider for being responsible for care of the patient
     - **Mandate to export personal data** ➔ the authorisation of sharing patient's data with other healthcare providers during the care process
     - **Continuity facilitator mandate** ➔ the authorisation to provide continuous sharing of information for supporting continuity of care to a patient

CEN/TC EN 13940-1: Basic Concepts

4. Time-related concepts in continuity of care

- Refers to **timeframes** of interactions among the involved **actors** that take place for treating a **patient**.
  - **Period of care**
    - Duration of clinical activities that are performed for multiple health issues
  - **Contact (i.e. encounter)**
    - A meeting between a patient and a healthcare professional for addressing one or more health issues
  - **Episode of care**
    - **Collection** of contact (i.e. encounters) elements for **one** particular **health issue**
    - An episode of care is usually divided into multiple sub-episodes
    - each **sub-episode** of care is aimed at achieving a **specific goal** for the care of the patient.

CEN/TC EN 13940-1: Basic Concepts

5. **Concepts related to knowledge, activities, & decision support**
   - Activities preformed in healthcare during the treatment of a patient includes:
     - **Healthcare activities such as**
       - Provider activity
       - Self-care activity
       - Contributing activity
       - Automated activity
     - **Clinical guidelines and protocols**
       - Generic clinical guidelines that are followed when healthcare activities are performed by provider for treating patients
     - **Programs of care and care plans**
       - Protocols followed within a health care organization by its **multiple Health care professionals** in the care process of a patient.
       - A Program of care can have a number of **Care plans**

CEN/TC EN 13940-1: Basic Concepts

6. Health data management

- Concepts related to management of health data is detailed in a **hospital** and including **sending it to another hospital**.
- Health data management deals with assuring **correctness** of such data generated by means of clinical devices
- Clinical record data in electronic form should also be stored in a **shared repository** after **verification and approval by clinician**
- The standards also deals with **access rights verification**
  - All access information should be logged in the EHR of a patient