JADECARE

ICT SOLUTIONS TO SUPPORT HUMAN-CENTRED COMPREHENSIVE SERVICES - CATALONIA

Person-Centred Integrated Care International Conference
9th September 2021

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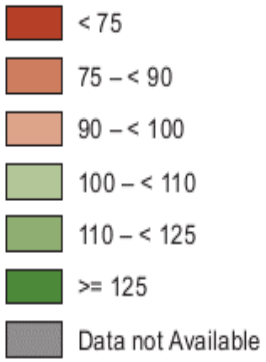
Agenda

- Catalan Health System
- Digitally Enabled Integrated Care Services
- Evolving ICT infrastructure
- Risk prediction tools: current status and perspectives

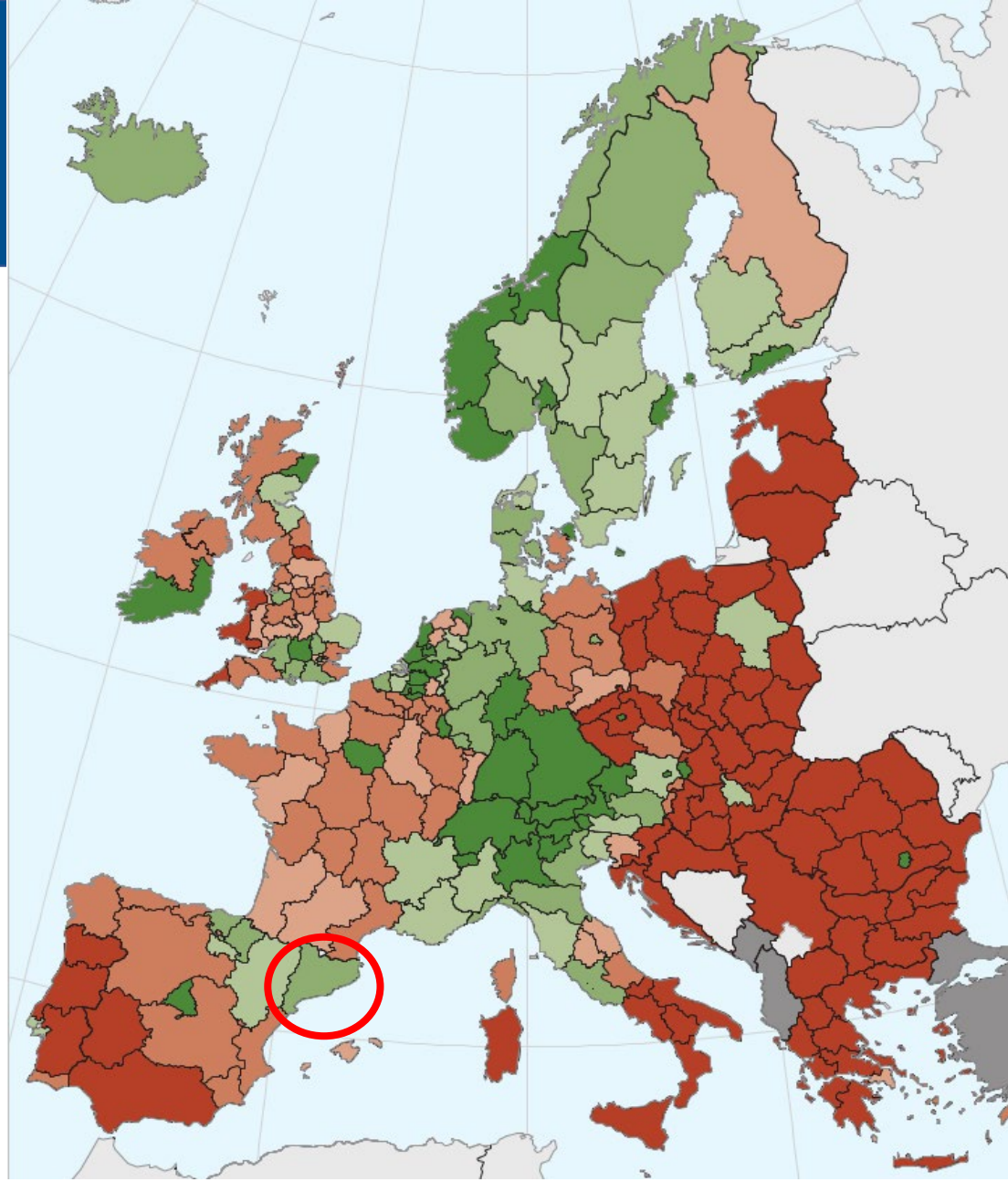
Catalonia
7,722,203 inhabitants



GDP 108%

- Universal coverage
- Public financing of the services
- Single public payer
- Civil Society involvement
- Access equity
- Continuity of care
- Integration and coordination

65 years and over (19%)



Gross Domestic Product (GDP) in purchasing power standards per EU regions in % EU28 average= 100

Highlights on Catalan Health System

7,722,203

Population in Catalonia on January 1, 2020.

Universal coverage

The publicly health care system of Catalonia was founded in 1990 under the principle of universality; so all individuals and communities are able to receive the health services.

20,000 M€

Catalan Health Service budget for 2020. The system is funded from general taxation and government founds and contributions.

> 160

Health care entities to provide health care services.

>16,000

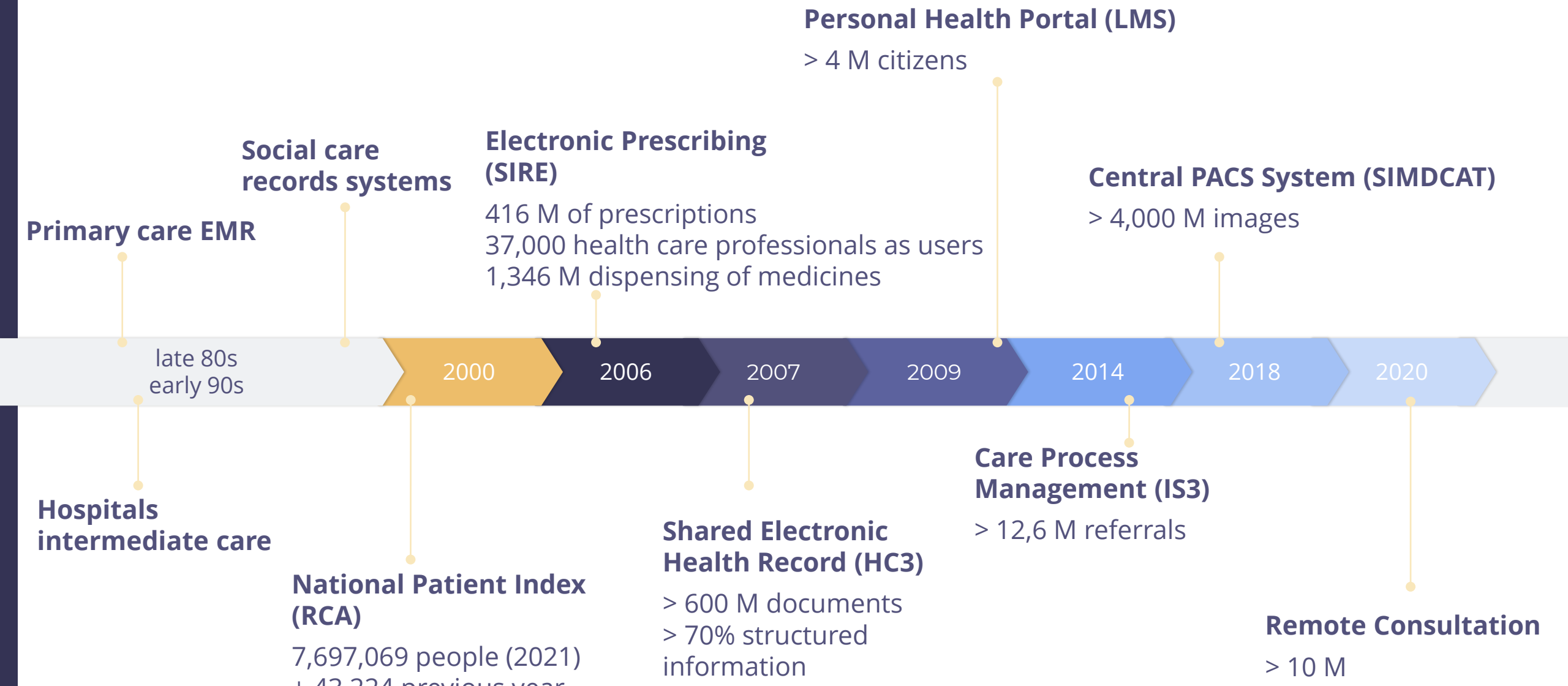
Applications across the Catalan Health System:

- 1 EMR for primary care.
- > 29 EMR products in the Intermediate care hospitals.
- At least 10 different systems for social care records.

940

Facilities that range from primary health care centres to hospitals and intermediate care centres.

Health care platforms in Catalonia



The Catalonian Digital Health Platform

Health Care Plans

World Health Organization
Europe

THIRTY-YEAR RETROSPECTIVE of CATALAN HEALTH PLANNING

Driver of Health System Transformation

The current Health Plan

A PERSON CENTRED SYSTEM: PUBLIC, UNIVERSAL AND FAIR

Health Plan
for Catalonia 2016-2020

Generalitat de Catalunya
Departament de Salut

COMMITMENT AND PARTICIPATION

1 People, their health and participation in the health system

2 Professional involvement

QUALITY OF CARE

3 Public Health

4 Accessibility and resolution

5 Pharmaceutical policy

6 Integrated Care and Chronicity

7 Research and Innovation

GOOD GOVERNANCE

8 Excellence and safety

9 Evaluation & transparency

10 Digital health

11 Integration in territories

HEALTH IN ALL POLICIES

12 Interdepartamental and intersectorial policies

AREAS OF PRIORITY AND SPECIFIC PROJECTS

Vulnerable children and teenagers | Elderly and disabled people | Mental Health | Rare diseases | Communicable diseases | Locomotor diseases | Respiratory diseases | Vascular system | Cancer

Generalitat de Catalunya
Departament de Salut

S/Sistema de Salut de Catalunya

19

https://www.euro.who.int/__data/assets/pdf_file/0003/429456/Catalan-health-planning-report.pdf

Adoption of Integrated Care Services at Barcelona-Esquerra

CLÍNIC BARCELONA Hospital Universitari

Àrea Integral de Salut Barcelona Esquerra

INTEGRAL HEALTHCARE AREA OF BARCELONA ESQUERRA:
An example of an Integrated Care System

Barcelona-Esquerra

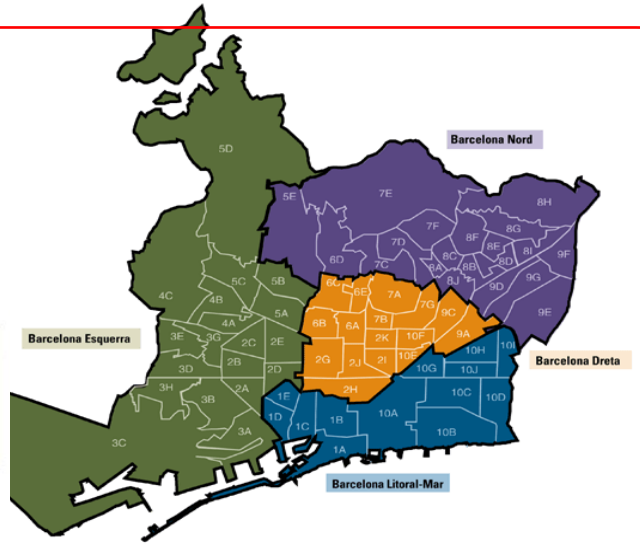
534.955 inhabitants
21% > 65 yrs

Atenció Primària:

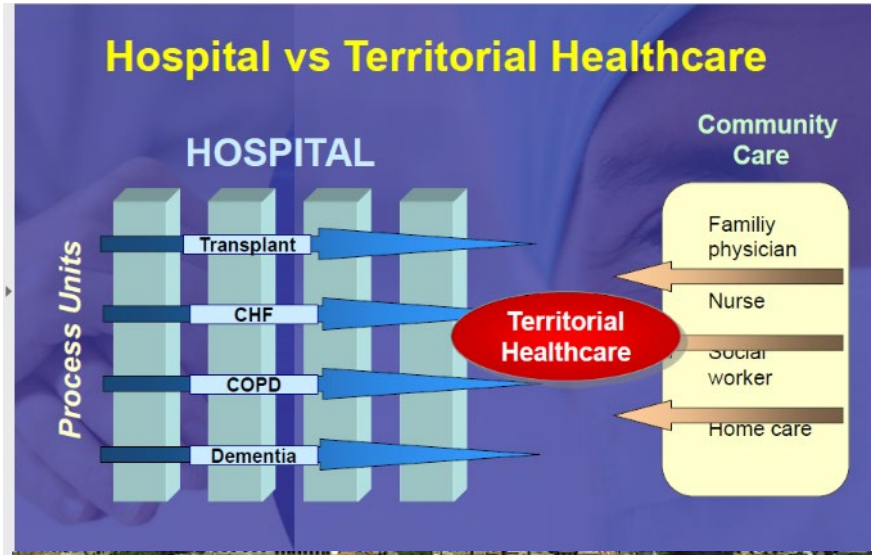
Institut Català de la Salut Servei d'Atenció Primària Litoral-Esquerra de Barcelona
CAPs Les Corts Casanova Rosselló
eap Poble-sec
eap Sarrià Vallvidrera Les Planes

Atenció Hospitalària

CLÍNIC BARCELONA Hospital Universitari
Sant Joan de Déu
Capio Hospital Universitari Sagrat Cor
hp Hospital Plató



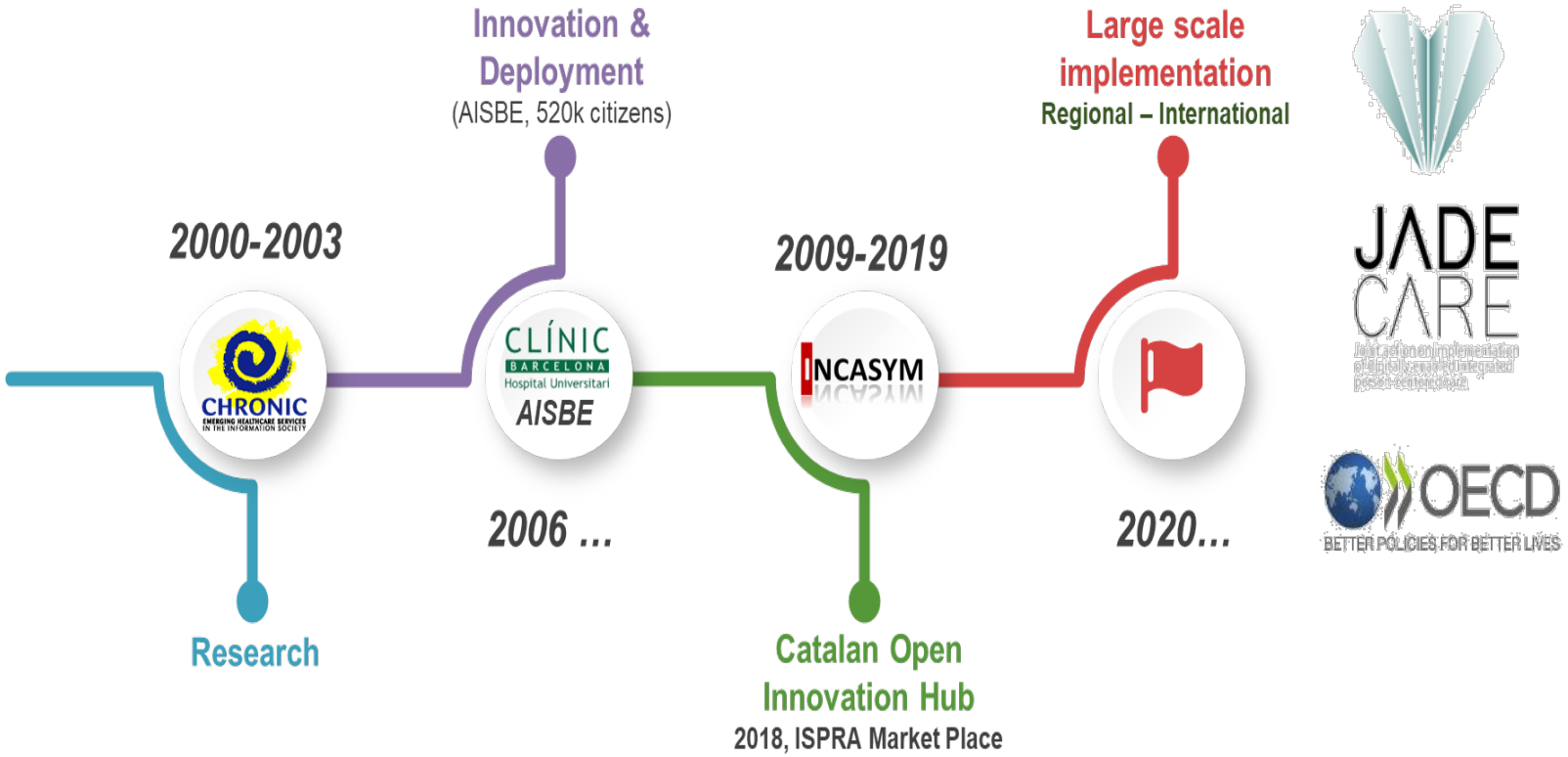
19 Primary Care Teams; 4 Hospitals



Int J Integr Care. 2016 May 23;16(2):8.

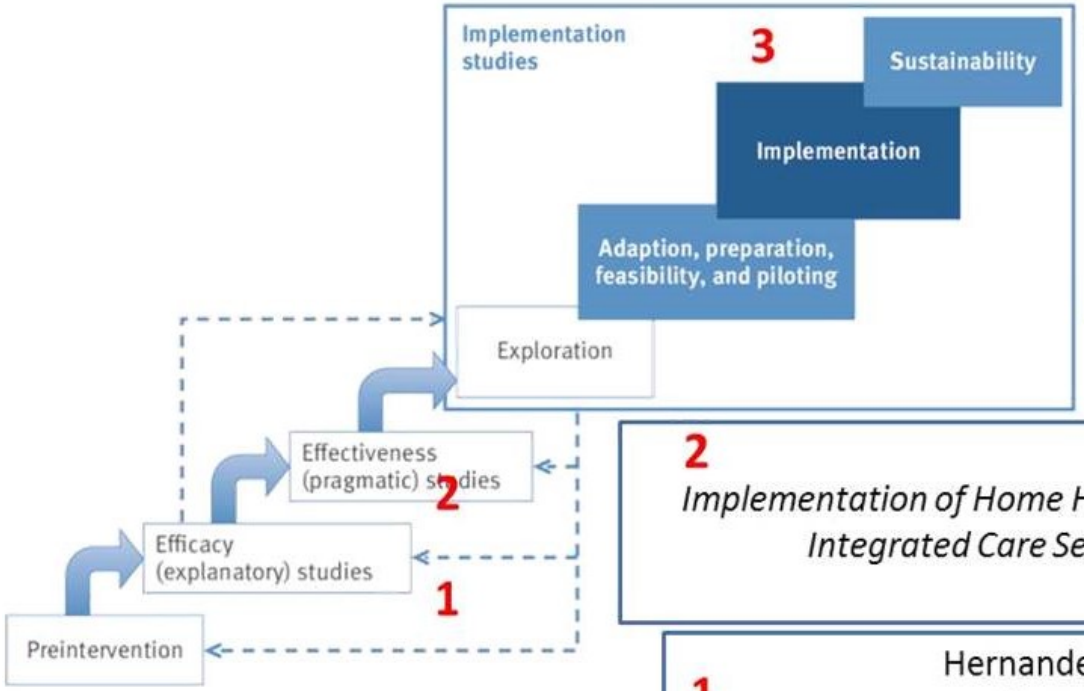
HOSPITAL CLINIC; UNIVERSITY OF BARCELONA;
IDIBAPS – Research Center

Over 20 years of experience in continuum care pathways paving the path for International adoption of digital integrated care services solutions developed at HC-IDIBAPS



www.incasym.com

- ✓ Remote support for high quality diagnosis in Primary Care
- ✓ Wellness and Rehabilitation
- ✓ Home Hospitalization & Early Discharge
- ✓ Prevention of Hospitalizations



3 Isaac Cano et al. Protocol for Regional Implementation of Community-based Collaborative Management of Complex Chronic Patients *NPJ Prim Care Respir Med. 2017;27(1):44*

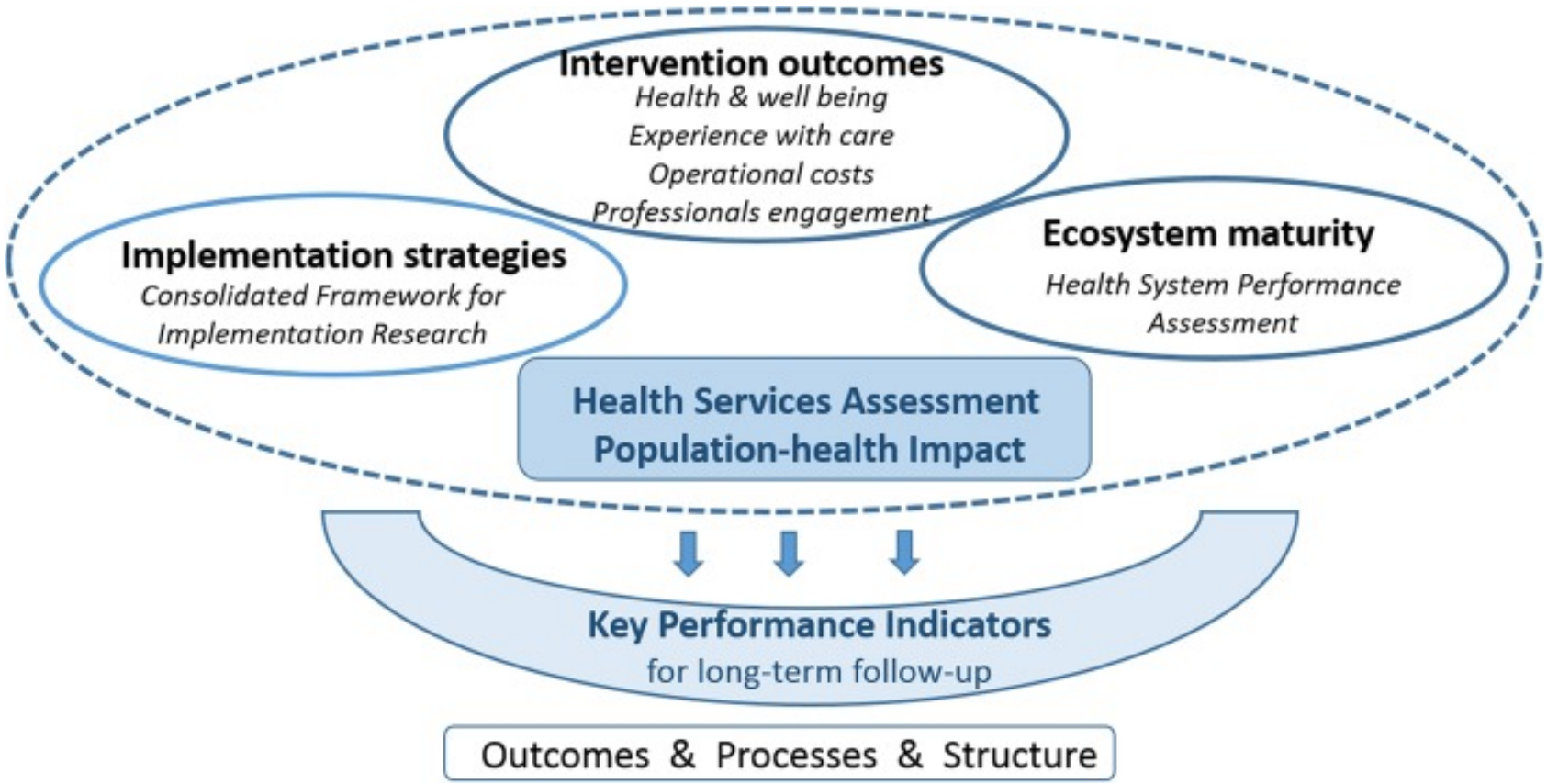
2 Hernandez C et al. *Implementation of Home Hospitalization and Early Discharge as an Integrated Care Service: a ten years pragmatic assessment IJIC (submitted 2017)*

1 Hernandez C et al. *Eur Respir J. 2003;21(1):58-67.*
Casas A et al. *Eur Respir J. 2006;28(1):123-30.*
Hernandez C et al. *NPJ Prim Care Respir Med 2015; 25: 15022*
Hernandez C et al. *Int J Integr Care 2015:15: e006.*

Granularities of several successful experiences across the region on vertical & horizontal integration

Expertise on real-world integration of health and social care

Refinement of assessment methodologies supporting large-scale adoption of Integrated Care programs

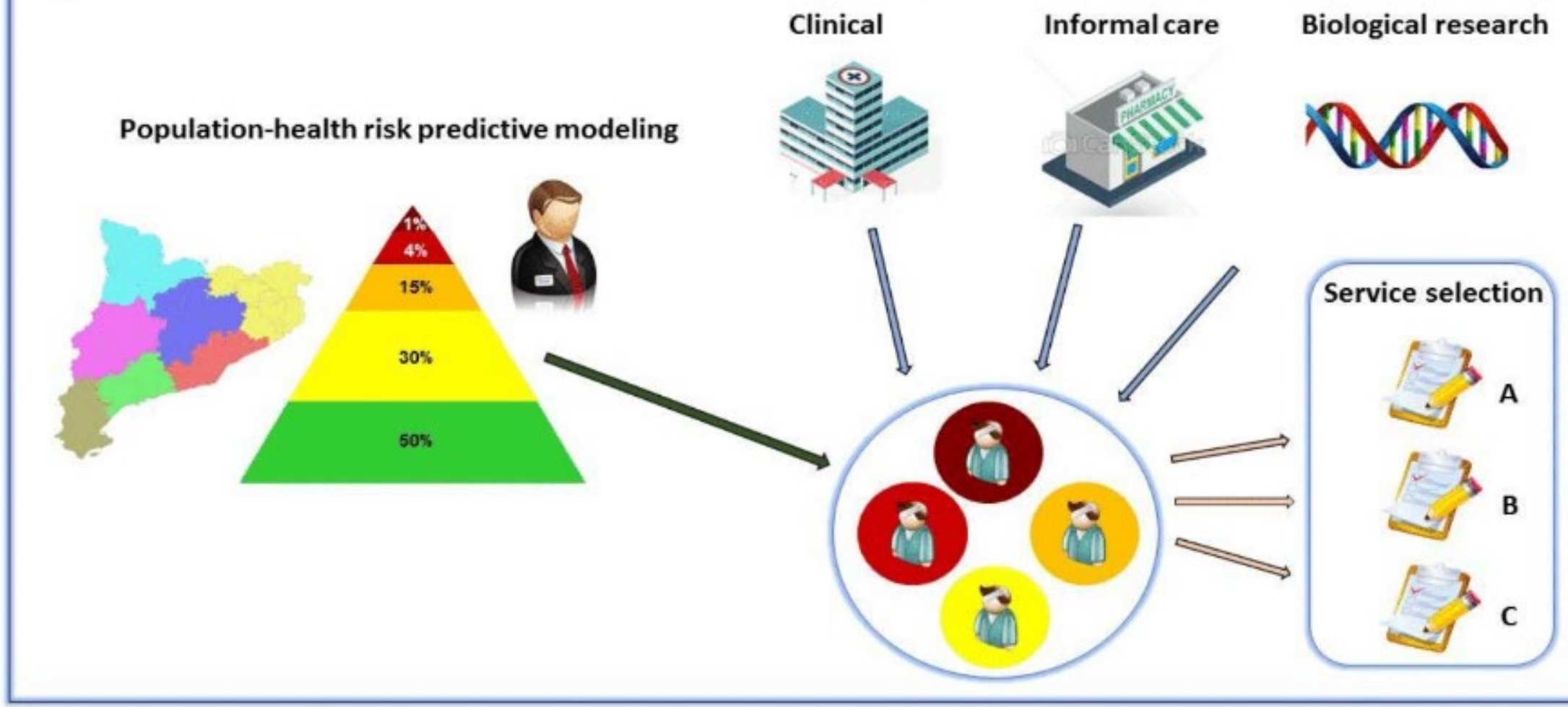


- Evidence-based efficacy
- Clinical leadership
- Patients and professionls engagement
- Effectiveness proven in real-world scenarios
- Robust & user-friendly digital support
- Healthcare value generation

BMC Health Serv Res. 2019; 19: 370

Health risk assessment and service selection

Fosters inclusion of covariates from multilevel data sources, resulting in enhanced patient-based stratification and optimization of service selection.



Limitations of current information systems

- **Diverse information systems, organized in silos** by care levels and providers, with individual medical histories in each provider
- Communication between suppliers through **static and incoherent interoperability solutions**
- **High maintenance and evolution costs**, which limit the ability of the system and each supplier to cope with innovation
- **Rigidity of the system to deal with changes** in the paradigm of care and management
- **Low level of satisfaction** from professionals and managers

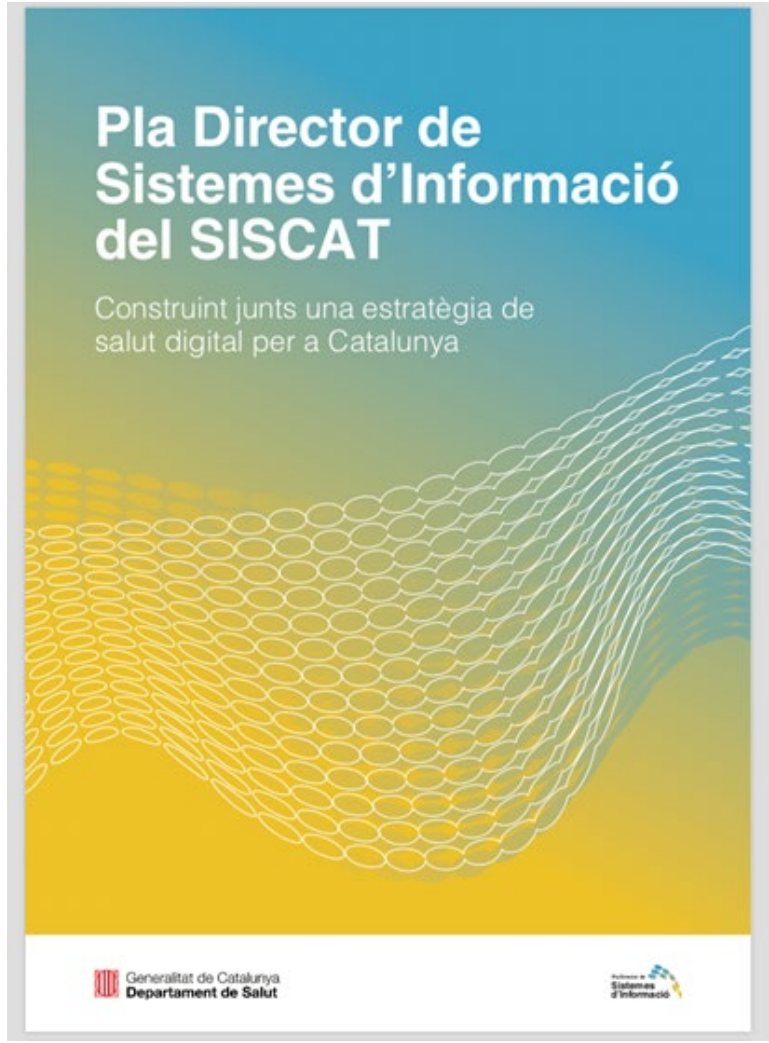
Overcoming limitations

- **Our proposal**:
  - Transfer of core services, data and capabilities to a new paradigm based on a **knowledge-driven platform**, within a service infrastructure and a modern application development environment

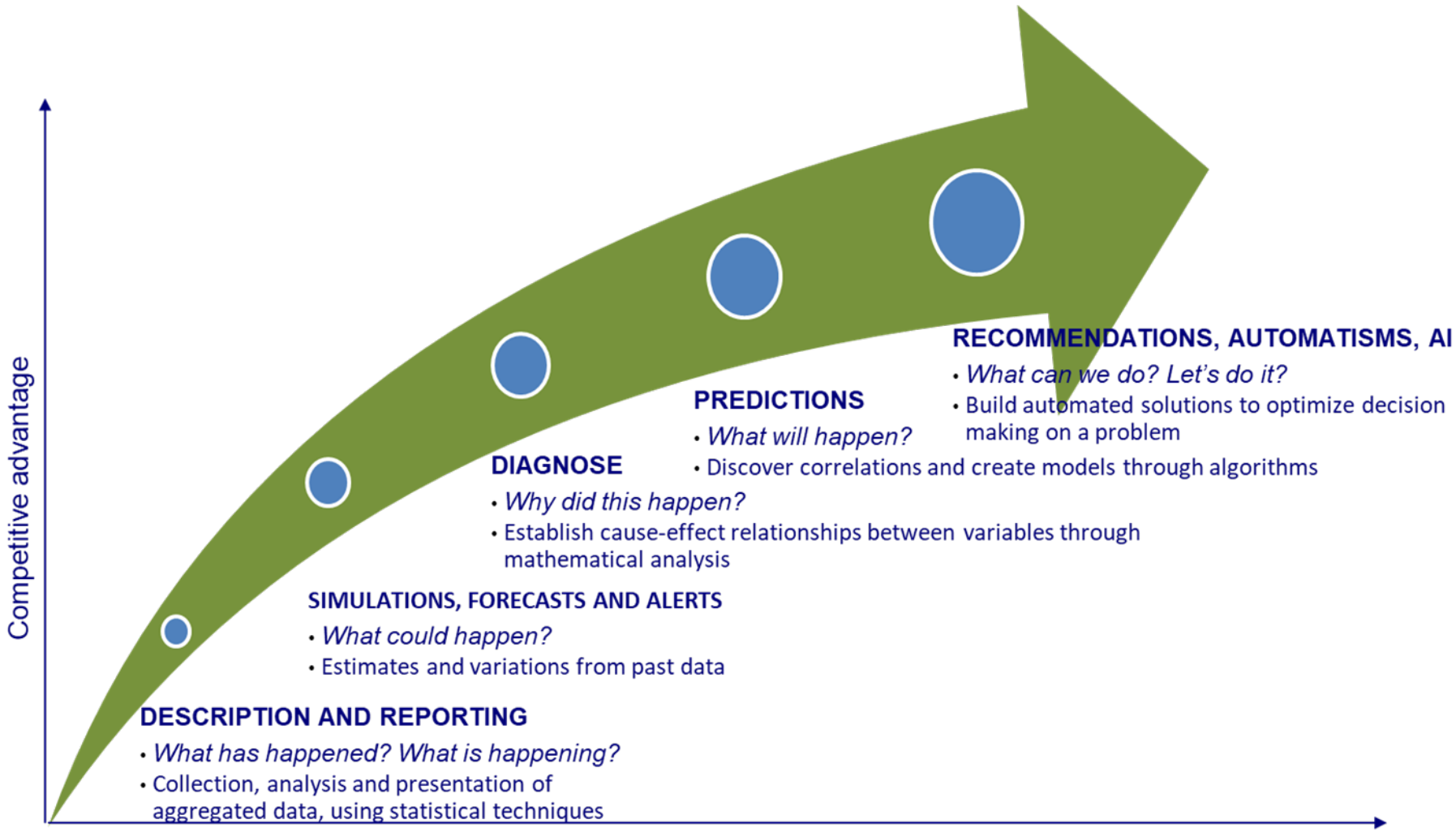
- **Alternatives not considered:**
  1. Purchase of a **commercial mega-suite**
  2. Purchase of **different commercial parts**, followed by integration according to the desired standards
  3. A **technological update** of current products with the aim of improving the UI / UX and, potentially, solving database and interoperability problems

/Salut

Clinical Information Model



Harnessing the power of data



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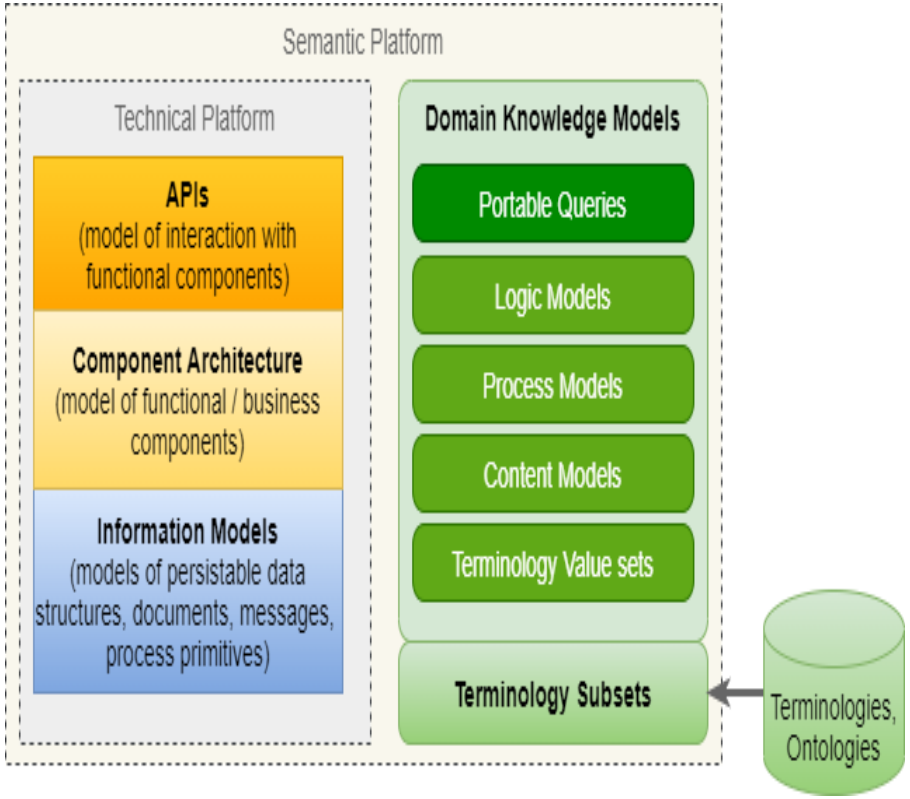
Generalitat de Catalunya

What is a “knowledge-driven platform”?

The aim of such a platform is to allow health professionals to structurally represent their knowledge with a longitudinal vision. This representation becomes requirements for software development (transactional and informational) in an automated manner

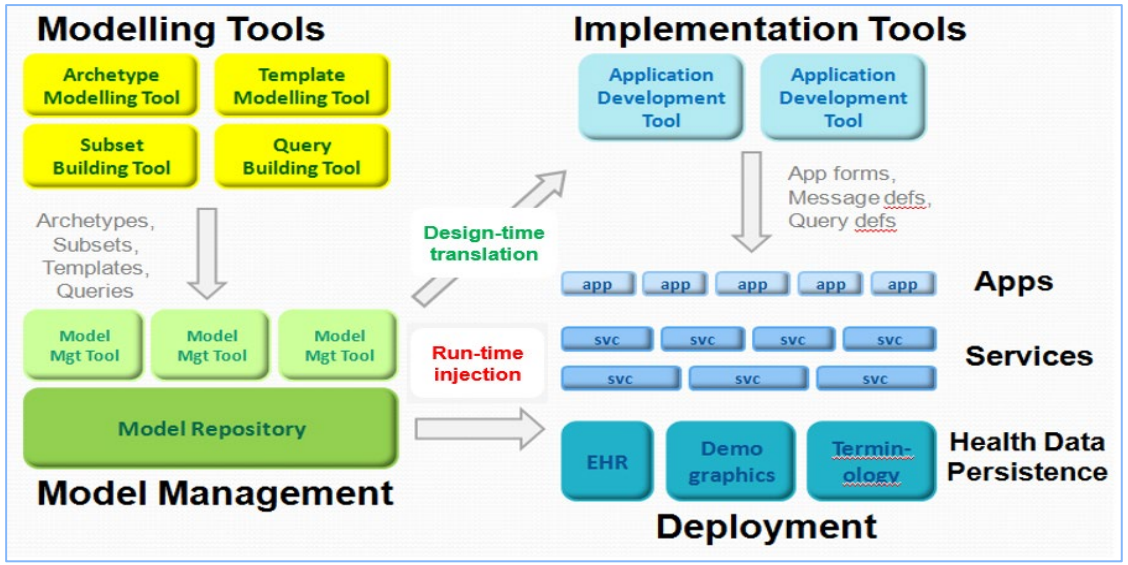
- Separate semantic definitions from software and databases
- Define a method of formal and explicit representation of this semantics
- Be focused on the requirements of representation in the field of Health
- Have tools that give autonomy to "knowledge specialists" in the management of semantic definitions
- Provide tools that allow the translation of this formal semantics, highly complex, into software solutions



What is OpenEHR

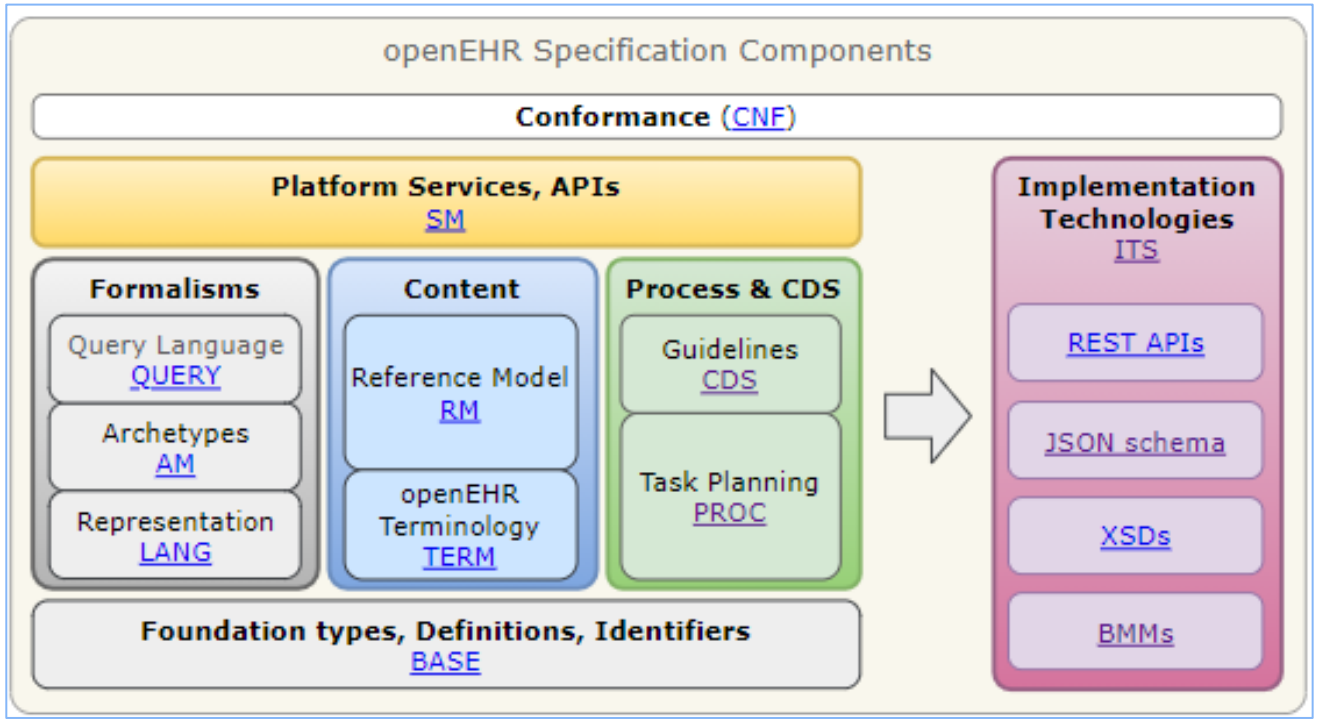
OpenEHR is a Health Knowledge-based, open and independent technology provider platform.

- The platform is specified in a set of standards, implementation specifications and tools that meet the most widespread technical criteria.
- Open philosophy implies that the use of definitions and specifications is freely accessible
- OpenEHR is NOT a software, a messaging system or an interoperability standard (it complements the existing ones –HL7, FHIR, ...)



What is OpenEHR (II)

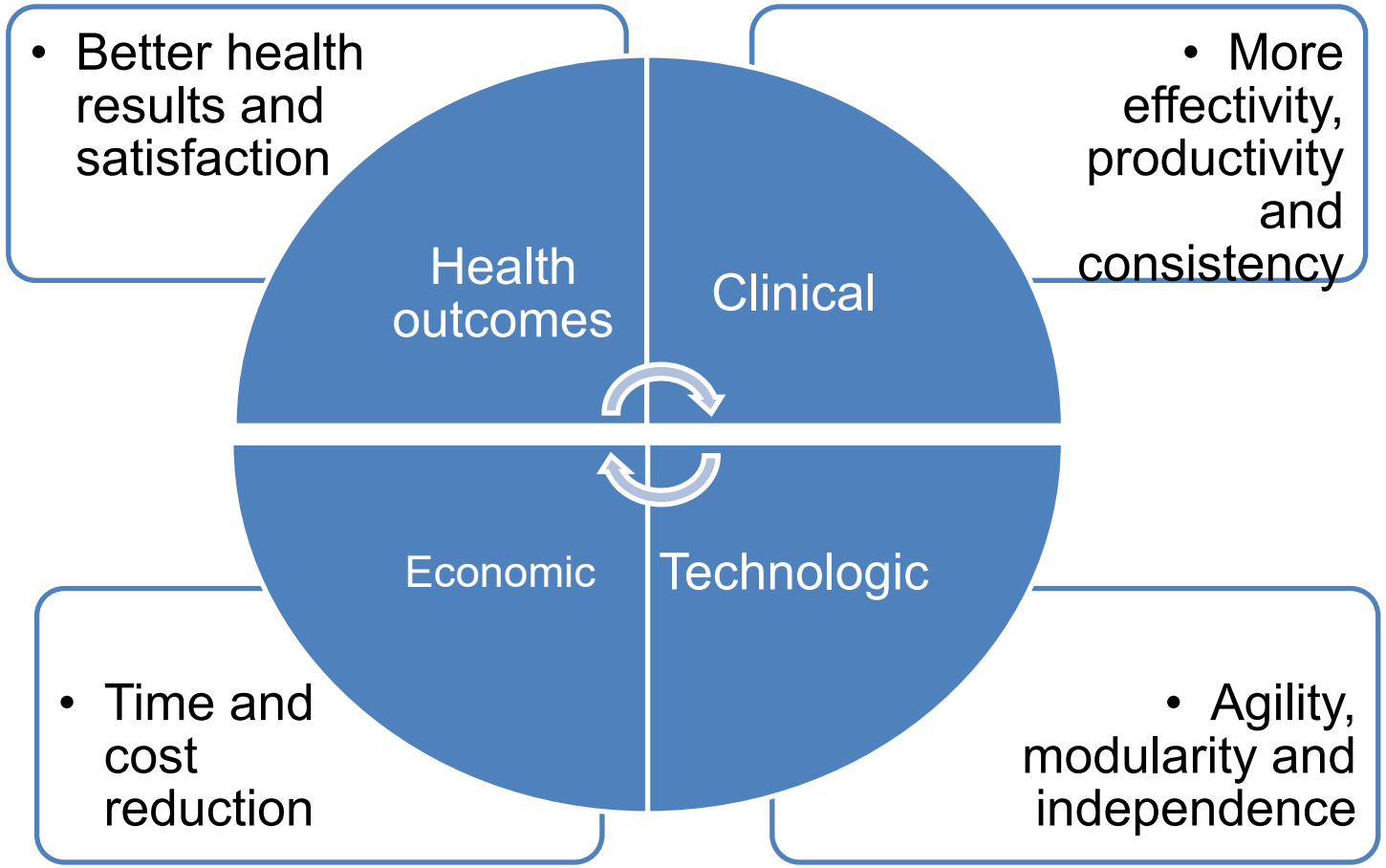
As a result of the activity of the OpenEHR community, they are available to its members, a series of components in a continuous process of refinement and evolution.



https://specifications.openehr.org/

Benefits

The implementation of a knowledge platform brings health, clinical, technical and economic benefits.

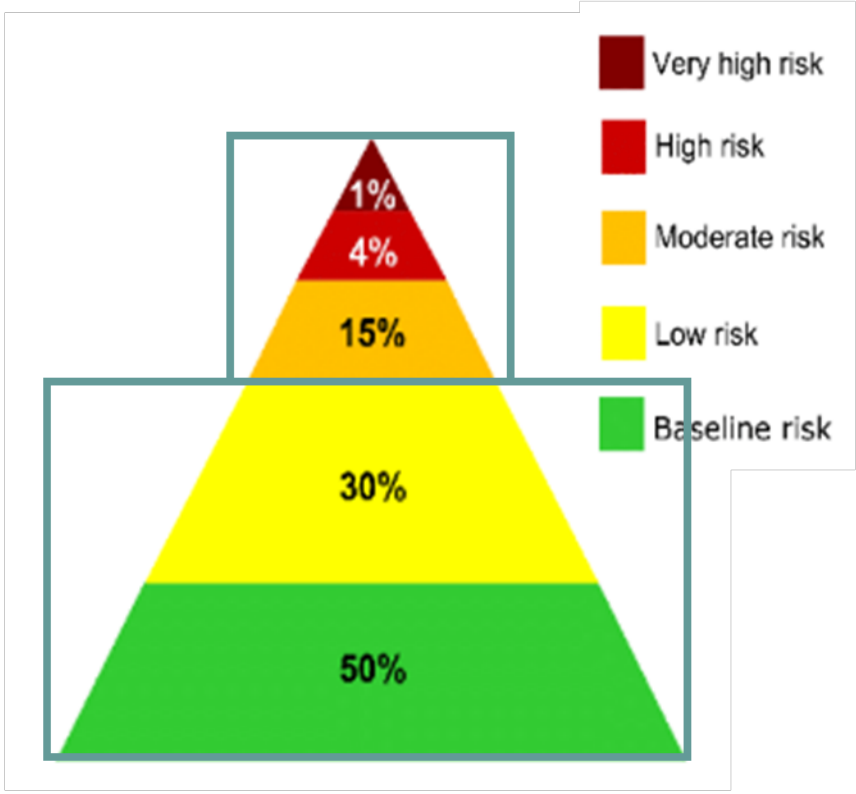


Risks

- Functional and technological learning curve
- Availability of suppliers with technical capabilities
- Deadlines for getting the first results
- Sizing and training of current teams
- Coexistence of both solutions (avoiding big bang)
- Migration of the legacy to the new solution

GMA – Current applications and future developments

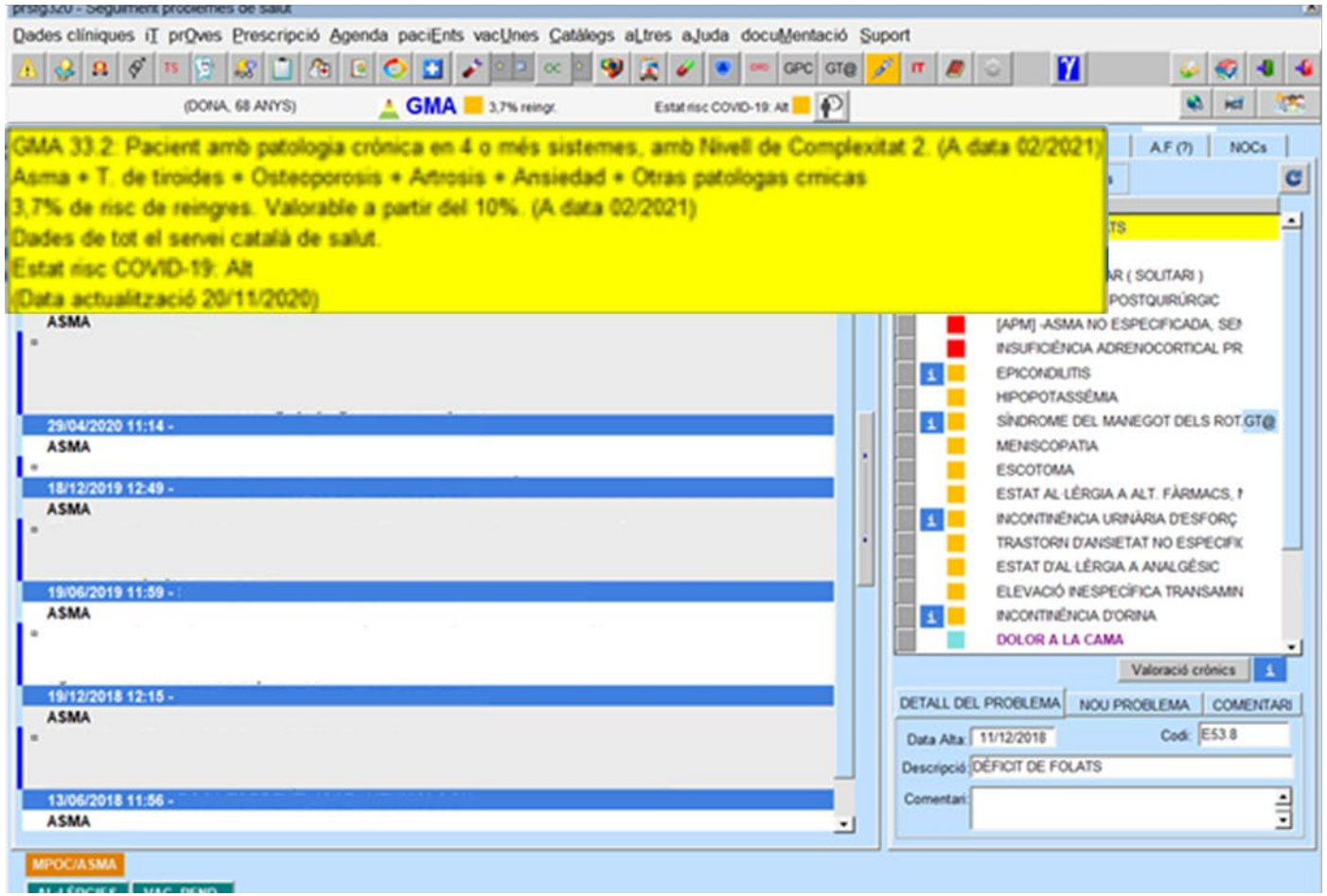
Uses of **Adjusted Morbidity Groups (GMA)**:



It allows the identification of patients with specific healthcare requirements facilitating personalized health delivery strategies by way of two different interventions:

- **Case Finding:** Highly vulnerable patients, allocated at the tip of the risk pyramid, prone to major deleterious health events, such unplanned hospital admissions, fast functional decline, death.
- **Screening:** Discovery of cases with non-manifest illnesses may benefit from early diagnosis and cost-effective preventive interventions

GMA – Current applications and future developments



Future challenges:

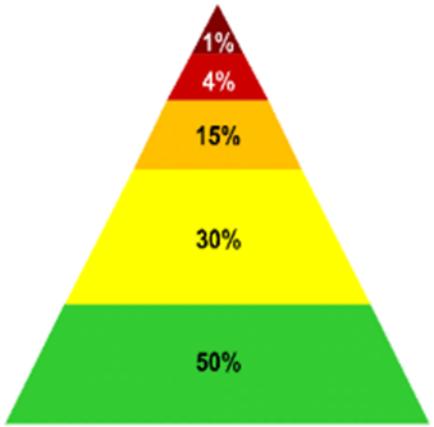
Improve the case screening anticipating movements across the Risk Pyramid

Use GMA for specific clinical risk predictive modelling

GMA – Current applications and future developments

Turning the Crisis Into an Opportunity: Digital Health Strategies Deployed During the COVID-19 Outbreak

Pol Pérez Sust [1]; Oscar Solans [1]; Joan Carles Fajardo [1]; Manuel Medina Peralta [2]; Pepi Rodenas [1]; Jordi Gabaldà [3]; Luis Garcia Eroles [1]; Adrià Comella [1]; César Velasco Muñoz [4]; Josuè Sallent Ribes [5]; Rosa Roma Monfa [1]; Jordi Piera-Jimenez [6]



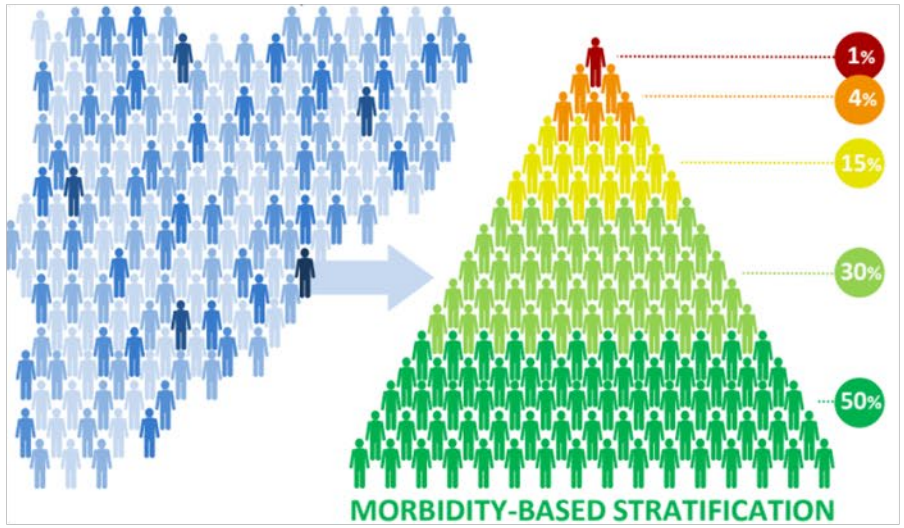
Covid 19 Risk strata:

Risk of mortality: High	Risk of hospital admission: Very high
Risk of mortality: Moderate	Risk of hospital admission: High
Risk of mortality: Low	Risk of hospital admission: Moderate
Rest of the population	

Health Risk Assessment

Risk assessment is the effort of identifying and analysing potential (future) events that may negatively impact individuals or a subset of a population, taking in account their likelihood and consequences, and the tolerances for such events.

Population risk assessment



Patient-based risk assesment

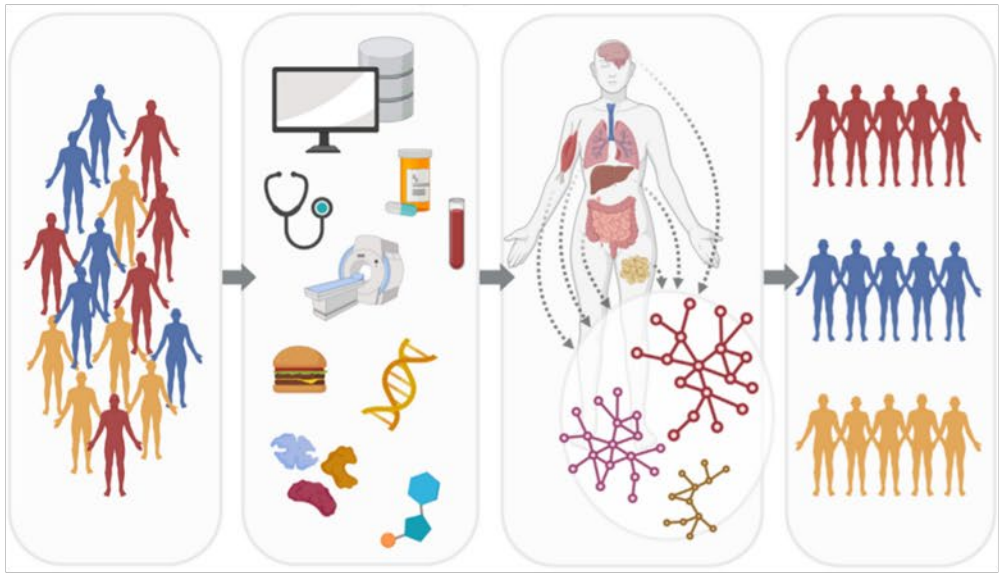
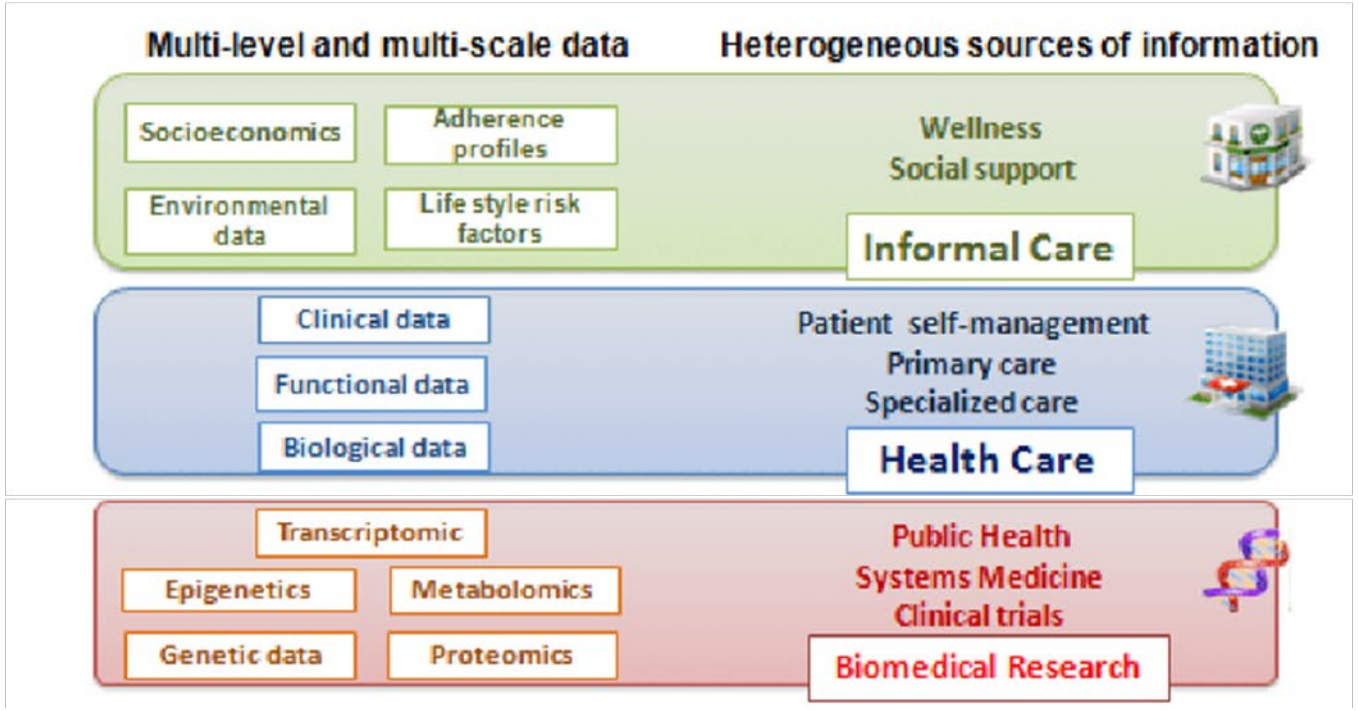


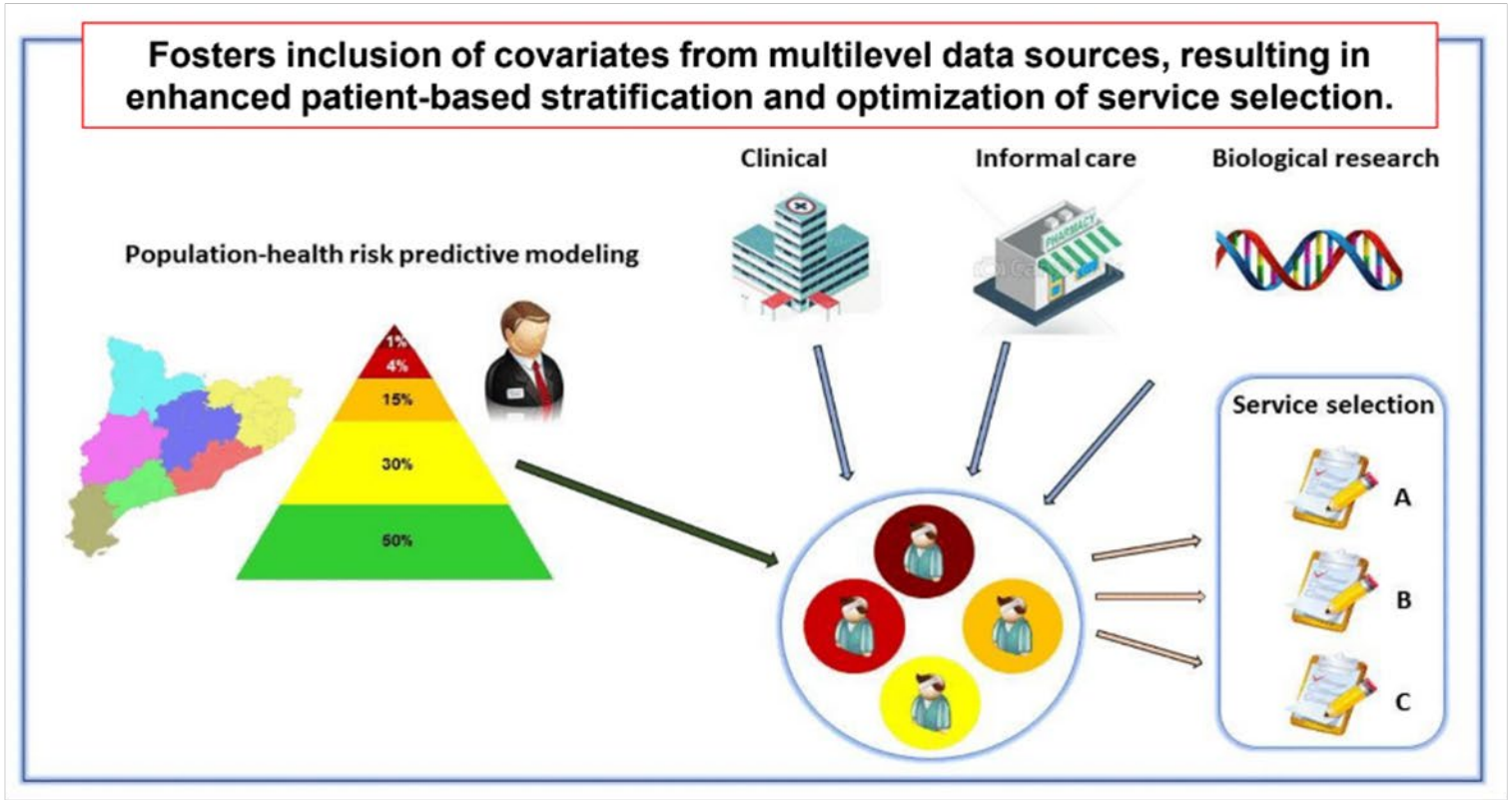
Image from: Lamb JR, Jennings LL, Gudmundsdottir V, Gudnason V, Emilsson V. It's in Our Blood: A Glimpse of Personalized Medicine. Trends Mol Med. 2021 Jan;27(1):20-30. doi: 10.1016/j.molmed.2020.09.003. Epub 2020 Sep 25. PMID: 32988739.

Multisource Clinical Predictive Modelling

Multisource Clinical Predictive Modelling emerges as a holistic strategy for subject-specific risk prediction and patient stratification, considering multilevel data sources which influence patient health in order to improve disease prediction and prevention, foster personalized treatment strategies and facilitate clinical decision-making.



Working Hypothesis



Applying holistic strategies for subject-specific risk prediction and stratification, that consider multisource covariates influencing patients health, could increase the predictive accuracy and facilitate clinical decision-making

Aspects that made the success and made it sustainable

- ✓ Political consensus on the health model with a positive perception of the population
- ✓ Long tradition of successful Catalan Health Plans
- ✓ Entrepreneurship & networking tradition leading to a consolidated ecosystem
- ✓ Despite some resistances, health professionals are champions of the change
- ✓ Current predominant analysis of the COVID-19 crisis as an opportunity

Acknowledgements

- ✓ DS3 - Digitalization for the Sustainability of the Healthcare System (DS3), Sistema de Salut de Catalunya

- ✓ INCASyM – Integrated Care and Systems Medicine Platform (https://www.incasym.com/). HCB-IDIBAPS

- ✓ Catalan Open Innovation Hub on ICT-supported Integrated Care Services