



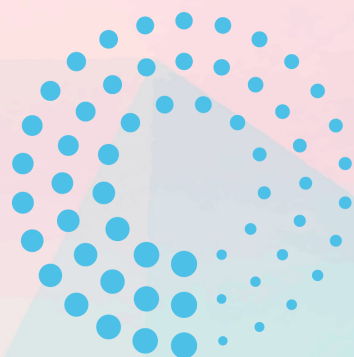
Healthcare Interoperability

A primer for healthcare
professionals and innovators.

ADAPTED FROM:



LEYR



HIMSS

Interoperability
saves lives.



What is Interoperability? 🔍

Interoperability is the ability of various systems, devices, or applications to connect and communicate seamlessly, without restrictions.

This implies that different technology systems and software applications can exchange data and utilize it - which in healthcare is currently not a given.

Interoperable data exchange makes the correct data accessible at the **right time to the appropriate people, which enhances healthcare delivery.**

Why Interoperability matters.



CURRENT STATUS QUO

Imagine a situation where every library in a city **speaks a different language** and uses a unique cataloguing system.

It would make sharing books or even finding a specific book a challenging task.

This is the state of healthcare today, where different systems and applications struggle to communicate and share data effectively - a problem that hampers the delivery of healthcare services.

Why Interoperability matters.



This is where the concept of interoperability comes into play.

Just **like a universal language** that every library can understand, interoperability allows different healthcare systems, devices and applications to communicate seamlessly.

However, achieving this is not possible without standardizing the data.

Data standardization in healthcare ensures that data is consistent and can be shared and understood across various systems and platforms.

4 levels of interoperability



Foundational (Level 1):

Establishes the **inter-connectivity requirements** needed for one system or application to securely communicate data to and receive data from another.

Structural (Level 2):

Defines the **format, syntax and organization** of data exchange including at the data field level for interpretation.

Semantic (Level 3):

Provides for **common underlying models** and codification of the data including the use of data elements **with standardized definitions** from publicly available value sets and coding vocabularies, providing shared understanding and meaning to the user.

Organizational (Level 4):

Includes **governance, policy, social, legal and organizational considerations** to facilitate the secure, seamless and timely communication and use of data both within and between organizations, entities and individuals. These components enable shared consent, trust and integrated end-user processes and workflows.

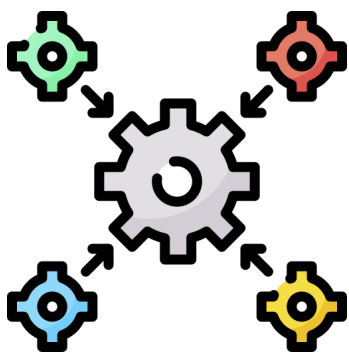
Benefits of interoperability



The key benefits of delivering an interoperable health and care system are huge:



Improved patient safety through **better and more informed decision making** with access to current information, reducing the potential for errors due to limited information.



More integrated care, enabling clinicians in different settings to **have current information available at the right time** and place to offer patients better, joined-up care.

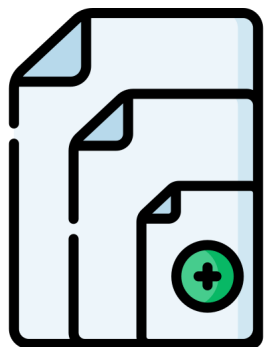


Patient interaction and involvement with long-term condition management through wearable devices and apps.

Benefits of interoperability



Population health data which can be used to drive policy priorities and research.



Reduction in unnecessary or duplicated tests, because clinicians will be able to see test results ordered by another care provider.



Reduction in diagnosis delays leading to quicker access to the right treatments.



Smoother transition of care supporting easier patient movement between care settings.

What is data standardization?



Data standardization is essential to facilitate interoperability.

It ensures consistency and facilitates that data can be shared and understood across various systems and platforms at scale.

Data standardization also aids data analysis and research, making it easier for healthcare professionals to understand and use the data effectively as well as leading to advancements in medical knowledge and healthcare delivery.

Interoperability Standards



What are Standards?

Standards provide a common language and a common set of expectations that enable interoperability between systems and/or devices.

Types of Standards

In order to understand the types of health data standards available for use, informatics professionals organize these standards into the following specific categories:

Vocabulary/terminology, content, transport, privacy and security, and identifiers.

Vocabulary/Terminology Standards

Vocabulary/terminology standards address the ability to **represent concepts in an unambiguous manner** between a sender and receiver of information, a fundamental requirement for effective communication.

Health information systems that communicate with each other rely on structured vocabularies, terminologies, code sets and classification systems to represent health concepts.

Some common vocabulary standards currently used in the marketplace include:

- **ICD-10 and ICD-11**
- **Logical Observation Identifiers Names and Codes (LOINC®)**
- **Systematized Nomenclature of Medicine-Clinical Terms (SNOMED-CT)**
- **Current Procedural Terminology (CPT®)**

Content Standards

Content standards relate to the data content within exchanges of information. They define the structure and organization of the electronic message or document's content.

This standard category also includes the definition of common sets of data for specific message types.

Some common content standards currently used in the marketplace include:

- . Consolidated CDA (C-CDA)**
- . HL7's Version 2.x (V2)**
- . HL7 Version 3 Clinical Document Architecture (CDA®)**



Transport Standards

Transport standards address the format of messages exchanged between computer systems, document architecture, clinical templates, user interface and patient data linkage.

Standards centre on “push” and “pull” methods for exchanging health information.

Some common transport standards currently used in the marketplace include:

- **Digital Imaging and Communications in Medicine (DICOM)**
 - **Fast Healthcare Interoperability Resources (FHIR®)**
- 



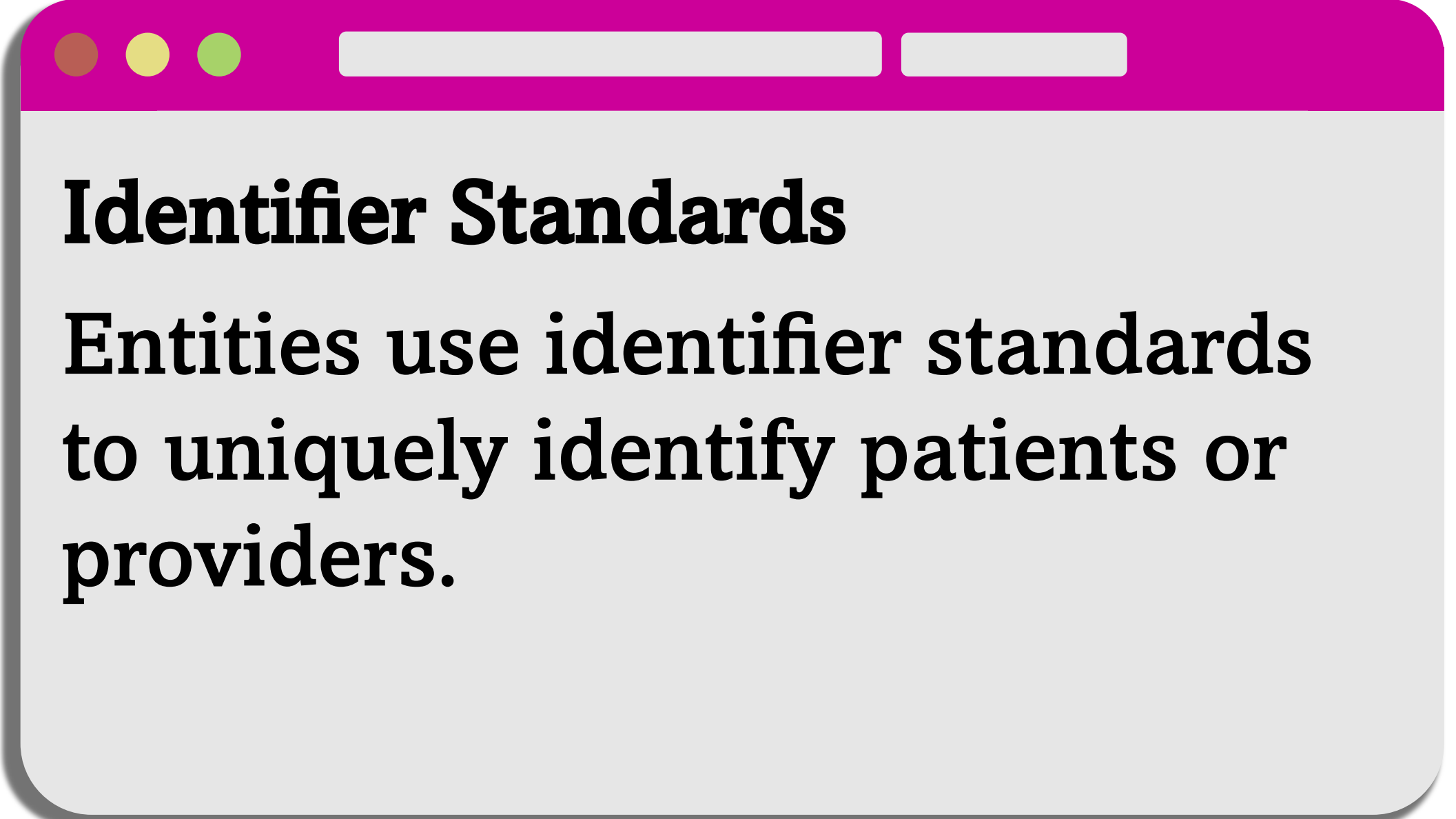
Privacy and Security Standards

Privacy standards aim to protect an individual's (or organization's) right to determine whether, what, when, by whom and for what purpose their personal health information is collected, accessed, used or disclosed.

Security standards define a set of administrative, physical and technical actions to protect the confidentiality, availability and integrity of health information.

Some common privacy standards currently used in the marketplace include:

- . Health Insurance Portability and Accountability Act (HIPAA)**
 - . General Data Protection Regulation (GDPR)**
- 



Identifier Standards

Entities use identifier standards to uniquely identify patients or providers.

Some common identifier standards currently used in the marketplace include:

- . Object ID (OID)**
- . Enterprise Master Patient Index (EMPI)**
- . Medical Record Number (MRN)**
- . National Council of State Boards of Nursing ID (NCSBN ID)**

What is FHIR?



FHIR (Fast Healthcare Interoperability Resources) is a standard for exchanging healthcare information electronically.

Developed by **Health Level Seven International (HL7)**, it aims to simplify the implementation and increase the interoperability of healthcare services.

FHIR provides a comprehensive framework for representing health-related information in various formats, including **clinical, administrative, financial, and infrastructural**.



What is OpenEHR?



OpenEHR is an open standard specification in health informatics that outlines **the management, storage, retrieval, and exchange of health data** in Electronic Health Records (EHRs).

This standard focuses on health data consistency and interoperability and EHR sharing among **different health service providers**.

It aims to support the development of flexible, interoperable, and patient-centred healthcare information systems.

open
EHR

What is SNOMED CT?



SNOMED CT (Systematized Nomenclature of Medicine Clinical Terms) is a systematic, computer-processable collection of medical terms in multiple languages.

It provides **codes, terms, synonyms, and definitions** used in clinical documentation and reporting.

It's a leading healthcare terminology worldwide and ensures consistent understanding and communication across various healthcare settings and providers.

SNOMED CT

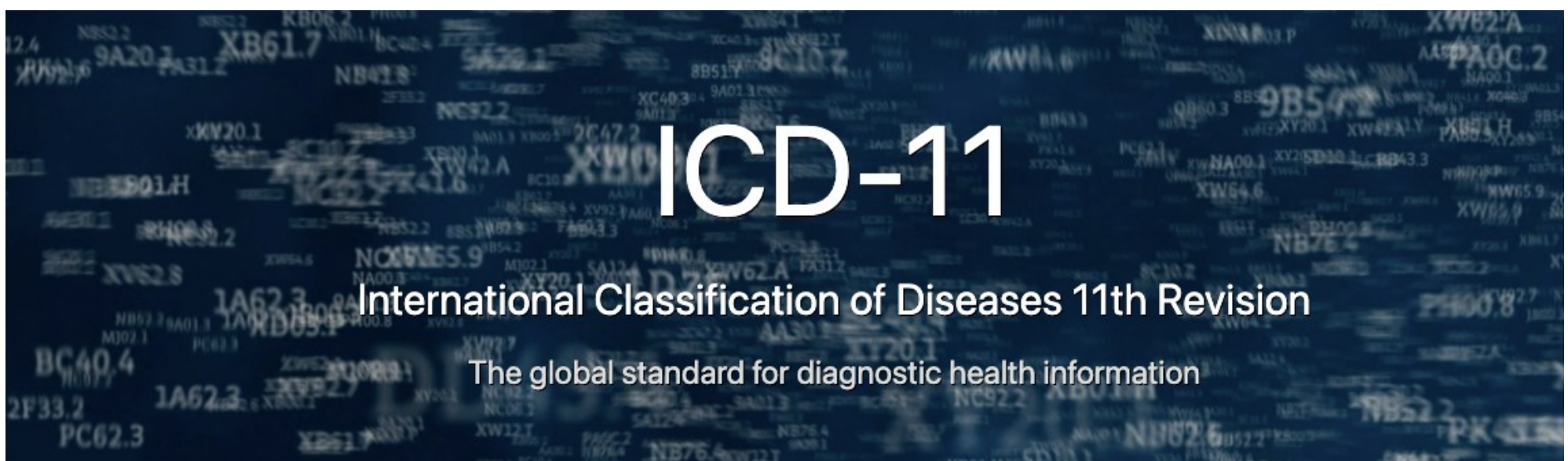
The global
language of
healthcare

What is the ICD-11?



ICD-11, the 11th Revision of the International Classification of Diseases, is a system of medical coding created by the **World Health Organization (WHO)** for documenting diagnosis, diseases, signs and symptoms, and social circumstances.

It's used globally for morbidity and mortality statistics, health care management, epidemiology, and clinical purposes. This latest revision is more detailed and **allows for more specificity and sensitivity in coding diagnoses**, leading to more accurate health data and better patient care.

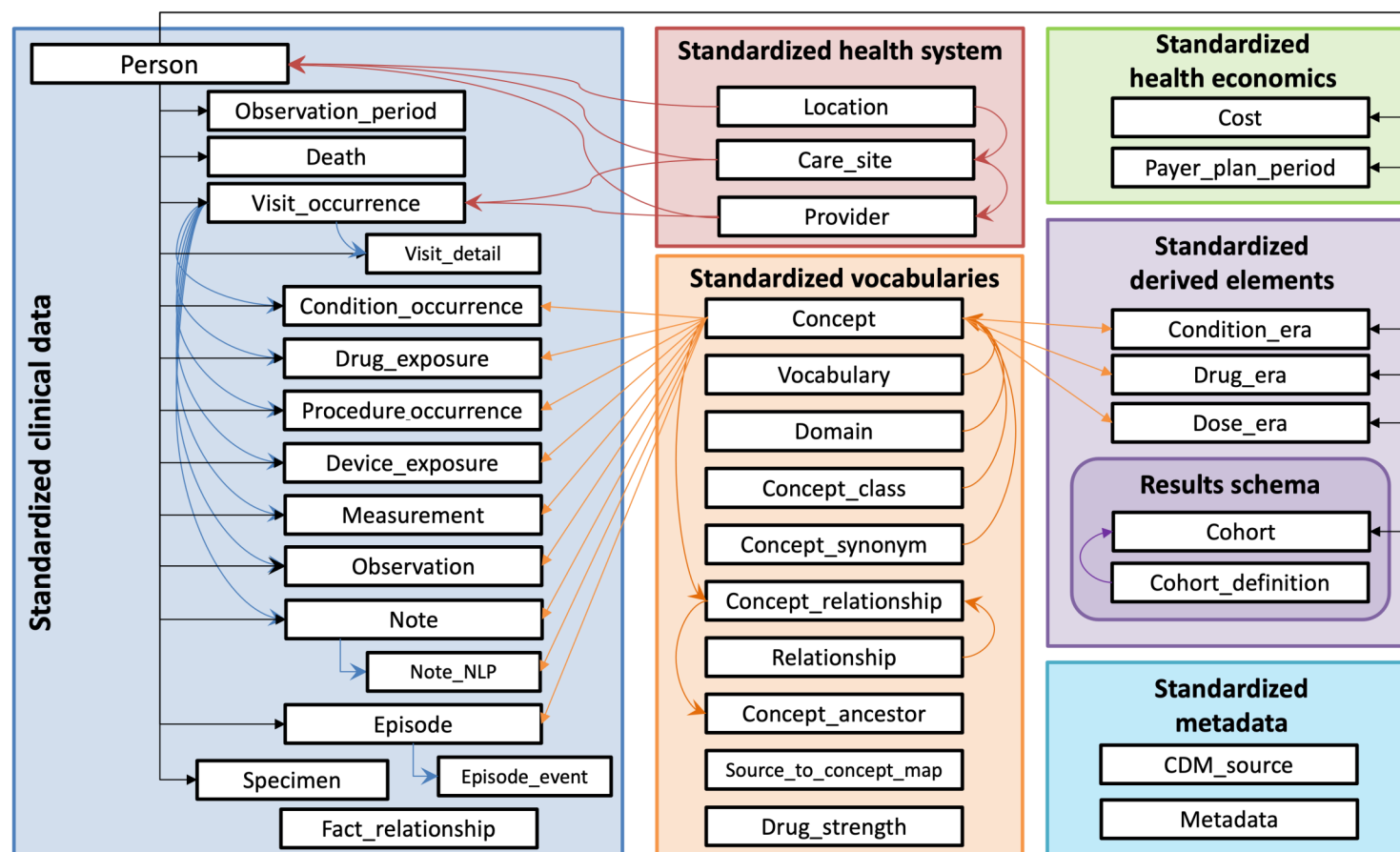


What is the OMOP?



OMOP (The Observational Medical Outcomes Partnership) Standard is a common data model that allows for systematic analysis of diverse observational databases.

It provides a standard to **transform data from various databases into a common format** (data model) and standardize content across different observational databases.



How can LEYR help?



Leyr enhances healthcare interoperability by enabling **HealthTech companies to integrate with Electronic Health Records (EHRs)** in a standardized and unified manner.

Instead of creating unique integrations for each EHR, **companies can integrate once with Leyr's platform and gain access to all necessary EHRs**. Regardless of which standard you prefer to use, Leyr can support you.

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Integrate with multiple EHRs

Reduce development time through our integration platform. You write one piece of code and we provide connection to multiple EHRs at once.

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HealthTech Innovators access better
resources.

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