



Semantic interoperability is it achievable or should we just stop trying?

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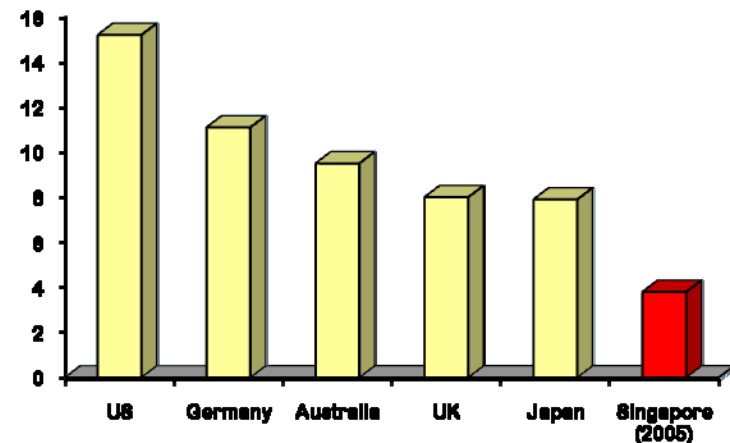


Singapore: a small country.....

- 4.59 million people on 707.1 sq km (6,489/km²)
- Ethnically diverse:
 - Chinese: 75 per cent
 - Malays: 14 per cent
 - Indians: 9 per cent
 - Others: 2 per cent
- 35,000+ healthcare providers
- 11,580 hospital beds
- 429,744 hospital admissions (2007)
- Public sector out-patient visits (2007)
 - Specialist Outpatient Clinics 3,687,910
 - A&E 752,122
 - Polyclinics 3,797,953

Achieving Positive Health Outcomes with Low Expenditure

Affordable healthcare expenditure at about 3-4% of GDP (1% is government spending)



Top-ranked overall healthcare system by WHO (6th overall)

- World Health Report 2000

1st for infant mortality, 8th in life expectancy, 20th for health and primary education and 15th in terms of social parity in health care quality

- The Global Competitiveness Report 2006-07 (by WEF)

3rd in health infrastructure; 4th in terms of impact of health problems (AIDS, drug, alc abuse etc) on companies

- The World Competitiveness Yearbook 2007 (by IMD)

1/3 of JCI-accredited hospitals in Asia are from S'pore

- All 7 public hospitals achieved JCI accreditation

Clinical expertise recognized internationally with many "Firsts"

Attracted internationally known partners such as Johns Hopkins, St Jude Children's Research Hospital, Duke University and JCI regional HQ

Challenges in Healthcare

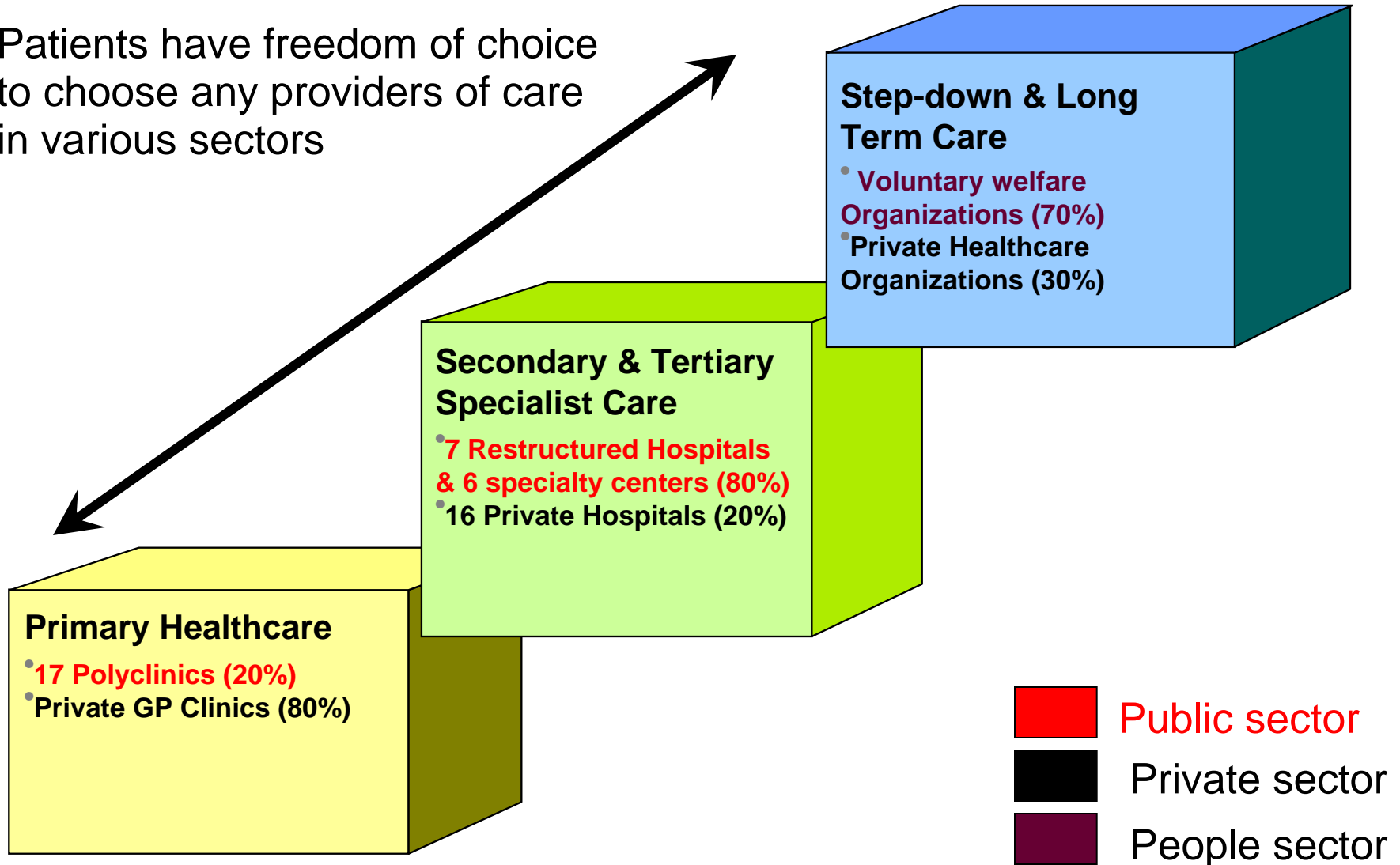
- **Aging population** - By 2030, 1 in 5 Singaporeans over age 65 (three-fold increase)
- **Changing diseases** – more chronic and emerging infectious diseases
- **Increasing public expectations**
- **Rising prices** of drugs and equipment
- **Yet, limited resources**
 - Global shortage of healthcare professionals;
 - Lack of facilities



Information Technology has the potential to enable solutions
to address pressures

Healthcare Delivery Eco-system

Patients have freedom of choice to choose any providers of care in various sectors



Singapore's Public Health Care Sector



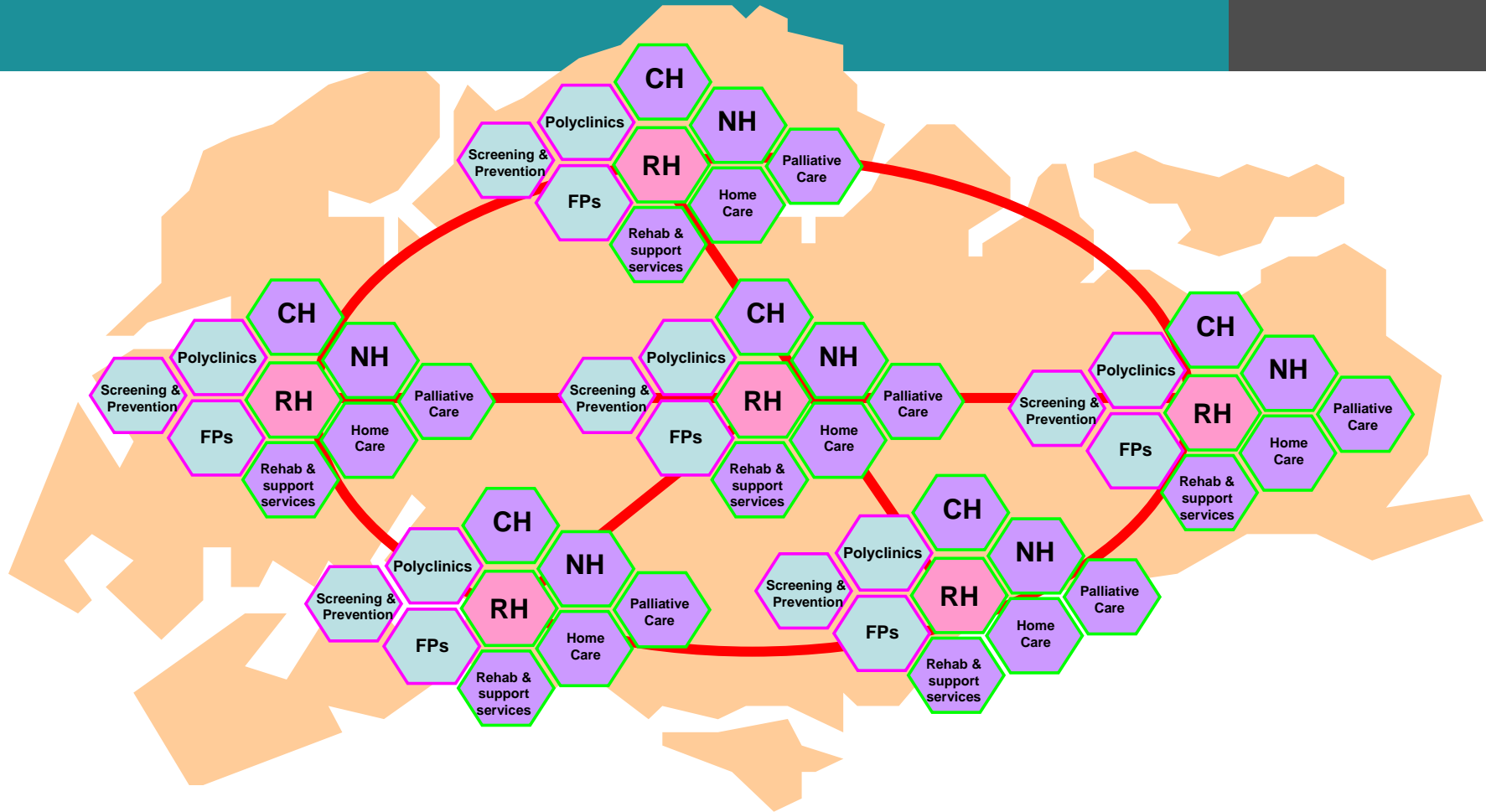
MOH Holdings

National Health Group

SingHealth Group



New Directions: Systems of Integrated Care



How do we integrate care “horizontally” across systems?

- Information Technology
- Manpower
- Platforms for Coordination

Strategic Imperatives

- Sharing of clinical information
- Drive clinical excellence and patient safety
- Integrated care for patients with chronic disease
- Streamline access to outpatient clinics
- Enable 'Self Help'
- Enable mobility of workforce
- Develop strong research analytics capabilities

Current Health IT Environment

- Multiple EMR systems in place at Cluster, Polyclinics and Specialist Clinics
- Minimal EMRs at GP and across Community Hospitals
- EMRX – over 100,000 clinical documents shared monthly – not structured data
- Culture of information sharing across clusters, not across all providers

Taking the Next Step (MSM April 2008)

1. Singapore requires a national integrated electronic health information system based on a common enterprise architecture, data standards and privacy and security guidelines.
2. A shared electronic health record (EHR) can be delivered by 2010.
3. Broad stakeholder engagement is needed. The EHR is not an IT project but a business and clinical transformation project.
4. Governance and accountability is necessary to align strategic intent with implementation.
 - National strategy and implementation plan
 - Funding mechanisms to encourage consistent, coordinated and continuous investment in health IT
 - Skilled resource capacity
5. Measuring of success of the national EHR with regards to health care quality, safety, and productivity.

But EHR raises new challenges...

Beyond the EMRX, EHR is envisaged to...

- Cover the entire healthcare continuum
 - Ministry of Health has fewer controls over private sector & Voluntary Welfare Organisations
- Cover the entire populace including non-resident foreigners
- Capture the full data complement
 - Including sensitive health information e.g. STD, mental health indications
- Support secondary uses
 - National health planning & resource allocation
 - Quality assurance
 - Public health regulation
 - Health research etc

MOHH and Standards

Clinical data included in the national project set meets defined quality standards and therefore can be:

- *Relied upon by health service providers and users for monitoring the health status of and providing care to individuals;*
- *Meaningfully used for secondary purposes, including the production of clinical knowledge;*
- *Reliably and safely shared/exchanged.*

“Enter once use many times”

Standards Vision

The Standards Work group will provide Singapore with a suite of standards that :

- Are clinically driven
- Are swift to develop and easy to use
- Fully support the development of the electronic health record and national health projects
- Promote rapid deployment and development of the EHR functionality;
- Provide a platform for long term semantic interoperability and research informatics
- Are internationally recognised

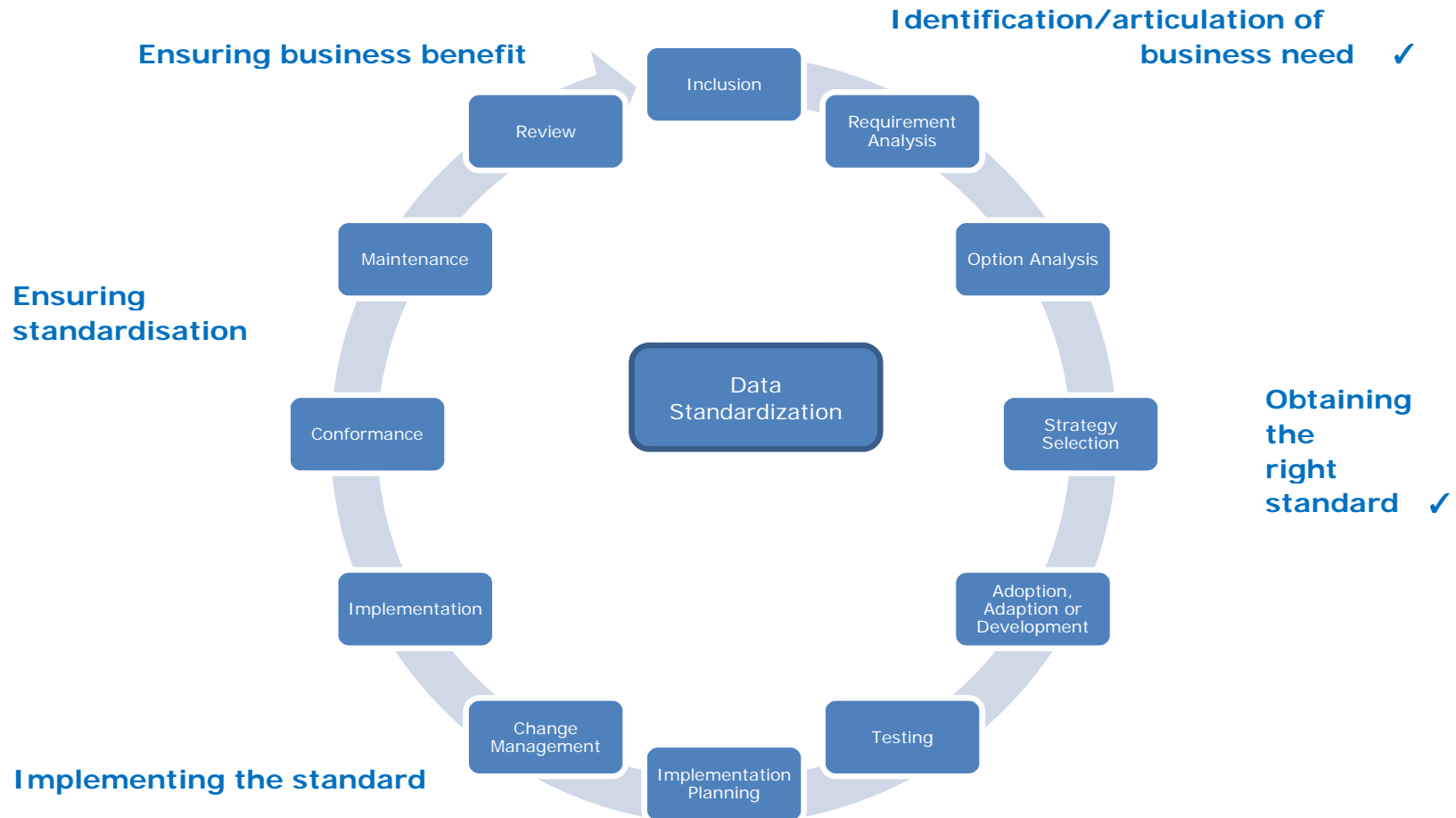
Workplan

- Infrastructure
 - National Standards Framework
 - National Standards Portal
 - National Data Dictionary
 - National Terminology and Classification Centre
- Development and Implementation
 - EHR Standards
 - Interoperability
 - Semantic Interoperability
 - Singapore Drug Dictionary
 - National Standardization of Disease and Diagnosis Coding
 - ICD 10 AM and AR DRG V 6
 - SNOMED and Discharge summary

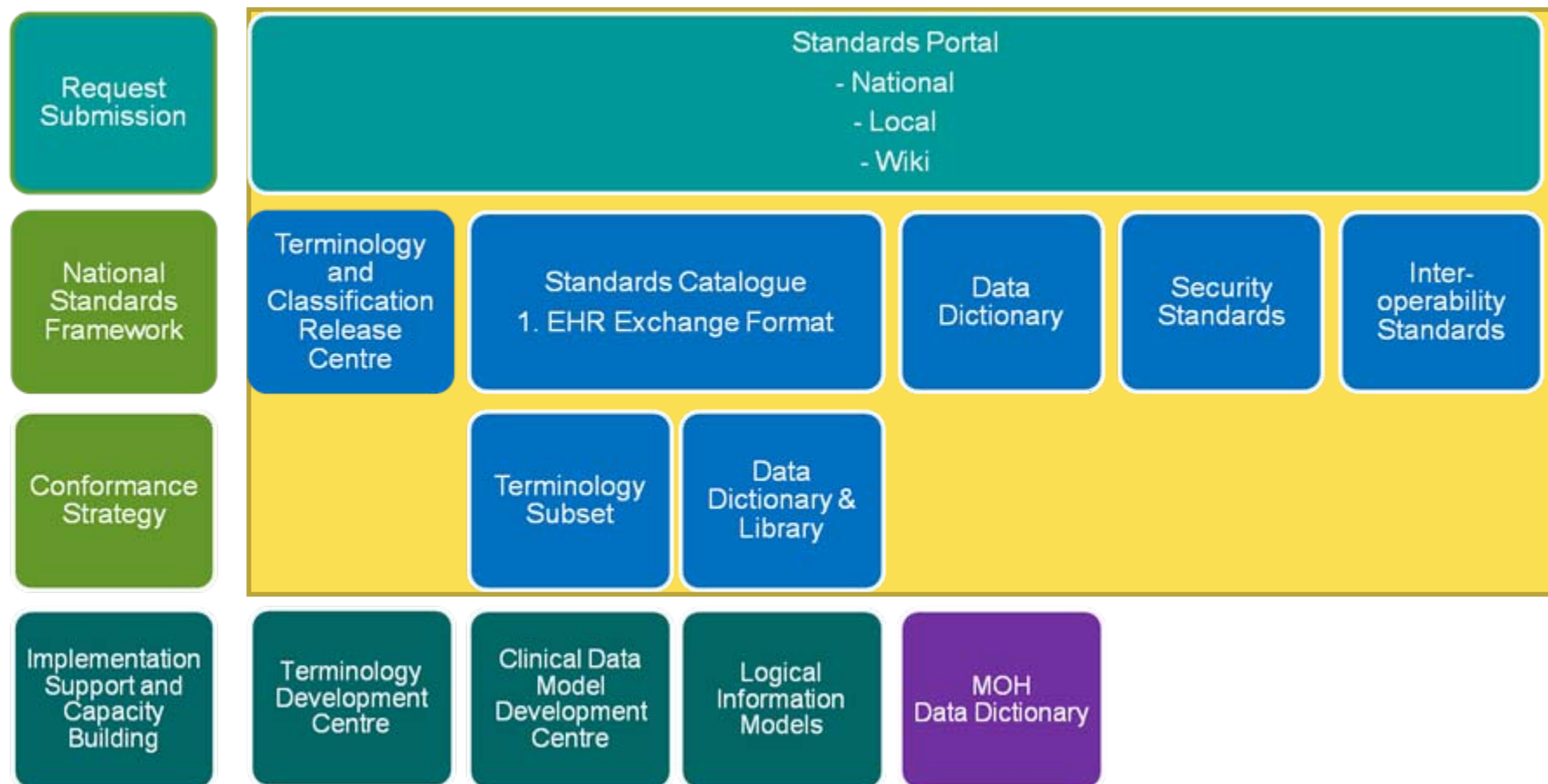
National Standards Framework

- Standards Governance
- Conformance Strategy
- Capacity Building
- Implementation Support

Standards Lifecycle



Standards Programme - Infrastructure



Electronic Records - EMR vs. EHR

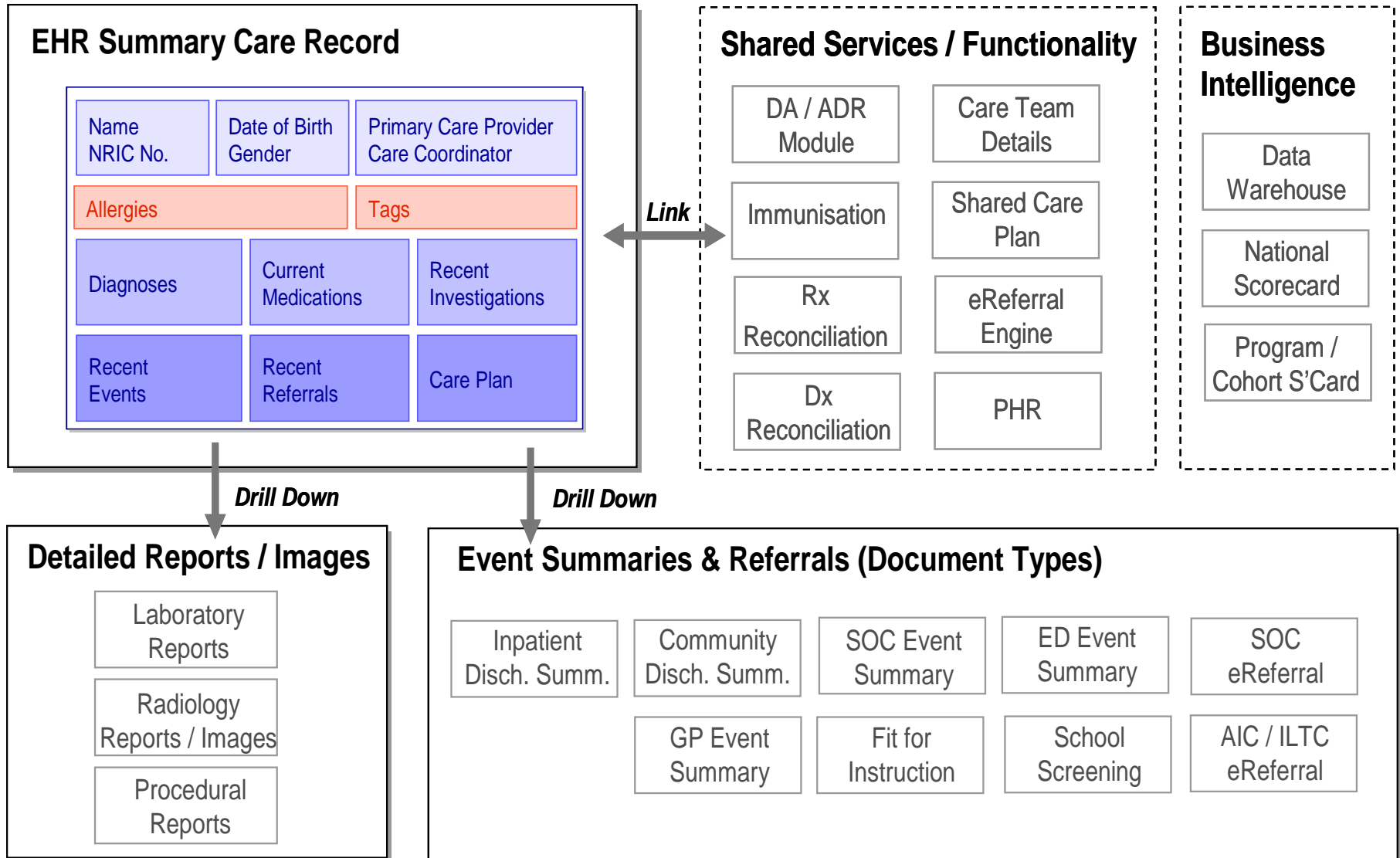
EMR

Specific to an facility (institution, private office); the equivalent of its paper predecessor and includes everything that is recorded by that organization about a given patient. It has “depth” but lacks “breadth”.

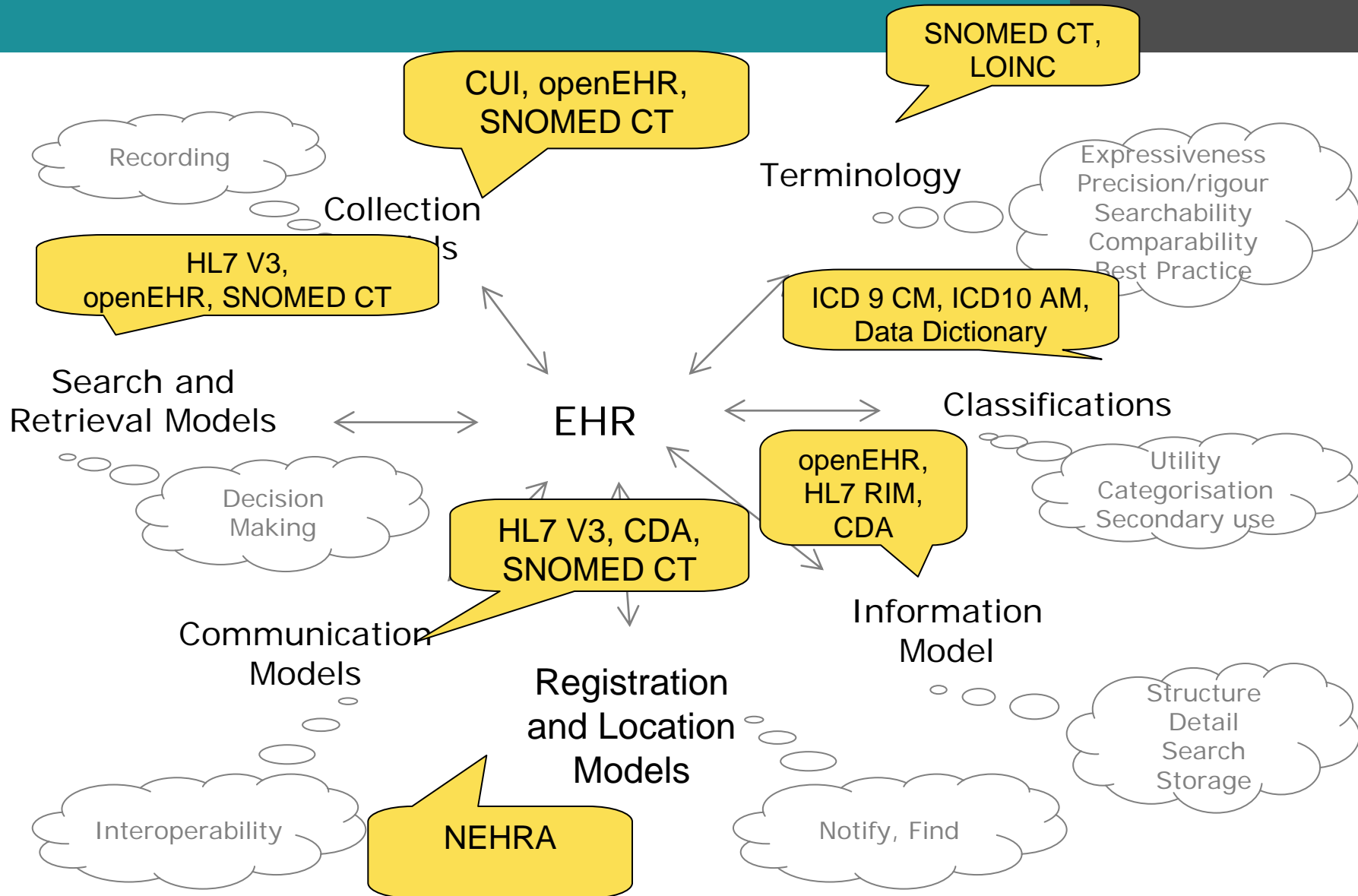
EHR

Specific to an individual; captures a key subset of health information from multiple point of service systems. It is available electronically to authorized healthcare providers and the individual anywhere, anytime in support of high quality care. This record is designed to facilitate the sharing of data across the continuum of care, across healthcare delivery organizations and across geographies.

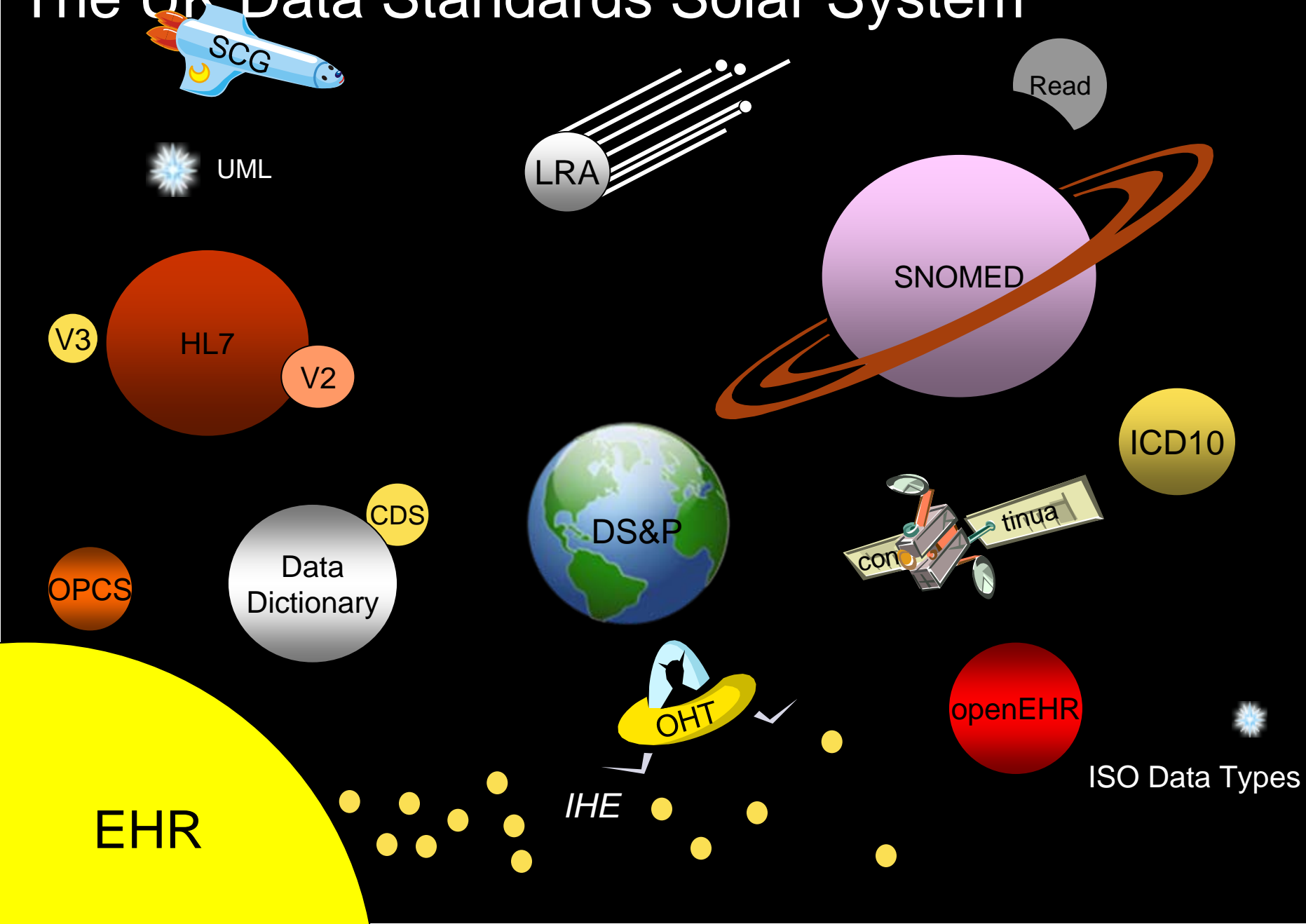
EHR – Conceptual View



Standards in the context of an EHR (UK)



The UK Data Standards Solar System



Interoperability and standards levels

■ Machine Transportability

- communication protocols

Communication

■ Machine Readability

- Point to Point
- Technology based and Operational workflows focused
- Standard message formats, Identifiers, Authentication, Authorisation

Accessing information

■ Machine interpretability

- Regional Connectivity
- Agreed structure and meaning
- Logical Information Model, Data Library
- Messages bound to terminologies and terminology constraints

Connecting systems

■ Co-operability

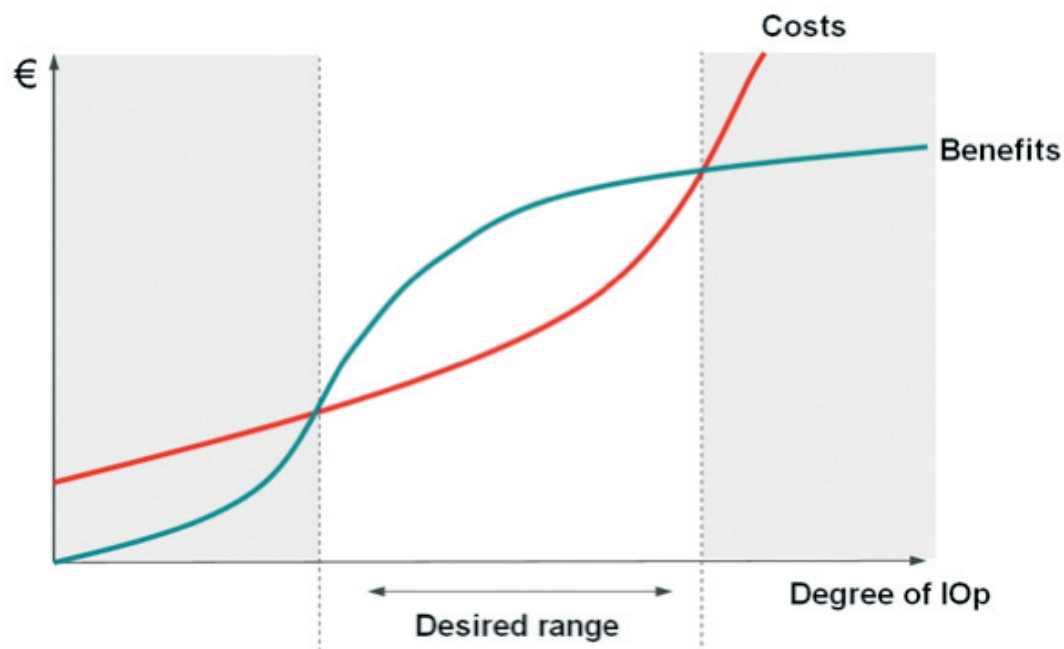
- Business transformation and Shared Care
- Clinician Driven leading to agreed process eg care planning
- Policy driven and agreed Business rules

Connecting people

EU Semantic Health

- Level 0: no interoperability at all
- Level 1: technical and syntactical interoperability (no semantic interoperability)
- Level 2: two orthogonal levels of partial semantic interoperability
 - *Level 2a*: unidirectional semantic interoperability
 - *Level 2b*: bidirectional semantic interoperability of meaningful fragments
- Level 3: full semantic interoperability, sharable context, seamless co-operability

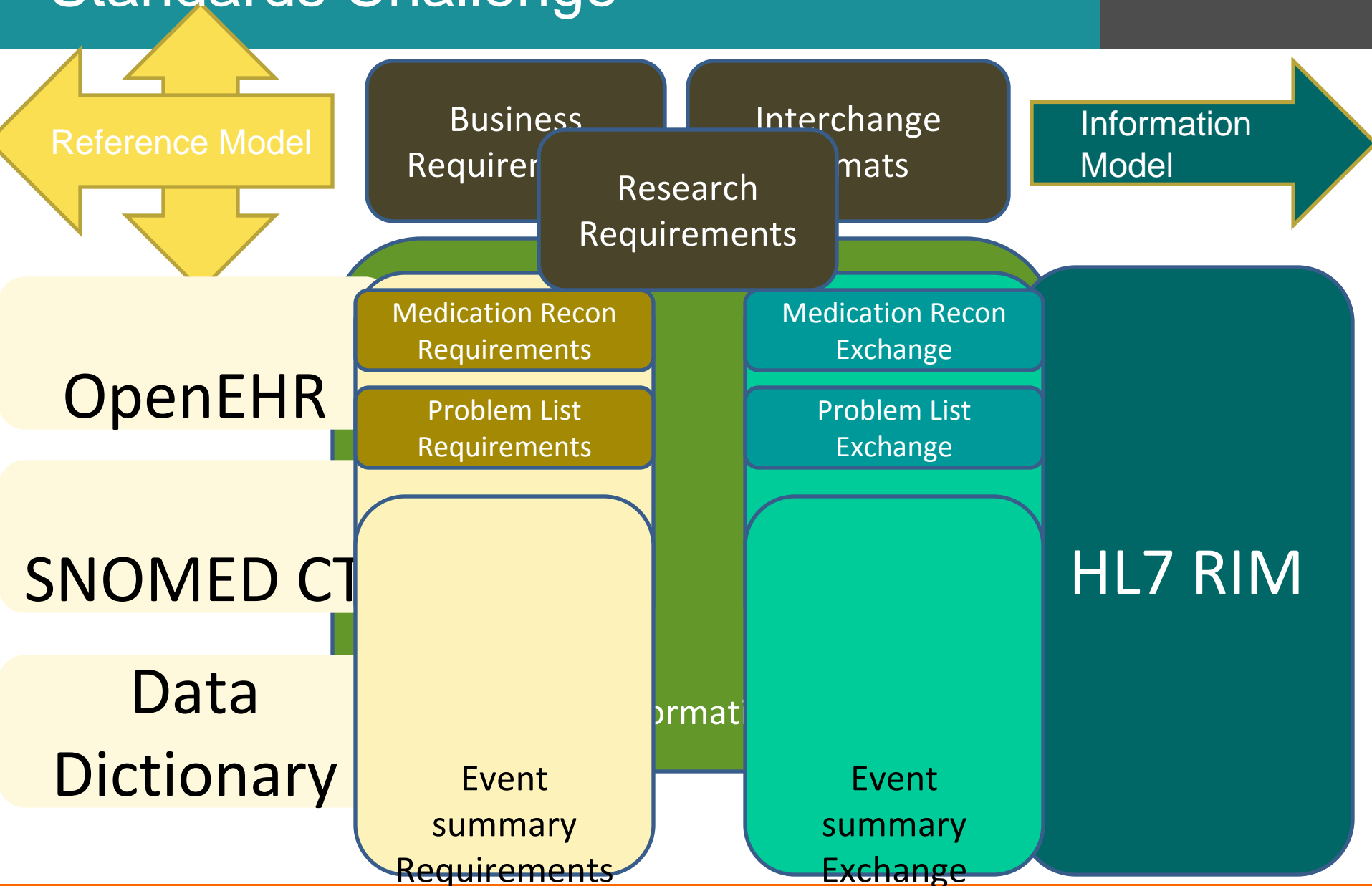
Standards when is enough enough

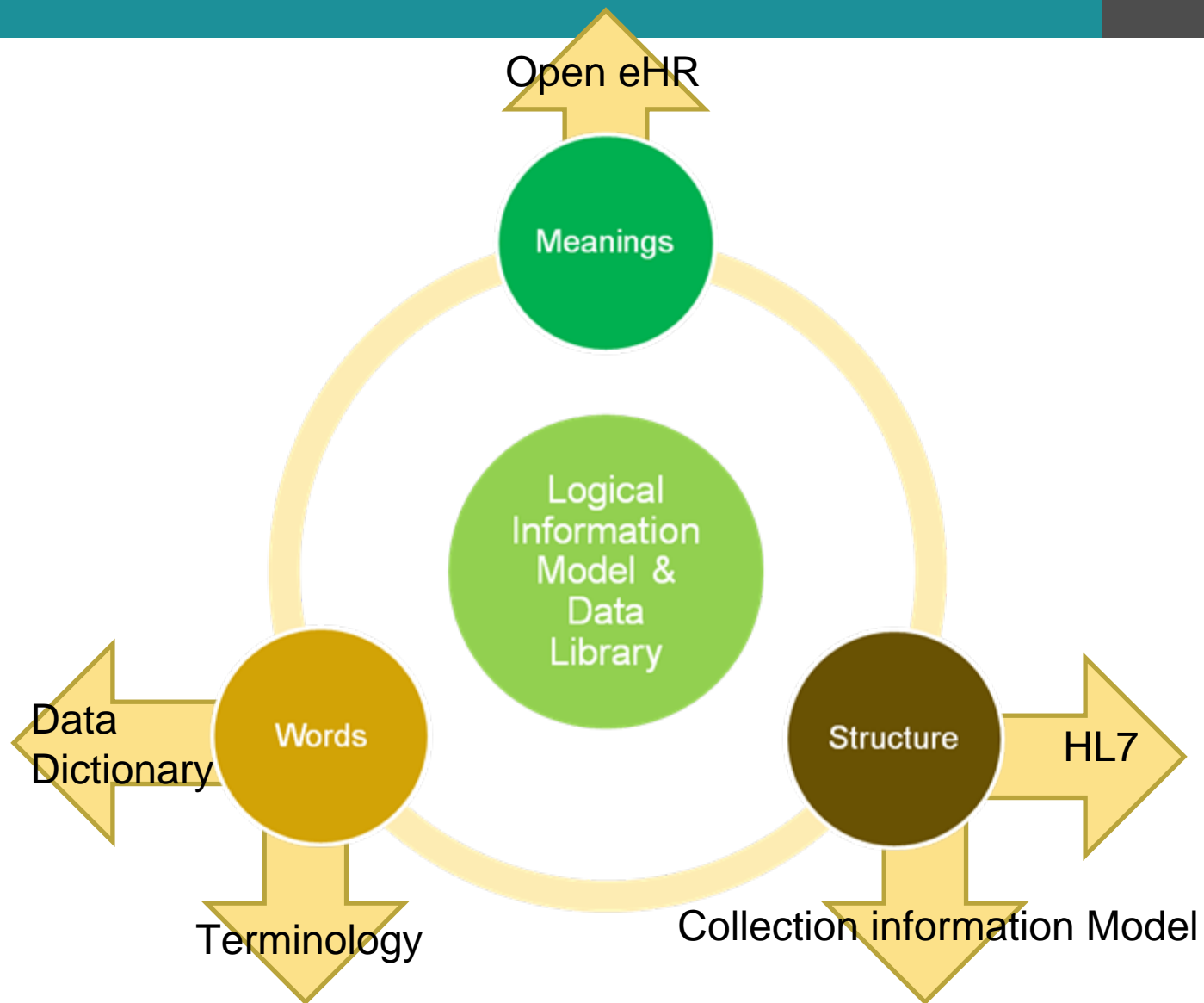


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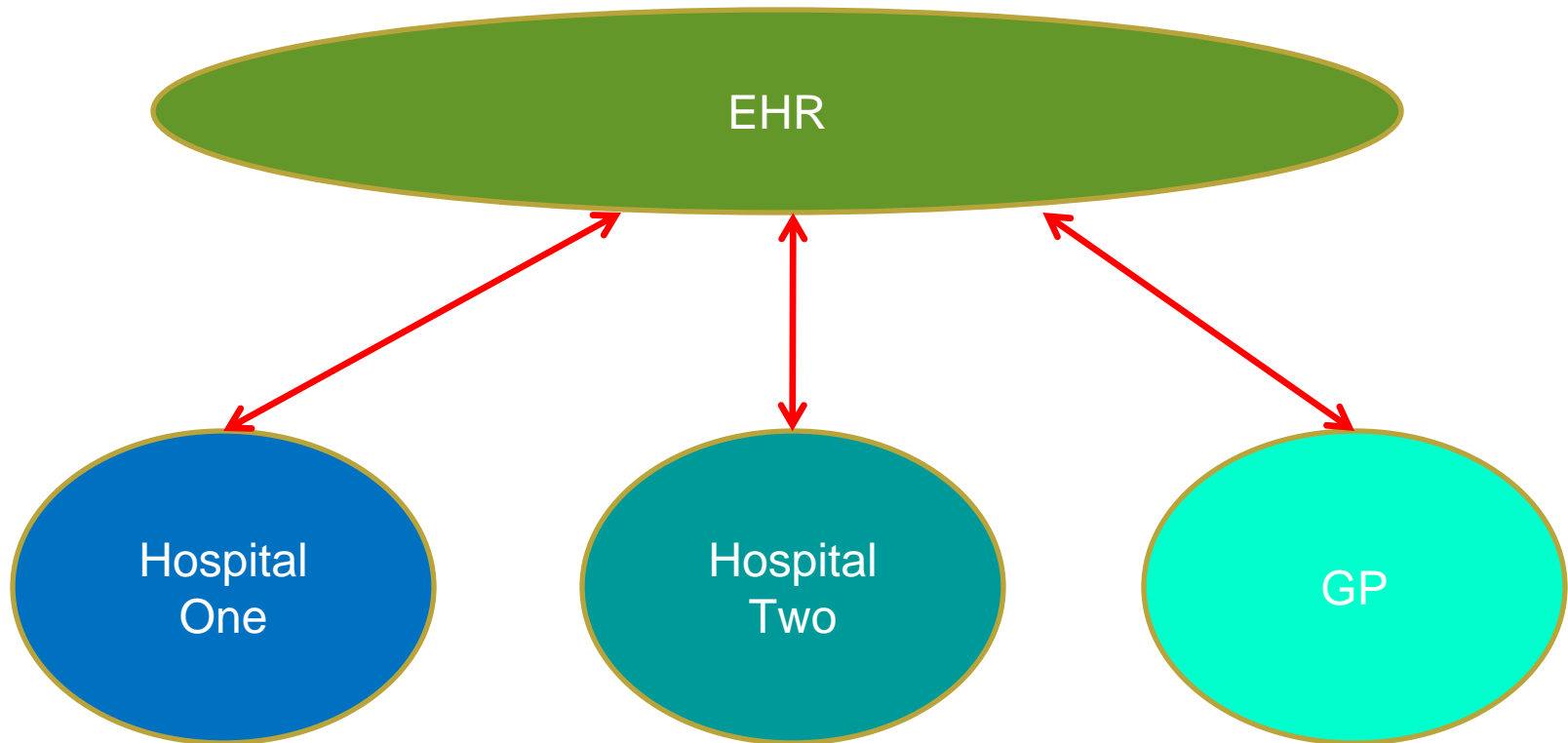
EU Semantic Health

Standards Challenge





What is the problem we are trying to solve?

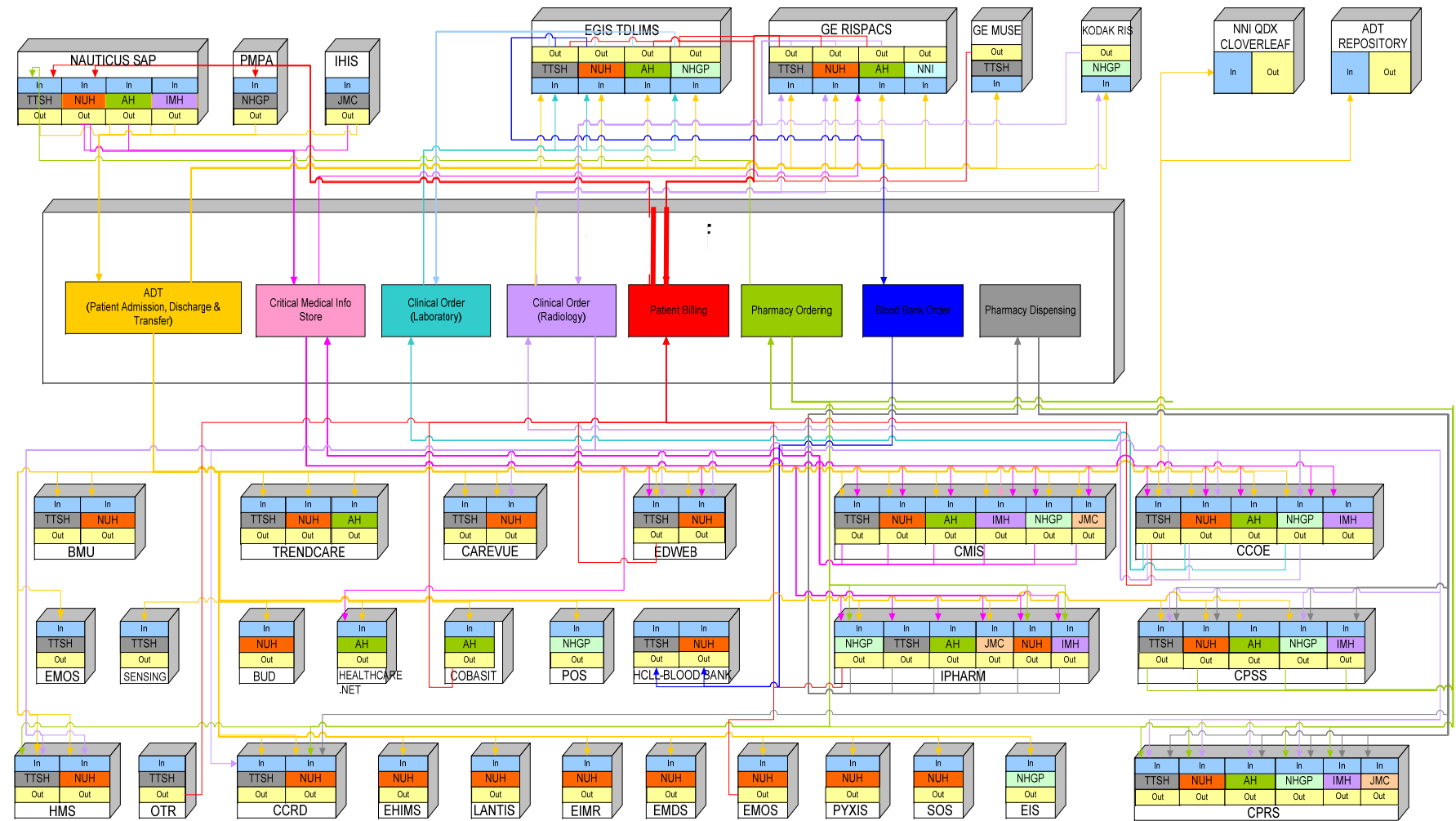


Diagnosis :
“Acute Asthma Suspected”

Diagnosis : “Asthma”
Severity: “Acute”
Status: “Suspected”

Diagnosis : “Asthma”
Status : “Suspected”

How big is the problem?



The Promise of the EHR

- Well-managed chronic illness
- Improved access to care
- Fewer adverse drug events
- Better prescribing practices
- Reduction in duplicate or unnecessary tests
- Reduced wait times
- Increased patient participation in care



A young boy waiting at A&E,
Tan Tock Seng Hospital

MOHHoldings
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Thank You

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