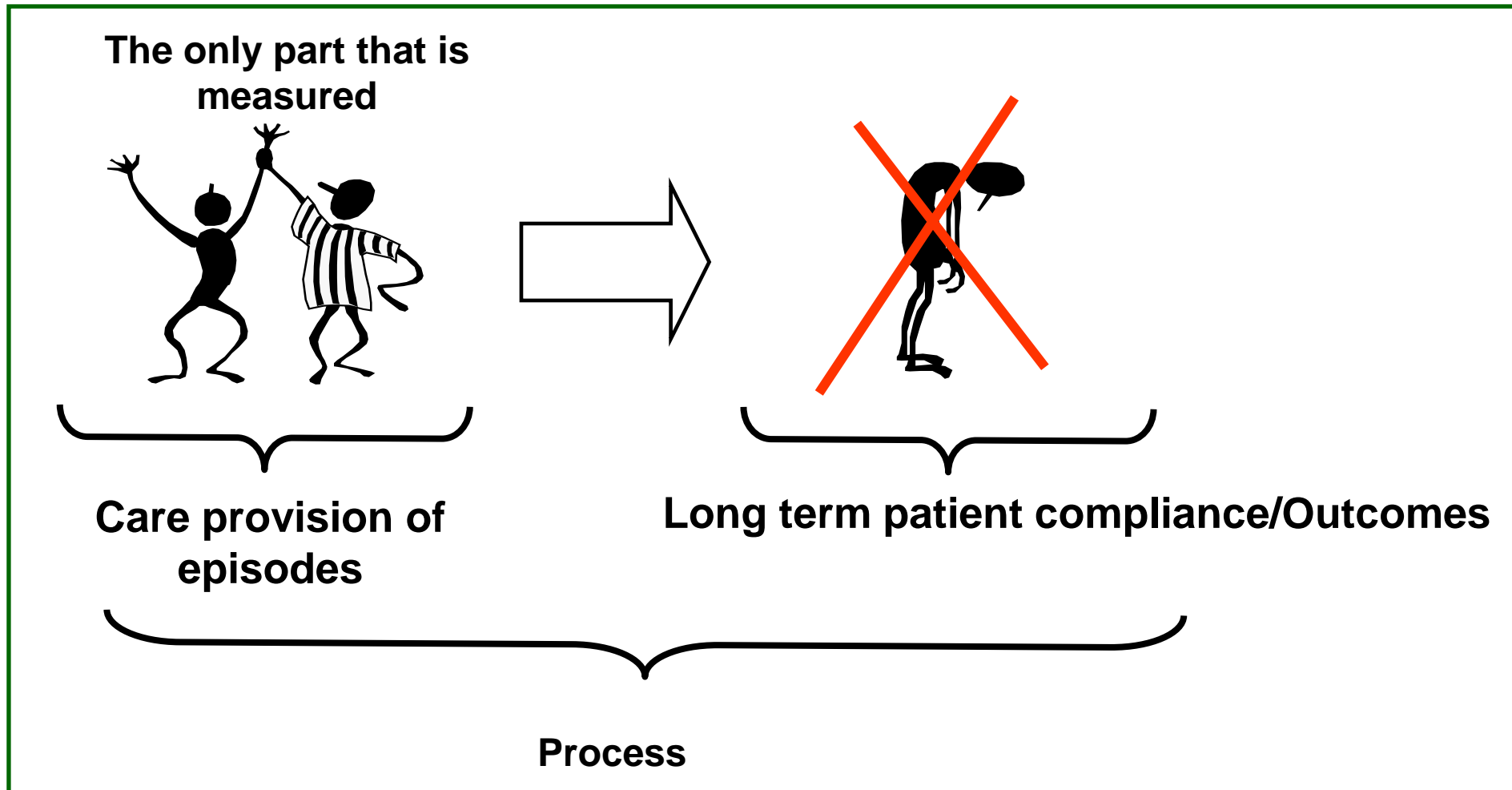# Care Delivery for Chronic Patients

Technology-Enabled Care & Support

Josep Roca,MD. PhD

Hospital Clinic.IDIBAPS.University of Barcelona

The " paradox " of successful Health Care Systems:
The lack of adherence and outcomes measurement
The patient does not play (yet !) an active role

The only part that is measured

Care provision of episodes

Long term patient compliance/Outcomes

Process

Need for **predictive** rather than reactive healthcare

using multiple sources of information to anticipate, for the individual patient, the development or progression of disease
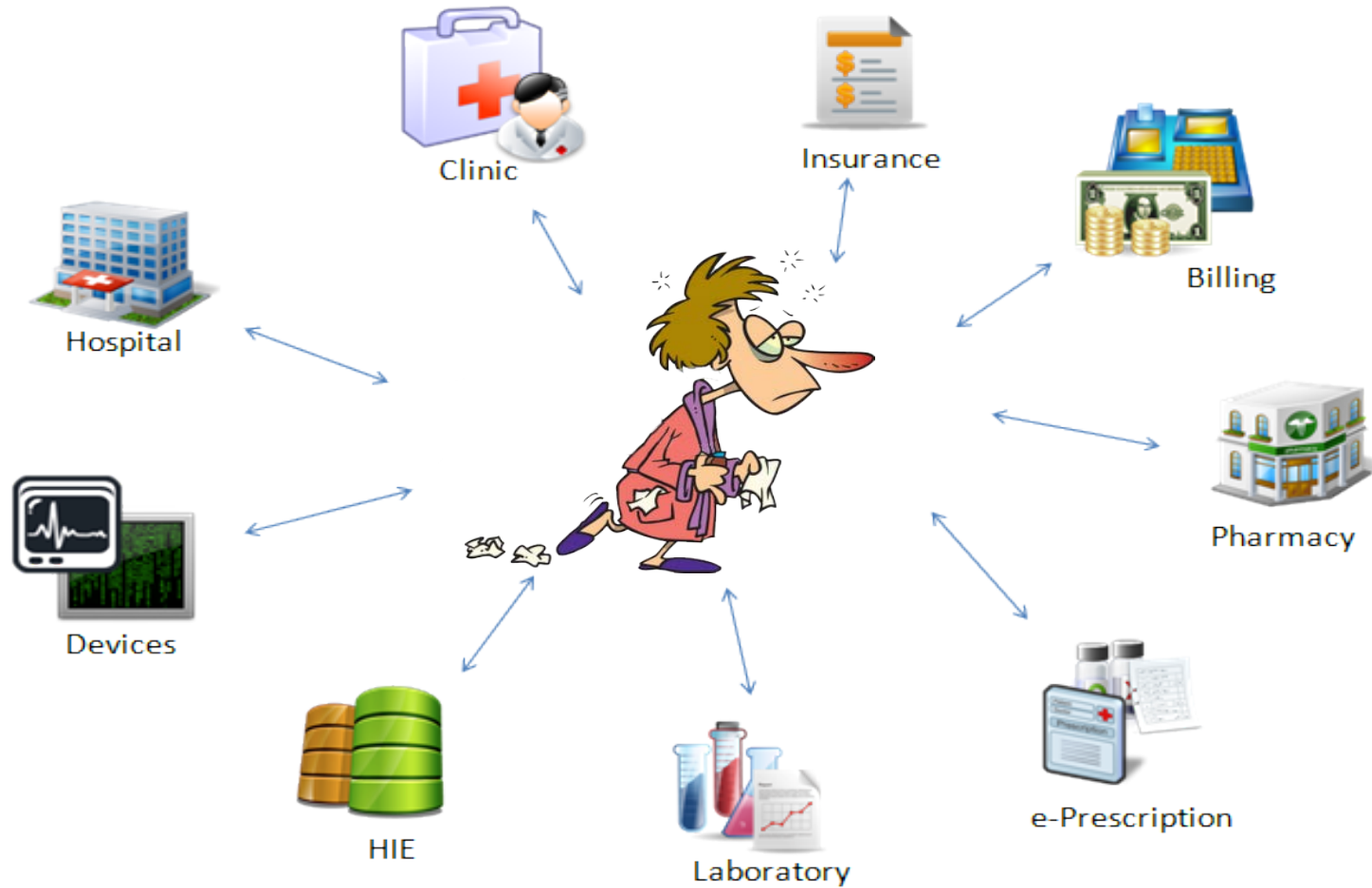
Why?

To prevent, or reduce the impact of, disease by:

- **Risk assessment**

In order to enable:

- **Early diagnosis**

- **Cost-effective interventions**

Communication between the patient and his/her care givers

Clinic

Insurance

Billing

Hospital

Pharmacy

Devices

HIE

Laboratory

e-Prescription

Goal: to increase patient's involvement in their own health maintenance

Enhanced communication among those involved in the patient's care
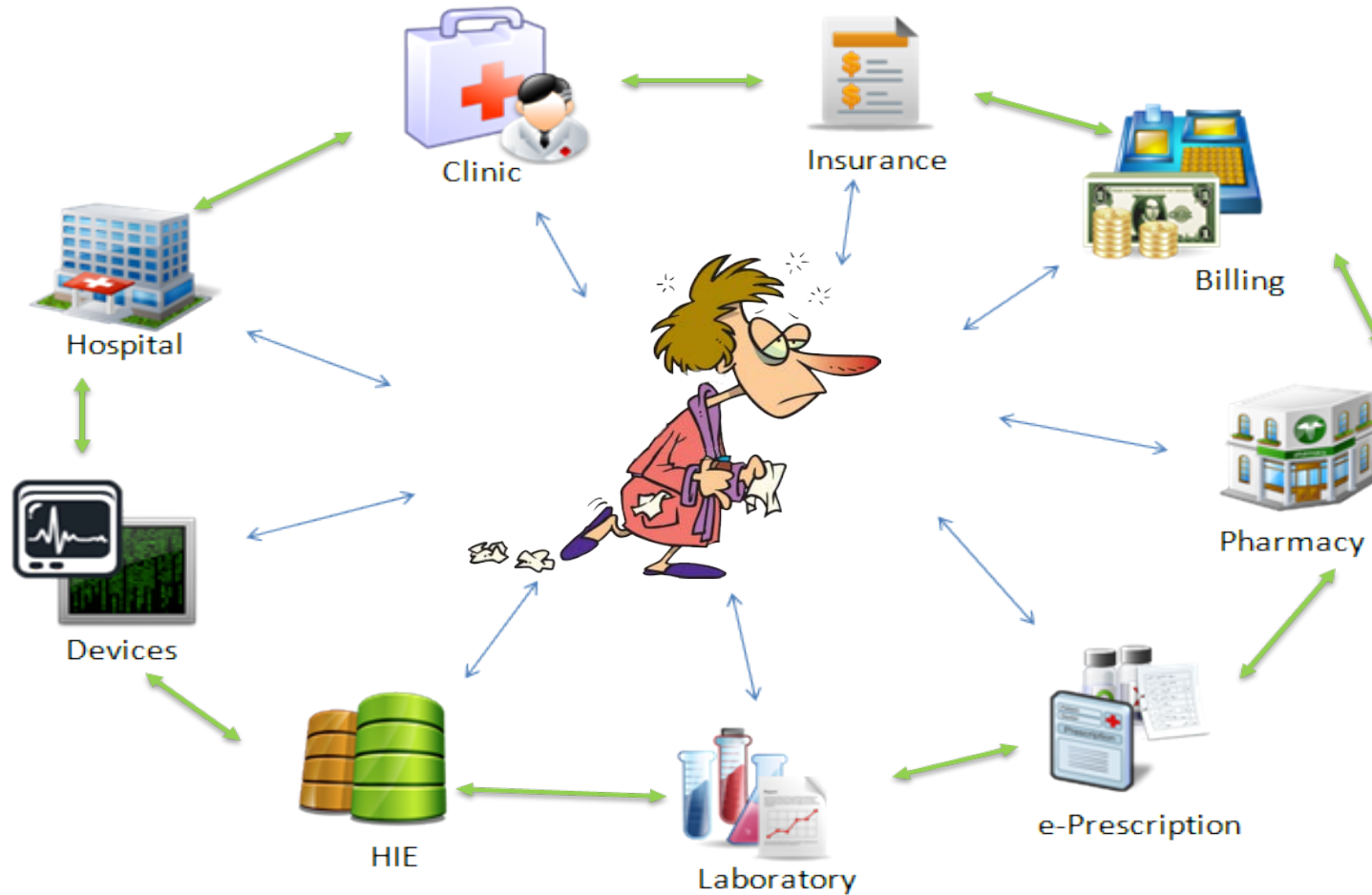
Goal: to optimize patient management

Integrated Care is what we all want

Fiona Godlee, editor BMJ
(9 June 2012)

Catalonia

|	
Population	7,5 millions
Elderly *(≥65 yrs)*	18%
Life expectancy	80 yrs men 85 yrs women
Healthcare costs	8% GDP
Model	Beveridge One public payer
Add. Private Insur.	27% population

ICT-supported Integrated Care Services generate healthcare efficiencies

Milestones in the design of services and deployment at Barcelona-Esquerra
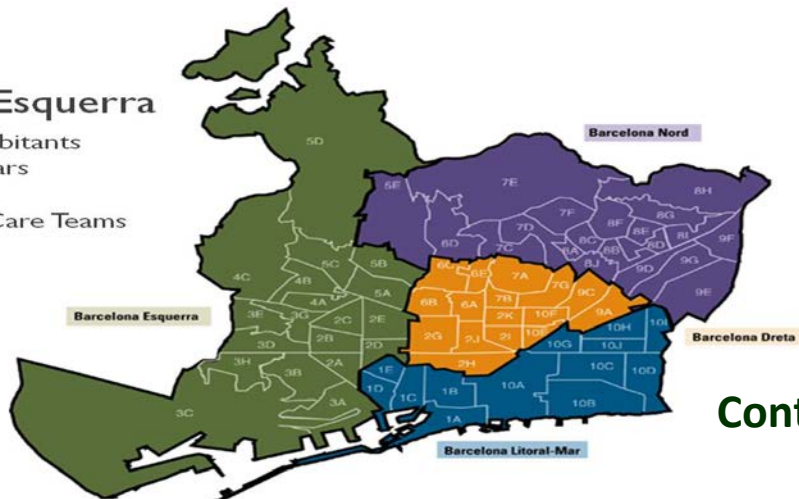
Creation of Case Managers (2000)

Conceptualization of the services (2006)
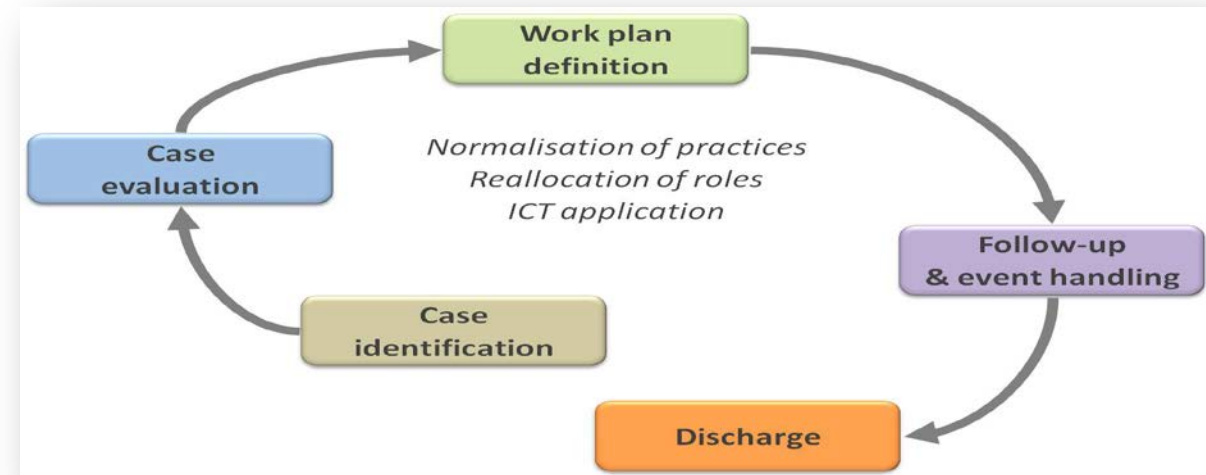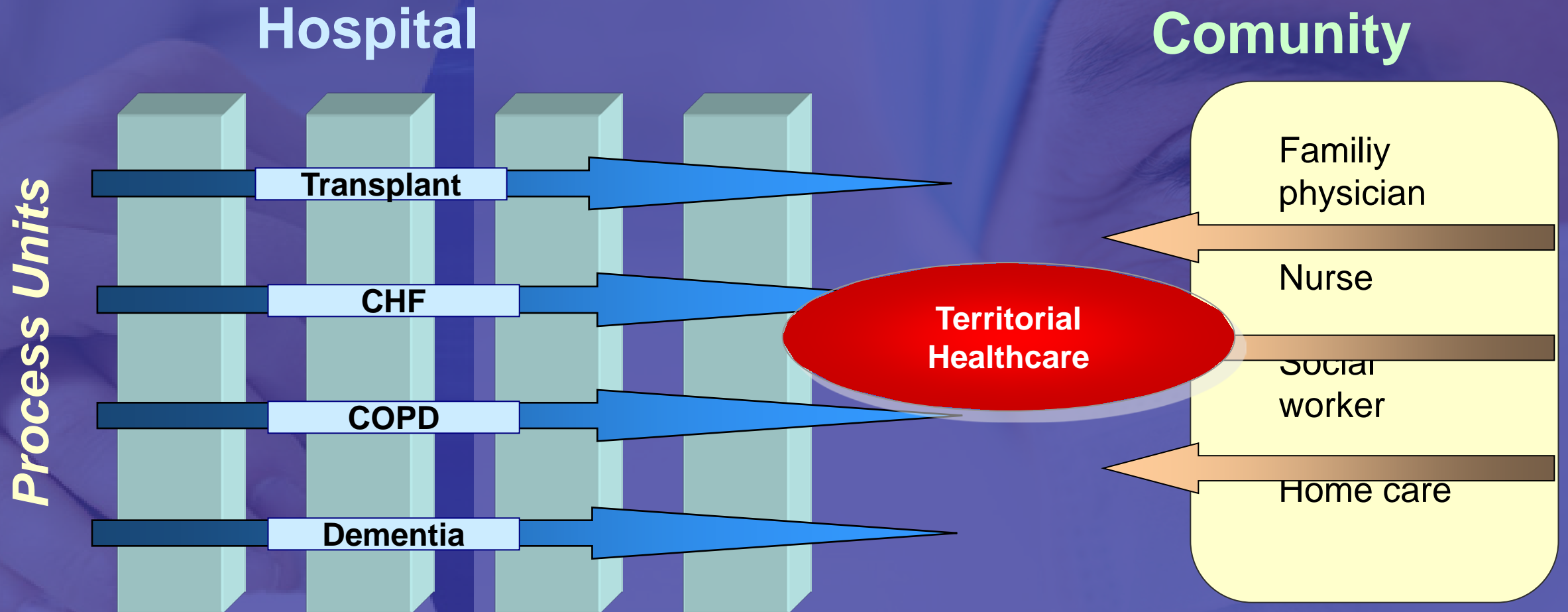

Barcelona Esquerra

534.955 inhabitants
21% > 65 years

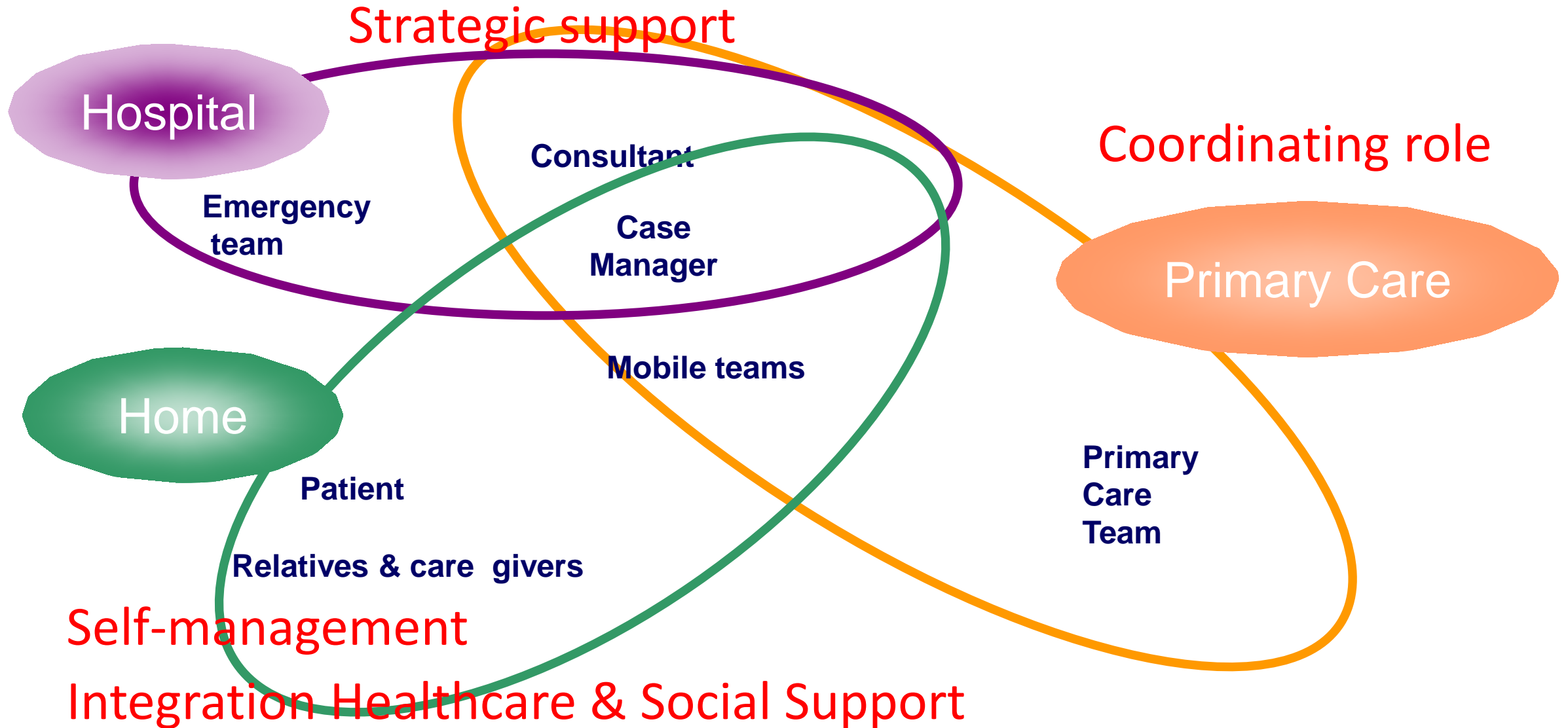19 Primary Care Teams
4 Hospitals

Controlled deployment 2006 – 2013

Adaptations of health system to chronic patients

shared care arrangements across the system

transferring service complexities to Primary Care and Home

Strategic support

Coordinating role

Hospital

Consultant

Case Manager

Emergency team

Primary Care

Mobile teams

Home

Primary Care Team

Patient

Relatives & care givers

Self-management

Integration Healthcare & Social Support

Major European Programs are fostering health care transformation and active ageing

European Innovation Partnership for Active and Health Ageing (EIP-AHA) *(since 2012)*

European Innovation Technology – Health (EIT-Health) *(since 2015)*

Horizon 2020 *(since 2014)*
Research and Innovation Strategies *(2016)*

Digital Health

(2016-2018)

Regional deployment of ICT-supported of integrated care services

Barcelona Virtual Health Practice (BVHP)

Hospital Clínic – Eurecat

Multimorbidity
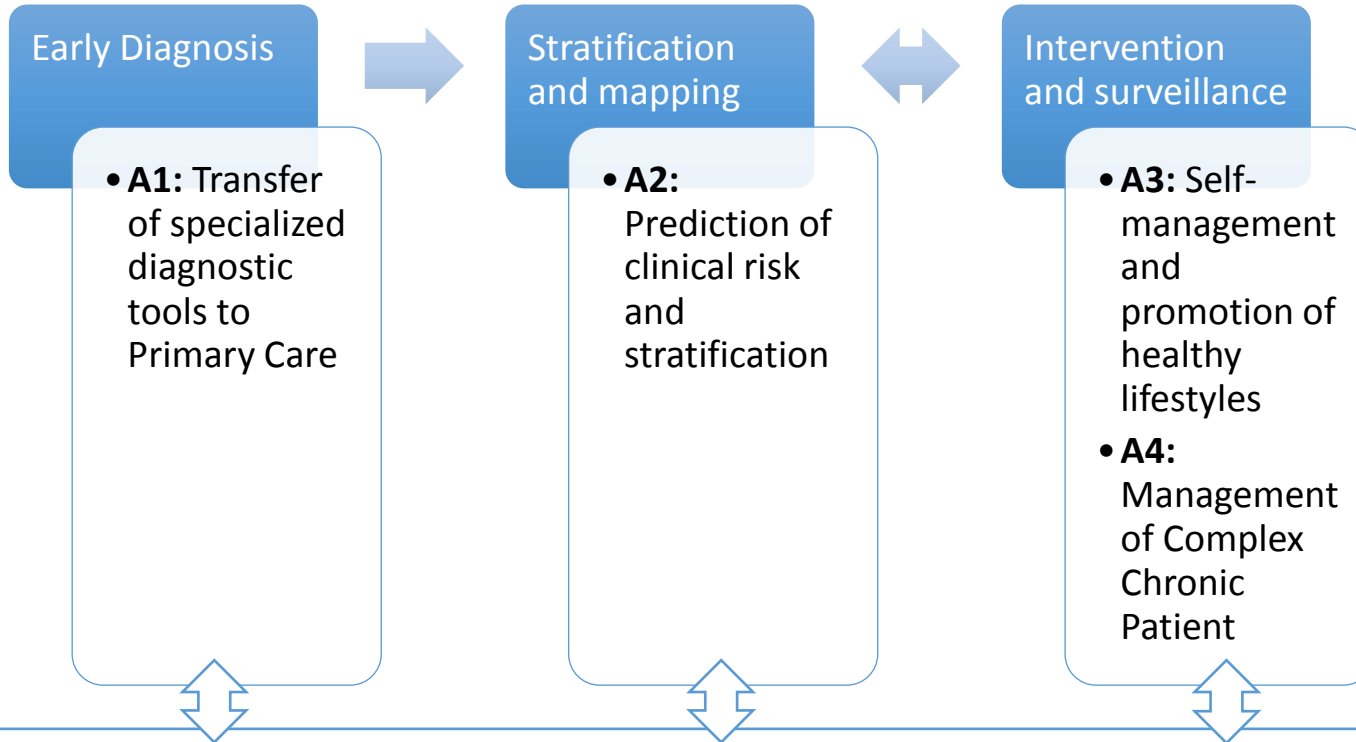*(cardiac diseases; COPD; diabetes type II and anxiety- depression)*

Design, evaluation and large scale implementation of interventions *(Actions 3 and 4)* generating healthcare-value at system level

*The ultimate aim is to contribute to the Catalan **test bed** for large scale adoption of integrated care services*

Digital Health – Innovation in Integrated Care Services for Chronic Patients

Healthcare system

5 strategic actions (A1-A5) with a 3 stages lifecycle

Early Diagnosis

- **A1:** Transfer of specialized diagnostic tools to Primary Care

Stratification and mapping

- **A2:** Prediction of clinical risk and stratification

Intervention and surveillance

- **A3:** Self-management and promotion of healthy lifestyles
- **A4:** Management of Complex Chronic Patient

A5 – Digital Health framework for interoperability at Catalan level

Adaptive case management system

Dashboard

Primary care

Specialized care

Social care

IHC³

Self-management and monitoring

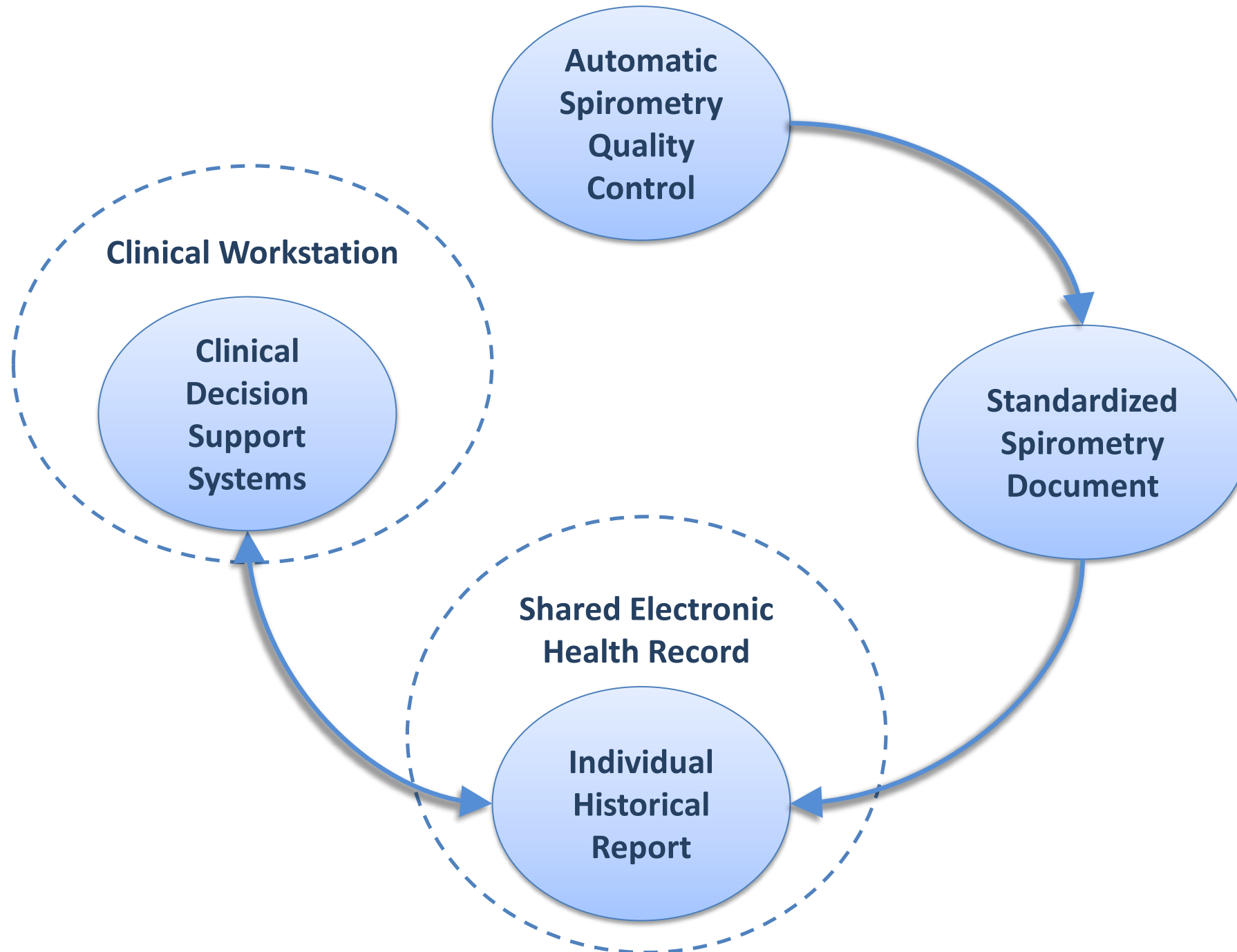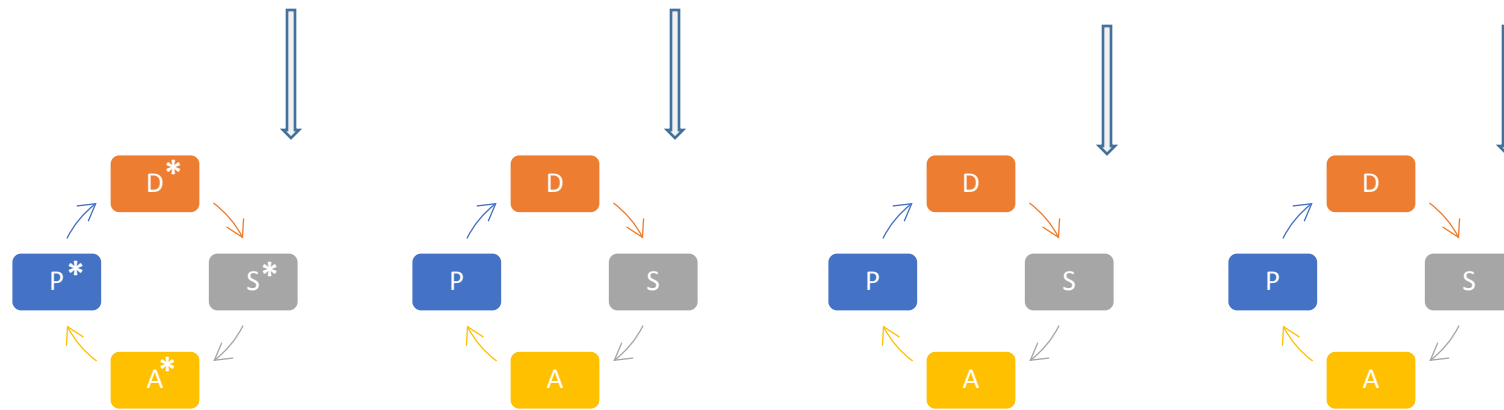**Informal care environment**

Digital Health

*System of **five ACTIONS** for deployment of the Catalan "reference site"*
The RIS3Cat program as accelerator

A1. Transfer diagnostic tools to the Community   (forced spirometry)

A2. Individual risk prediction   (GMA – clinical prediction)

A3. Healthy life styles (core)   (primary/secondary prevention)

A4. Telemedicine deployment (core)   (secondary/tertiary prevention)

A5. Interoperability (core)   (personal health folder/i-ISSIS.Cat)

A1 – Transfer of diagnostic tools to Primary Care

Forced Spirometry Program

Automatic Spirometry Quality Control

Standardized Spirometry Document

Clinical Workstation

Clinical Decision Support Systems

Shared Electronic Health Record

Individual Historical Report

A1 –Transfer of diagnostic tools to Primary Care
*Objectives within RIS3CAT to be accomplished **within 2016***

<u>O1.1</u>. Regional deployment of accessibility of high quality forced spirometry across healthcare tiers in Catalonia completed, including the assessment protocol.

<u>O1.2</u>. Elaboration of a roadmap for generalization of he program to other diagnostic tests

<u>O1.3</u>. To achieve self-sustainability of **Action 1** between M12 and M18

A2 -Individual Risk Prediction

Population-based stratification
Regions participating in Advancing Care Coordination and TeleHealth (ACT) – *DG Sanco project 2013-15*

	Basque	Catalonia	Groningen	Lombardia	Scotland	Barriers for comparison
Scope of the stratification strategy	Entire population (population health)	Population (population health)	Program (population medicine)	Program (population medicine)	3.4 million people (toward population health)	Heterogeneous predictive modelling tools
Current predictive modelling tool	ACG-PM	GMA (owned by the region)	Not available	CReG, evolving toward a risk predictive modeling tool	SPARRA v3 (owned by the region)	Different statistics describing predictive power, different levels of flexibility
Number of categories	Four	Four	Four	Three	Four	Different criteria for risk categories leading to non-comparable population distributions
Characteristics of reporting on top indicators	Regional & Micro-systems	Regional & Four areas	Three programs	GReG cohorts	Sub-region	Heterogeneity of reporting allowed conceptual consensus but not comparability of results

ACG-PM®= Adjusted Clinical Groups-Predictive Model
CReG= Chronic Related Group
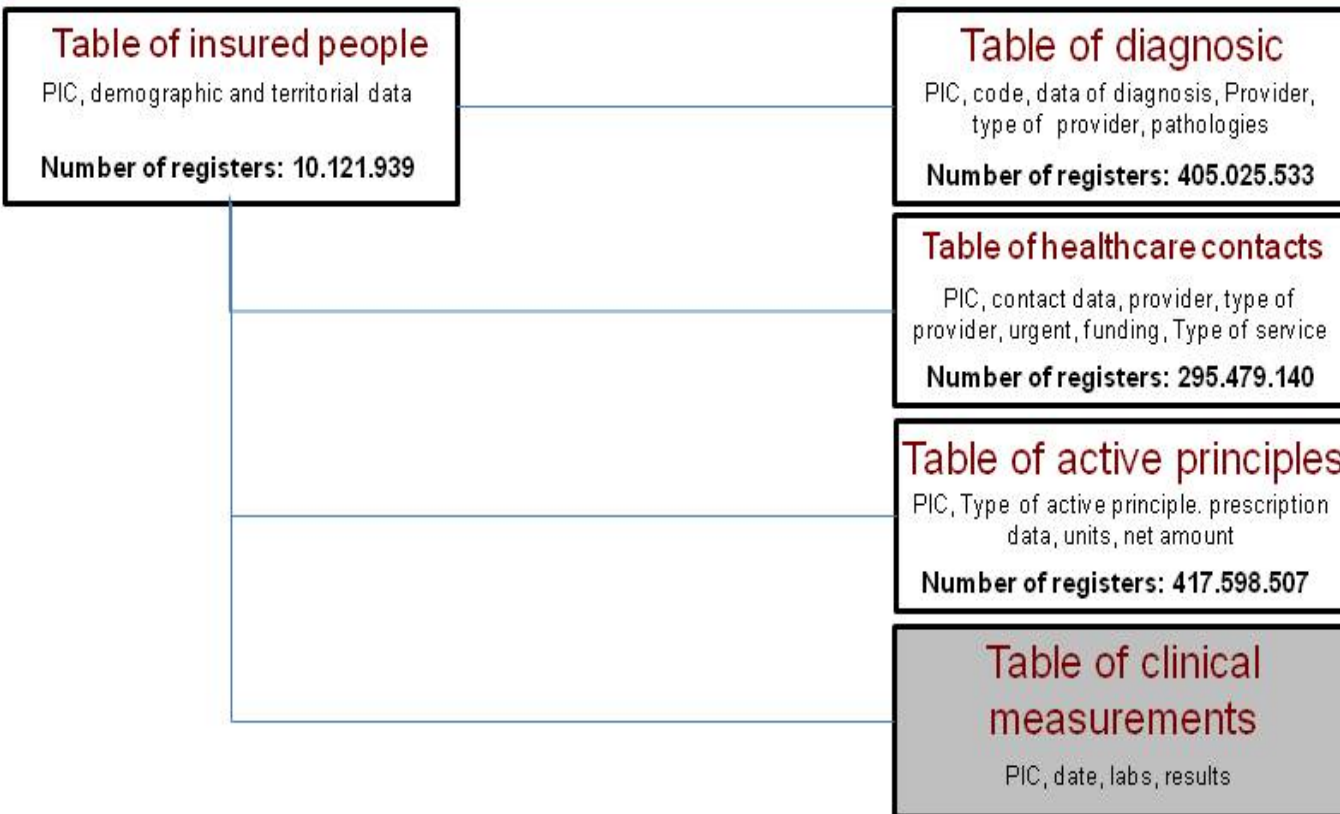*SPARRA V3= Scottish Patients at Risk of Readmission and Admission- version 3*

Catalonia – Whole Population Morbidity Dataset

Size – 7.5 million inhabitants
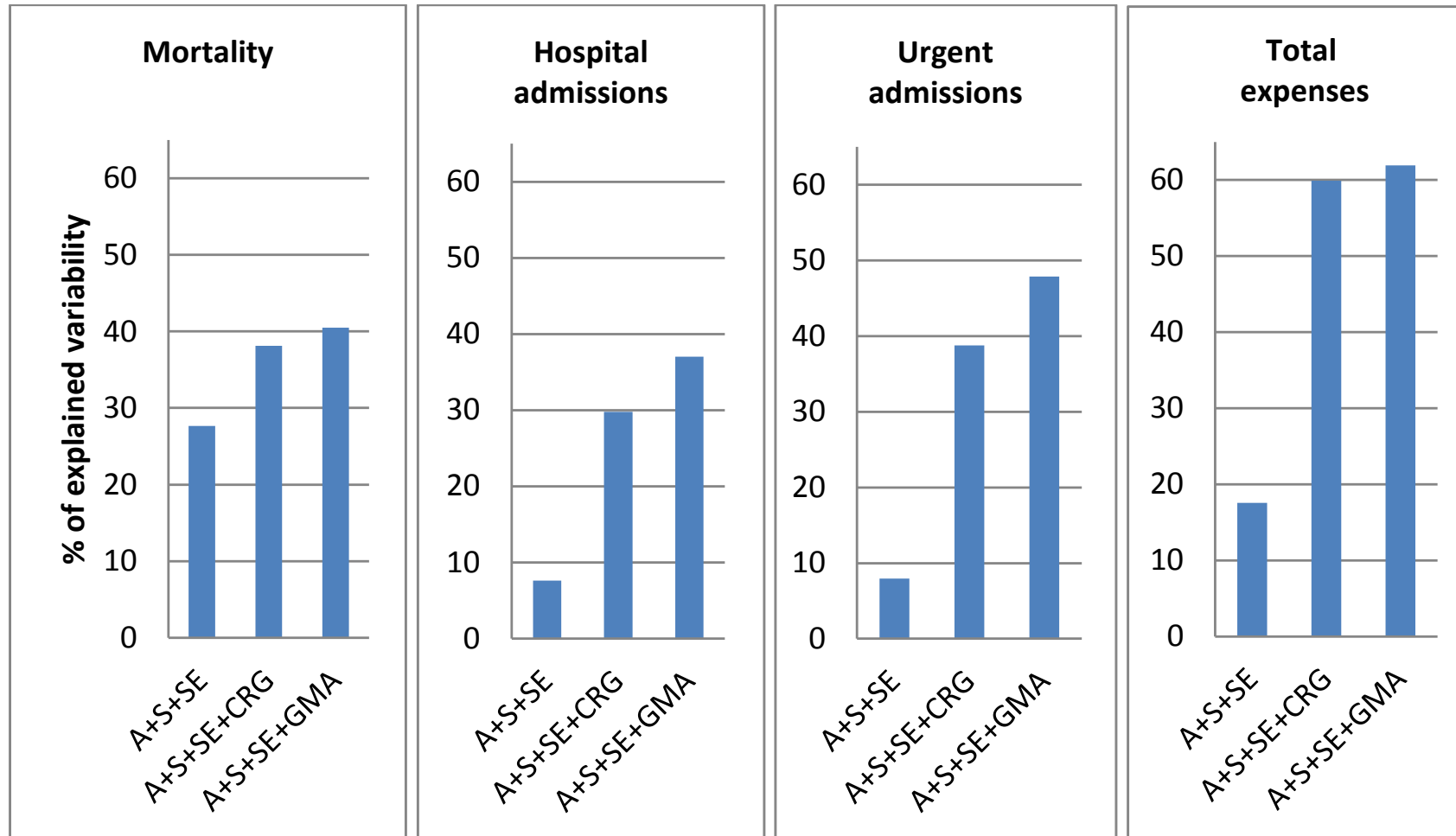**Periodic update** – every 6 months
Variables – Use of healthcare resources; Incidence & Prevalence of key disorders; Pharmacy, Adjusted Morbidity Groups (GMA)
**Outcomes** – Population stratification; Risk assessment of clinical use

Table of insured people

PIC, demographic and territorial data

Number of registers: 10.121.939

Table of diagnosic

PIC, code, data of diagnosis, Provider, type of provider, pathologies

Number of registers: 405.025.533

Table of healthcare contacts

PIC, contact data, provider, type of provider, urgent, funding, Type of service

Number of registers: 295.479.140

Table of active principles

PIC, Type of active principle. prescription data, units, net amount

Number of registers: 417.598.507

Table of clinical measurements

PIC, date, labs, results

Population-based stratification
Catalonia-2014

Population-based stratification
Catalonia-2014
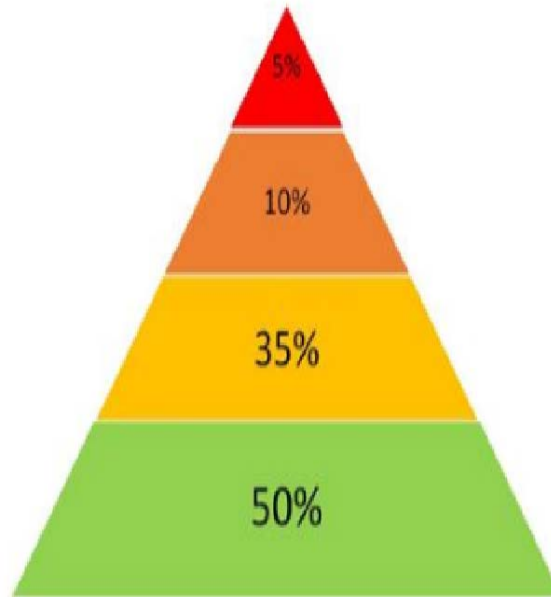
	% Pop.	Mortality	Admissions	Expenditure	% Expend.
GMA-4	5	11,2	58,4	7.070	35,8
GMA-3	15	1,1	6,6	2.124	32,3
GMA-2	30	0,1	2,4	777	23,6
GMA-1	50	0,0	0,5	164	8,3
Catalonia	100	0,8	4,9	987	100,0

- Columns 1 and 2 - GMA levels by percentiles of the entire population
- Columns 3 and 4 - Rates of mortally and hospital admissions
- Column 5 - Cost per inhabitant per year expressed in €
- Column 6 (last) - % total healthcare expenditure by risk strata.

Novel CDSS approach
Prediction of risk for multi-morbidity in COPD
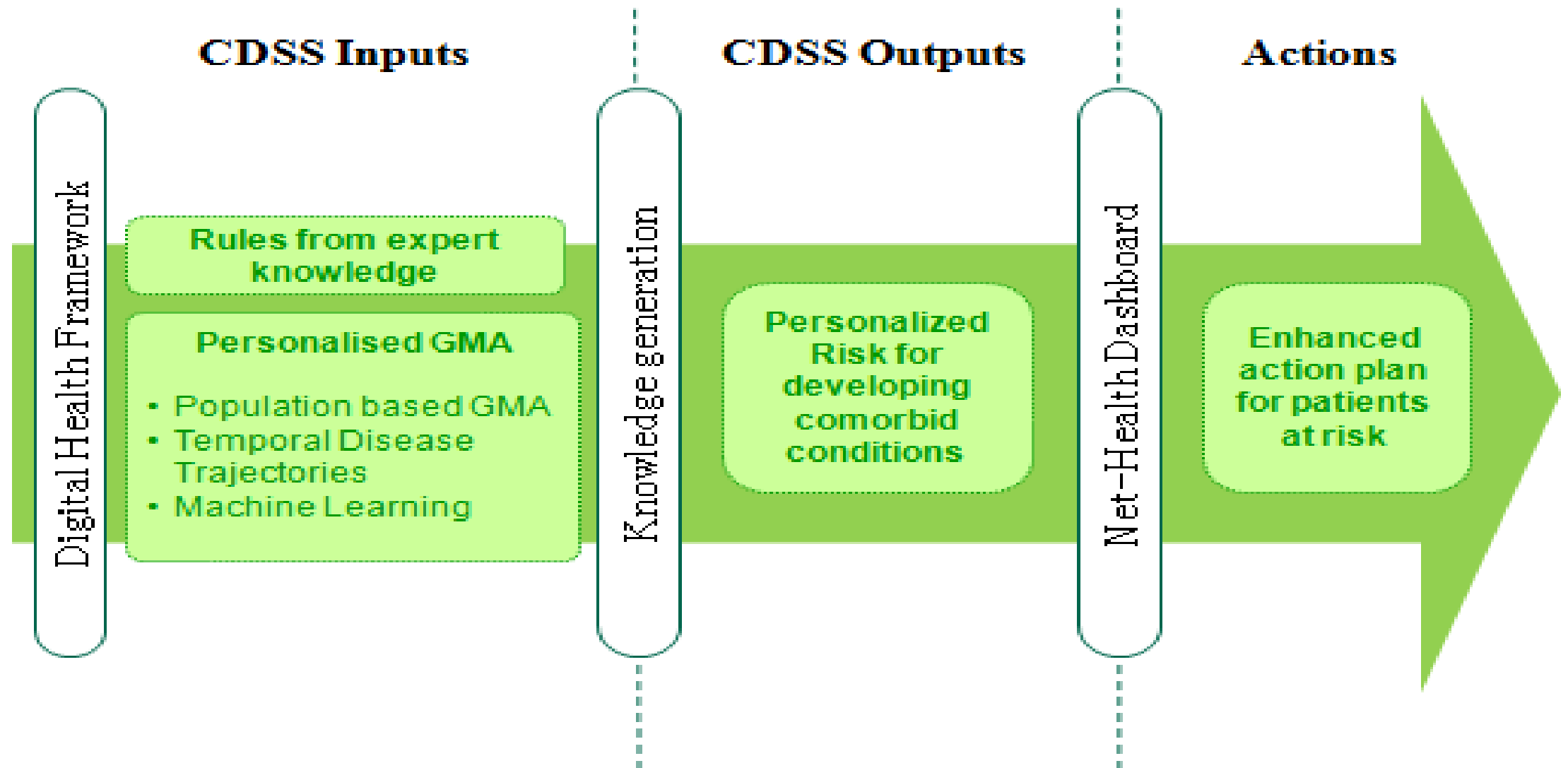
 O2.1. To assess the potential of GMA to contribute to clinical risk prediction through an specific use case.

O2.3. To elaborate a roadmap for transferability of GMA at EU and international level

O2.4. To elaborate a roadmap toward personalized medicine (i.e. Net-Health program)

O2.5. To achieve self-sustainability of **Action 2** between M12 and M18. International strategic plan for the period 2017-2018

A3 – Self-management

Wellness and rehabilitation

Enhanced HRQL & Daily Physical activity

Barberan A et al. Respiratory Medicine , 2014. **108** (4): p. 9
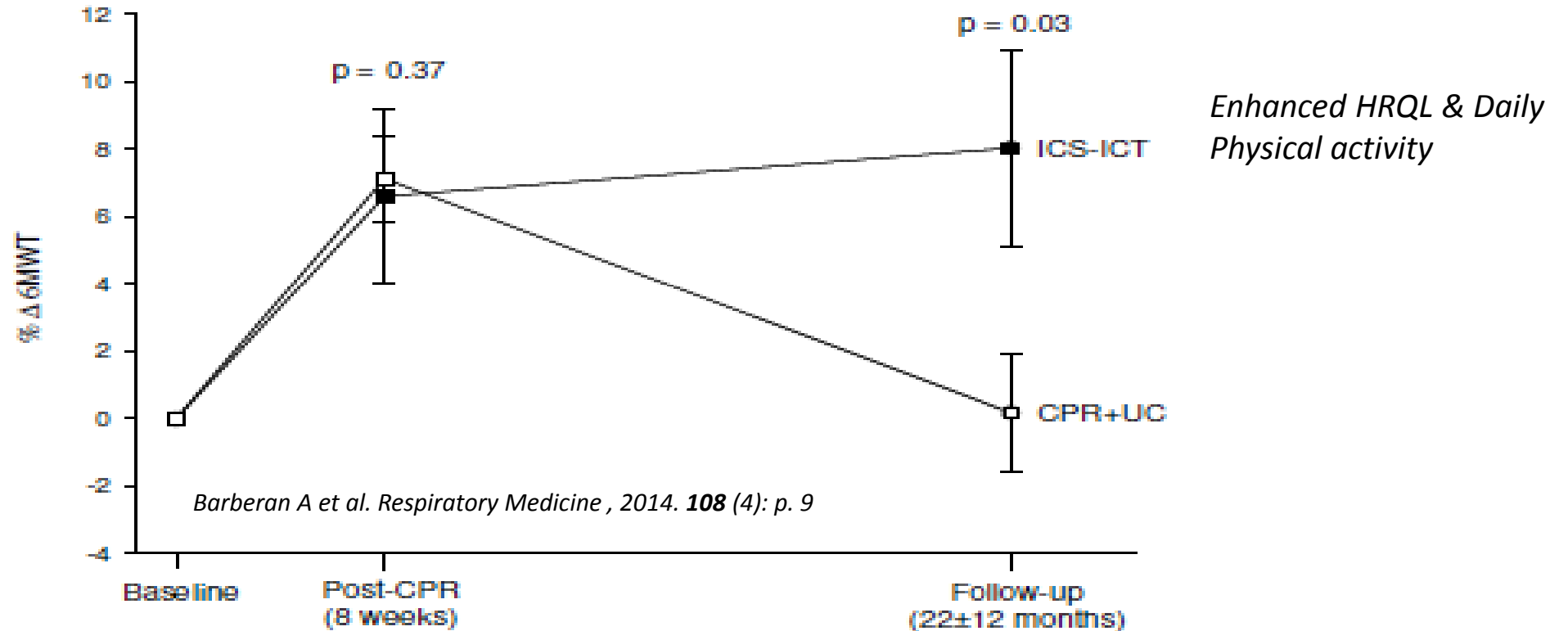
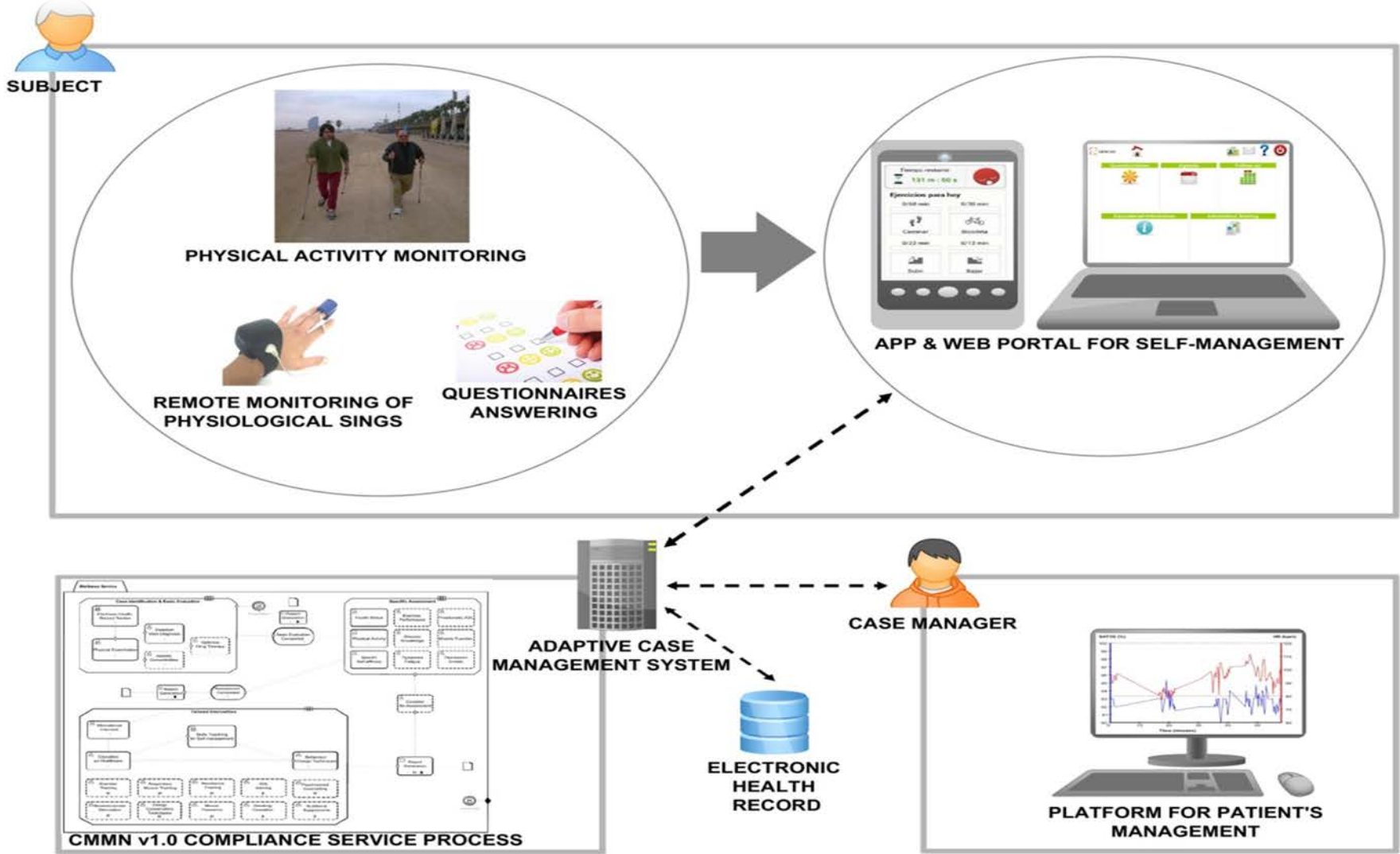Long-term sustainability of training induced-effects
in COPD patients with ICS-ICT

Wellness and rehabilitation

*Barberan A et al. Respiratory Medicine , 2014. **108** (4): p. 9*

High potential of the Personal Health Folder to enhance patient adherence

Wellness and rehabilitation

*Barberan A et al. Respiratory Medicine , 2014. **108** (4): p. 9*

High potential of the Personal Health Folder for remote off-line monitoring and to enhance patient adherence

A3 – Self-management

*Objectives within RIS3CAT to be accomplished **within 2016***
Barberan A et al Implementation of collaborative self-management services to support physical activity: protocol for a mixed methods evaluation
Implementation Science 2015 (Submitted)

O3.1. Deployment and assessment of a community-based service to promote physical activity in the healthcare sector of Barcelona-Esquerra.

O3.2. To elaborate the roadmap for regional adoption of the service in Catalonia

A4 – Telemedicine as a support of complex case management

- Management of cases with at least one of the three different levels that define complexity will be tackled by the action:

  ✓ Highly specialized services directly delivered into the community

  ✓ Need for coordination across healthcare tiers and home

  ✓ Management of frailty due to functional impairment and/or risk of social exclusion

- Adaptive Case Management will be a core component of the process design and implementation

A4 – Telemedicine as a support of complex case management

- The action aims at large scale deployment by enhancing ICT support to already successful clinical programs linking tertiary care with the community *(i.e Type I diabetes mellitus; rare diseases, LTOT, Non-invasive ventilation, Cardiac Failure, HIV-AIDS, COPD, Major ambulatory surgery, Sleep disorders, Home hospitalization; Support pre- and post-surgical high risk procedures, etc...)*
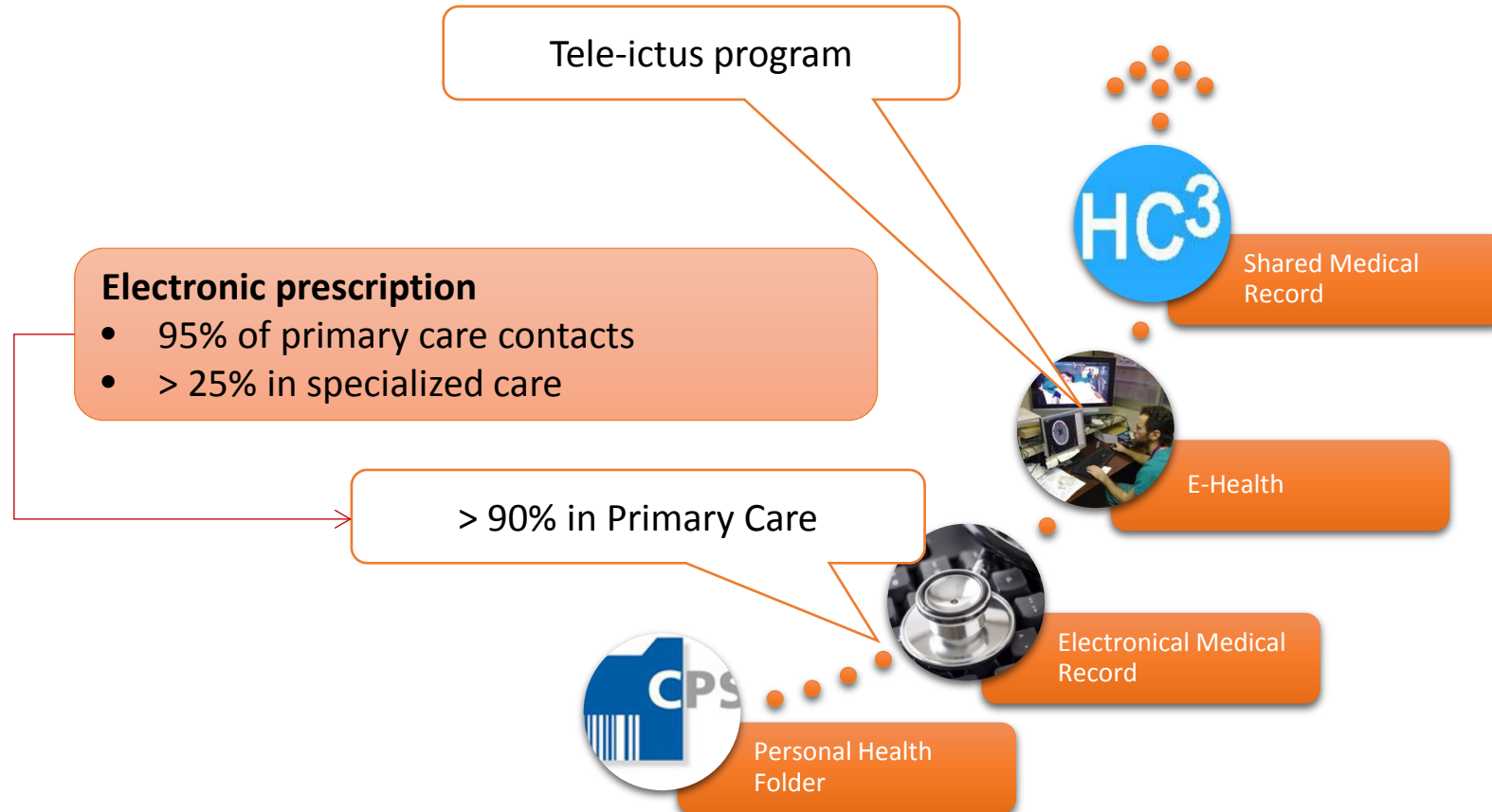
<u>O4.1</u>. Deployment and assessment of two use cases: i) Management of complex chronic patients; and, ii) Home hospitalization aiming at adoption as mainstream services in the region

<u>O4.2</u>. To elaborate the roadmap for general deployment and adoption of additional services at Hospital Clinic during the period 2017-2018.
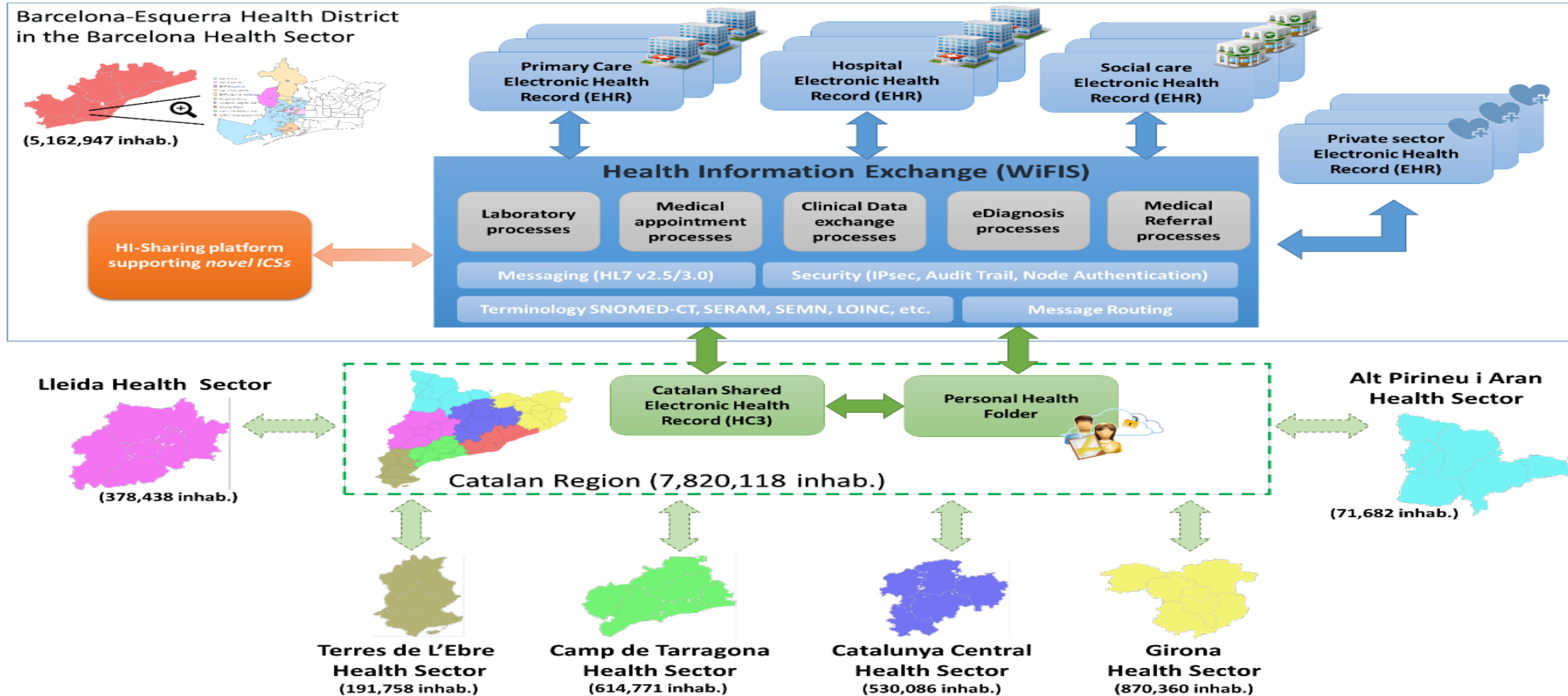
<u>O4.3</u>. To elaborate the roadmap for transferability at regional level in Catalonia.

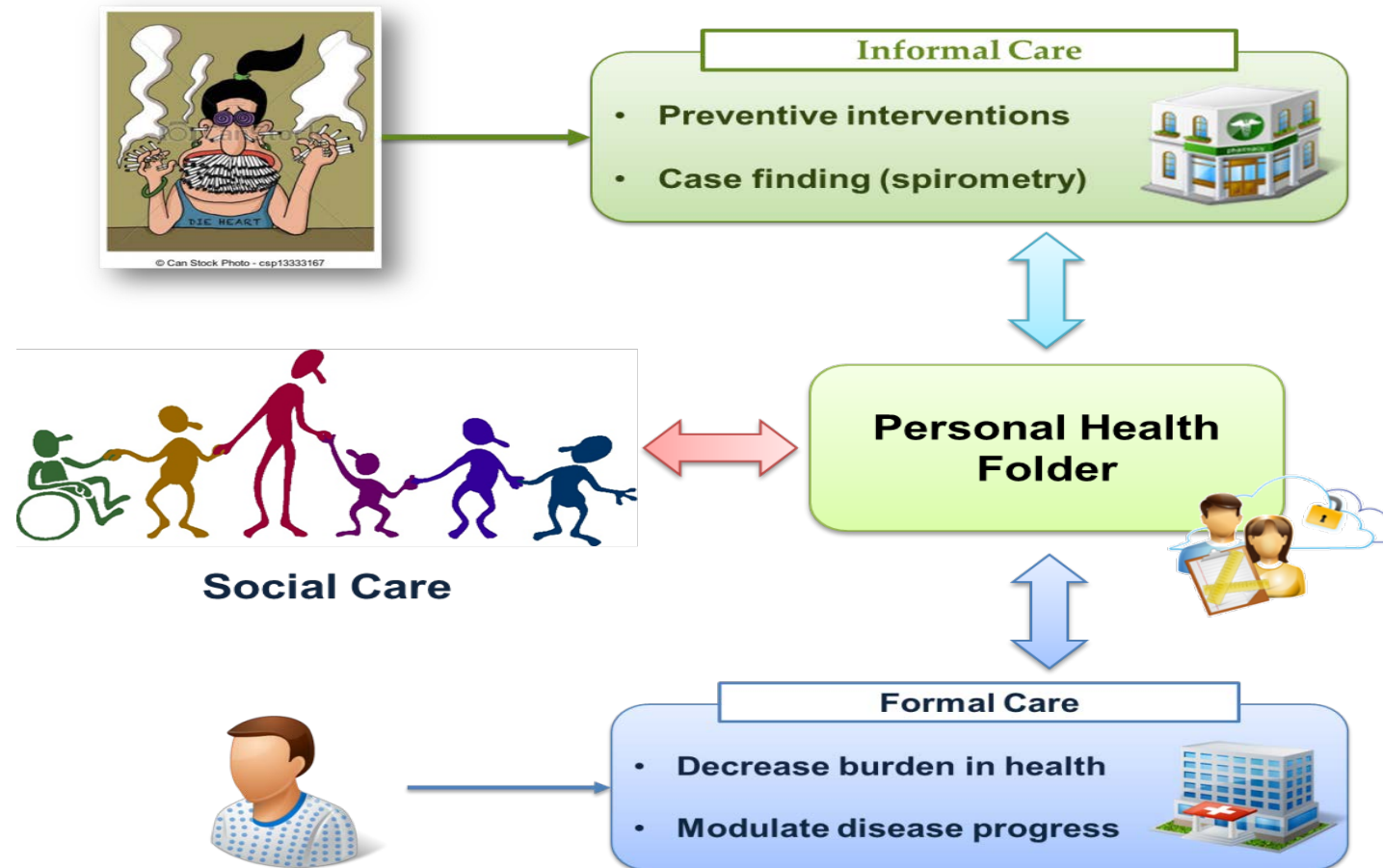# A5 –Interoperability – Digital Health Framework (DHF)

Telehealth in Catalonia

Tele-ictus program

Electronic prescription
- 95% of primary care contacts
- > 25% in specialized care

> 90% in Primary Care

HC³

Shared Medical Record

E-Health

Electronical Medical Record

CPS

Personal Health Folder

Regional Interoperability (HC3)

The Personal Health Folder as a facilitator for convergence of formal, informal and social care

<u>O5.1</u>. Deployment and assessment of the Personal Health Folder ("Cat@Salut - La meva salut") as a self-management tool for citizens/patients in **Actions 3 and 4**.

<u>O5.2</u>. To elaborate the roadmap for deployment of the DHF concept in Catalonia – Plan for development of an open platform supporting Adaptive Case Management
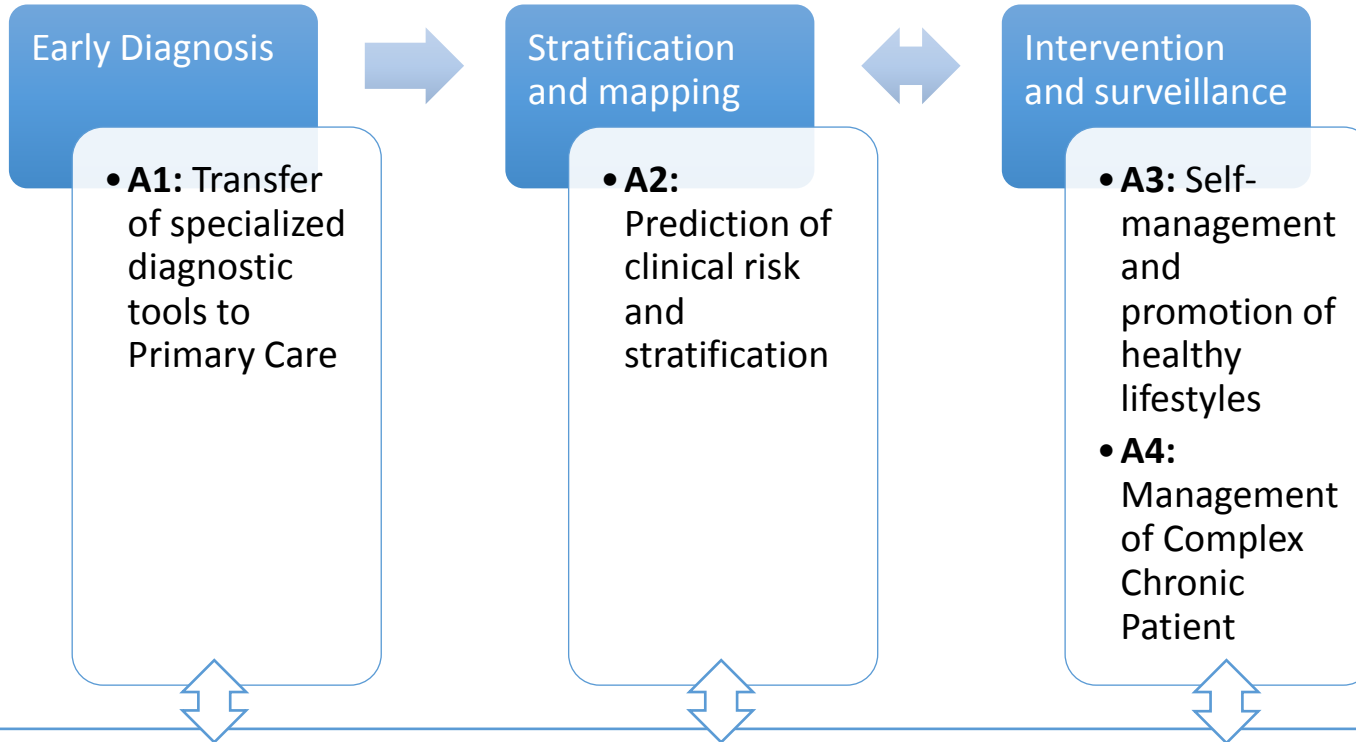
<u>O5.3</u>. To elaborate the roadmap for transferability of the DHF concept to other EU regions

<u>O5.4</u>. To elaborate a business model aiming at achieving progressive self-sustainability of **Action 5** after M18 toward full sustainability by the end of the project M36

Digital Health – Innovation in Integrated Care Services for Chronic Patients