Compartir Datos en Investigación Biomédica

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Health care in Europe: A mounting challenge

- The healthcare sector currently accounts for 10% of the EU's GDP. In 2014 the EU-28's total healthcare expenditure was €1.39 trillion. This is expected to increase to 30% by 2060.

- The increase in healthcare costs are primarily due to a rapidly aging population (e.g. proportion of individuals aged 65 years and older is projected to grow from 15% in 2000 to 23.5% by 2030), rising prevalence of chronic diseases and costly developments in medical technology.

- Chronic diseases result in the loss of 3.4 million potential productive life years (annual loss of €115 billion for EU economies).

Oportunities of Big Data in Health Sector

- Better knowledge of impact and disease burden
- Benefits and risk of therapeutic approaches in non-communicable chronic and in low incidence diseases
- Faster and cheaper development of new knowledge
- Reduce health care costs
- Opening of new frontiers
- Reshaping costs in the development of new diagnostic and therapeutic methods
- Alineating research in the most necessary areas

Fields for policy actions in Big Data for Health

BigData@Heart
Big Data for Better Hearts
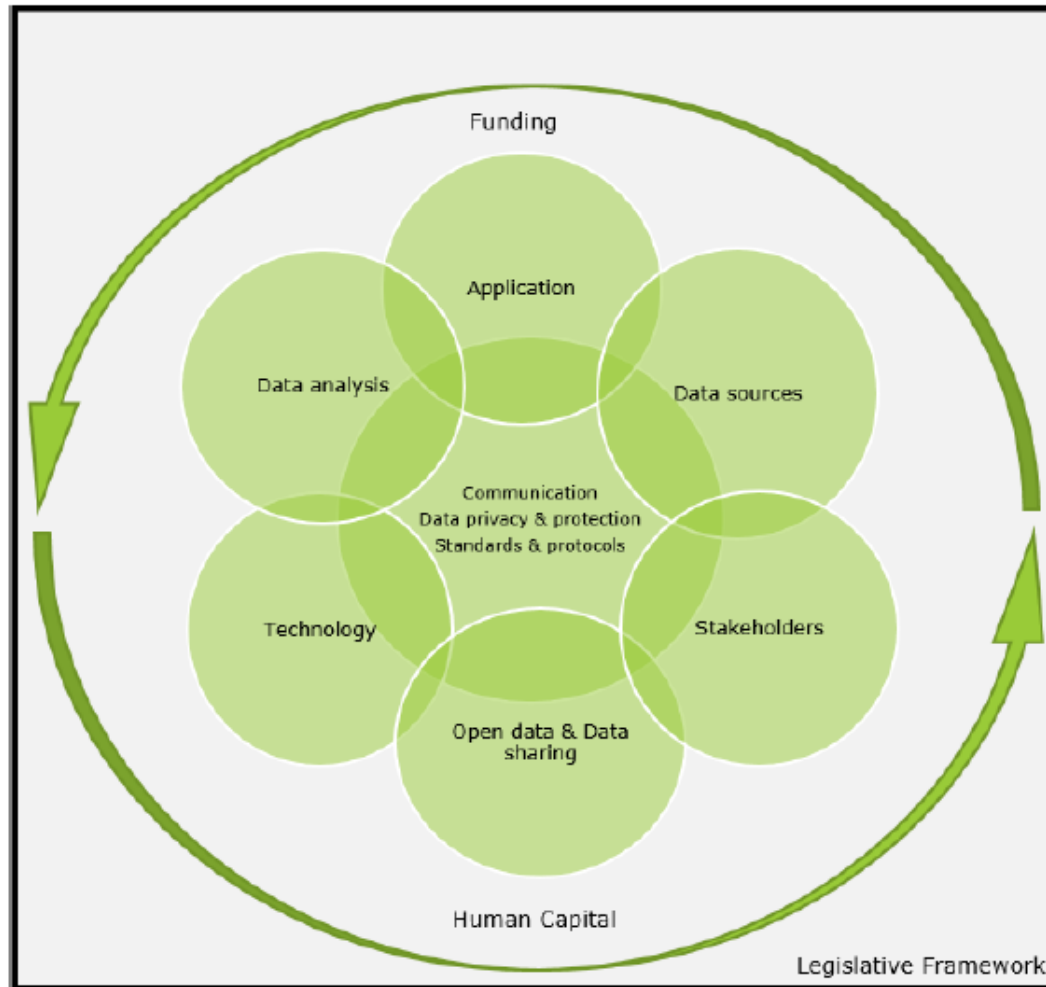
IMI 2

Main features

20 partners: Netherlands, Spain, UK, Germany, Sweden, France, Denmark, Irland, Israel, Finland, Russia

European Society of Cardiology

Drug Pharma: Bayer, Novartis, Servier, Vifor Pharma

Spain: INCLIVA

Budget: 15M€

Ambition (I)

BigData@Heart's ambition is to unlock the societal, scientific, clinical and industrial value of:

- Current and future European data sets by fully realising the potential big data approaches have for cardiovascular diseases.

- Developing and testing a framework that will enable big data cardiovascular research

- Informatics platform that allow to link, visualize and harmonise data sources of varying types, completeness and structure.

- Data science techniques to develop new definitions of disease, identify new phenotypes, and construct personalised predictive models.
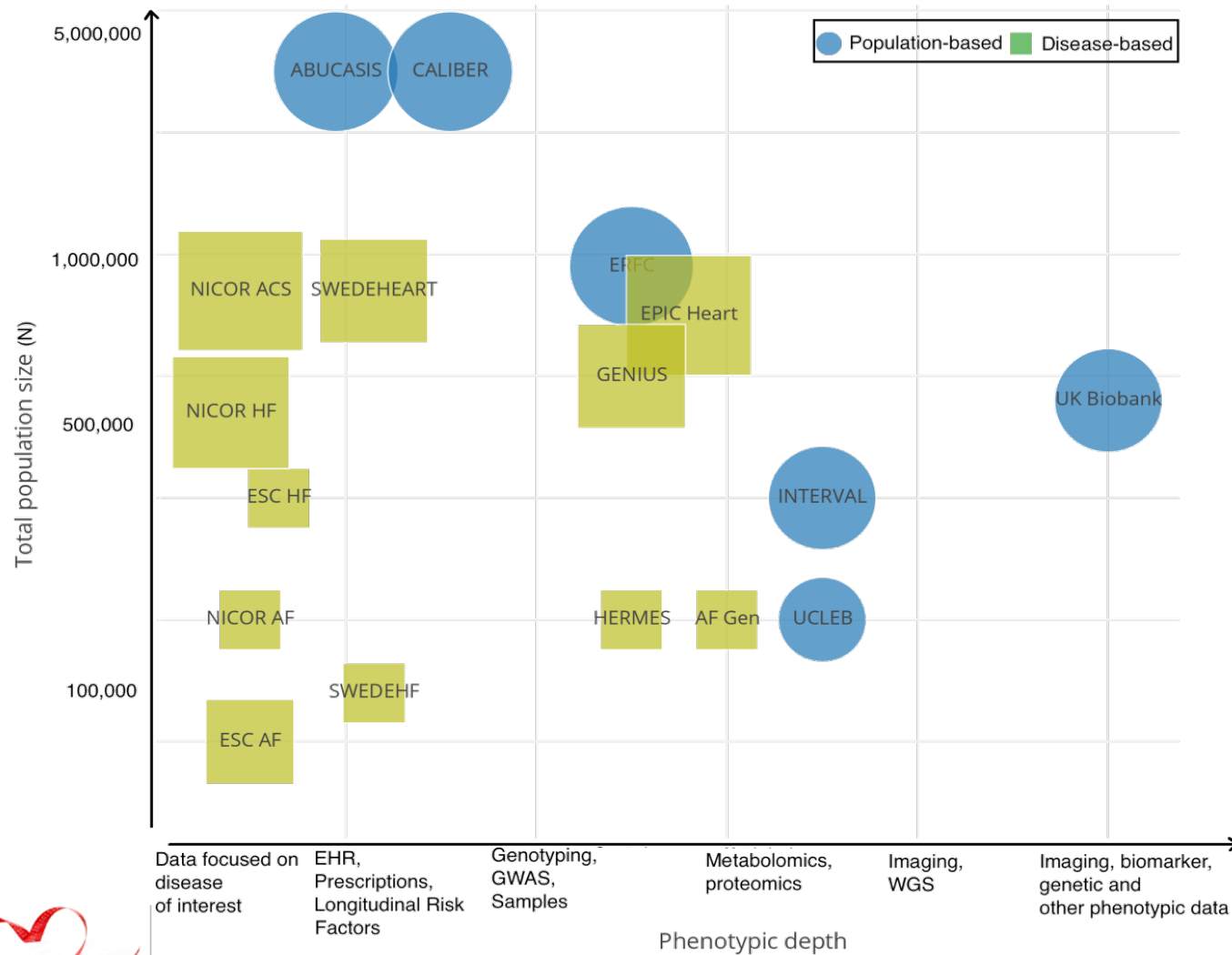
Ambition (I)

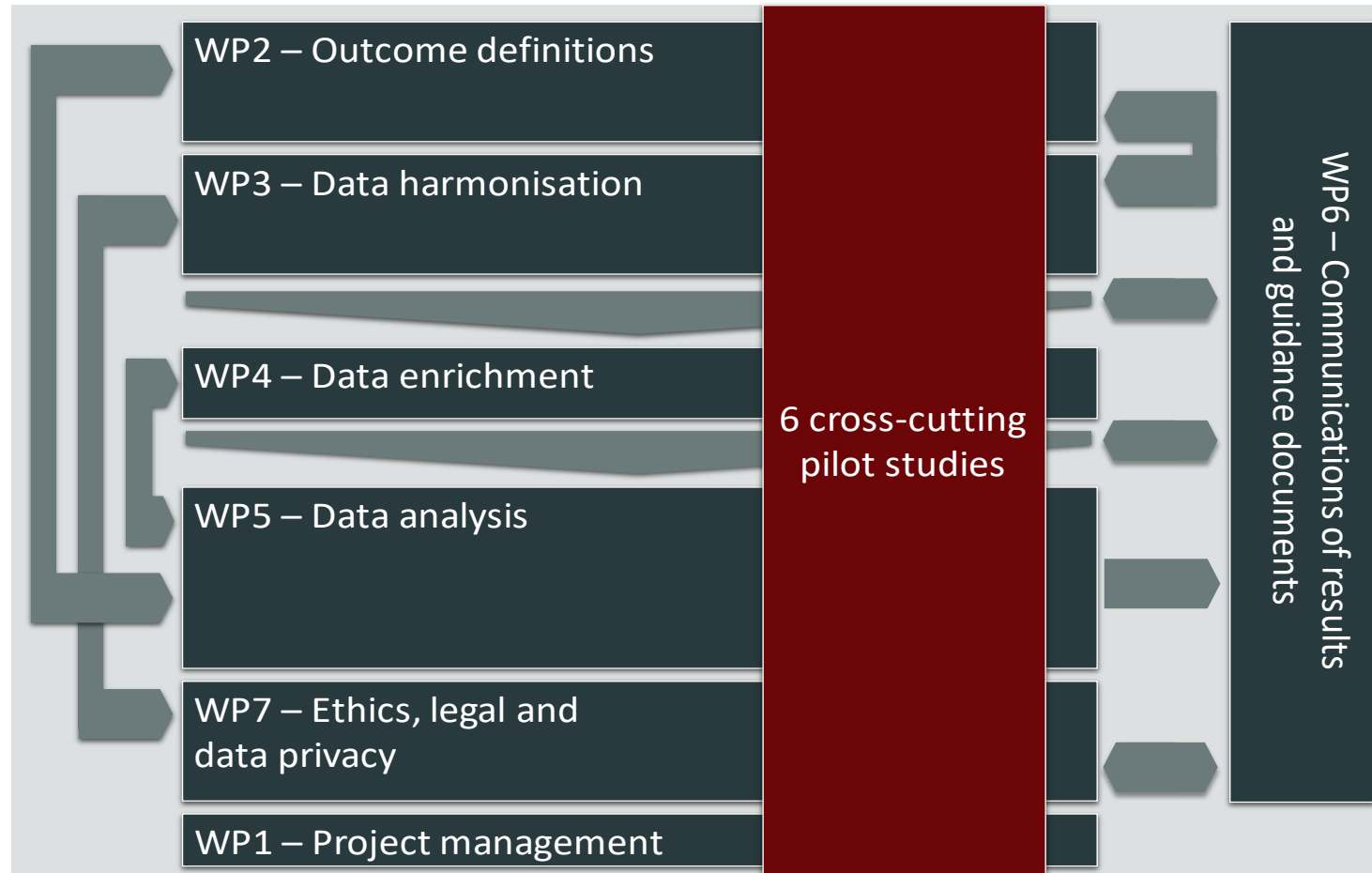Within the project (in a set of directly relevant pilot studies) we will show that:

- Combining molecular and EHR-derived data sources has value for identifying relevant subphenotypes that contain prognostic information that can guide future clinical trials design

- Big data approaches in CVD will lead to the identification of new phenotypes and subtypes of diseases

- Integrating -omics with EHR data can identify and prioritize novel therapeutic targets

- Guidelines that allow for cross-border usage of big data sources acknowledging ethical and legal constraints and data security.

Scale (N participants) and phenotypic and genotypic depth of a selection of disease-based and population-based data sources

Approach of BigData@Heart (Perth diagram)

WP2 – Outcome definitions

WP3 – Data harmonisation

WP4 – Data enrichment

WP5 – Data analysis

WP7 – Ethics, legal and data privacy

WP1 – Project management

6 cross-cutting pilot studies

WP6 – Communications of results and guidance documents

BigData@Heart
Big Data for Better Hearts

Harmonize and evaluate data elements across biomedical data sources using the Observational Medical Outcomes Partnership (OMOP) Common Data Model (CDM).
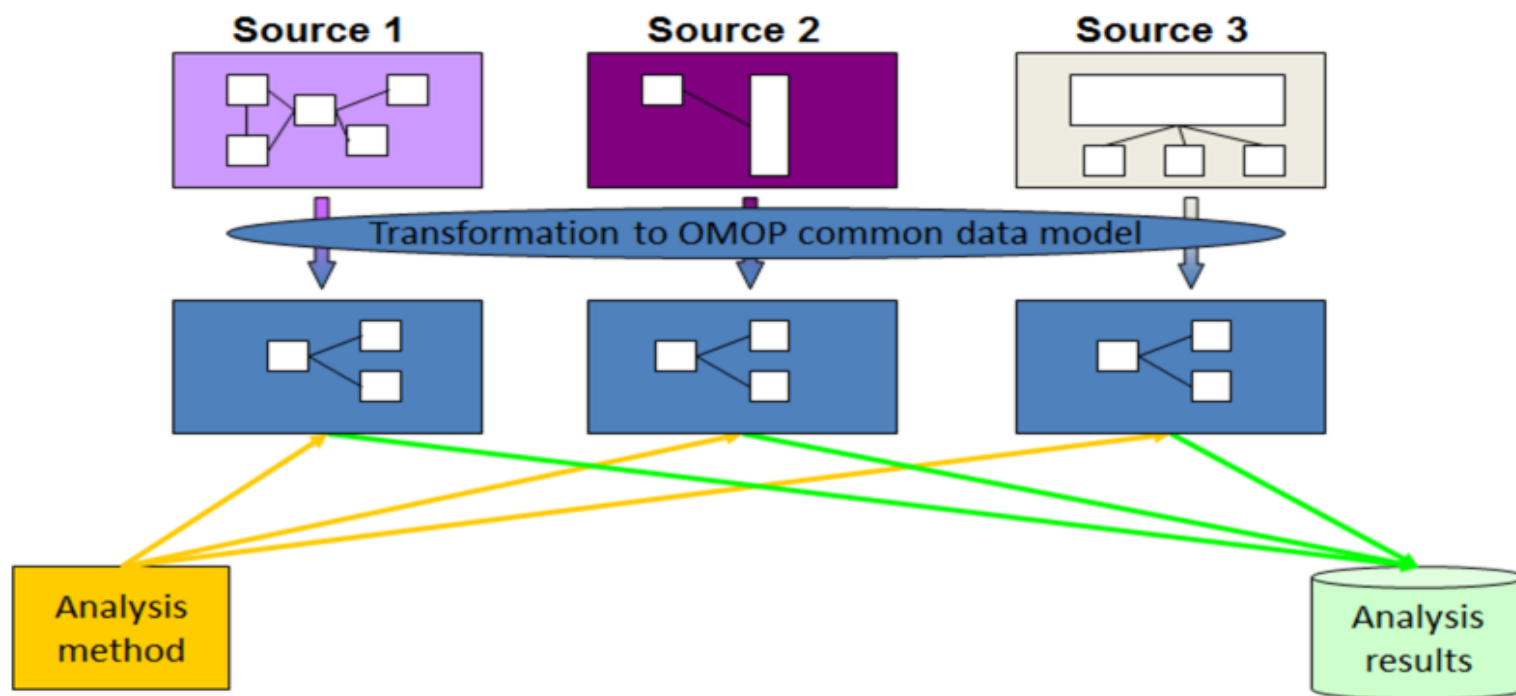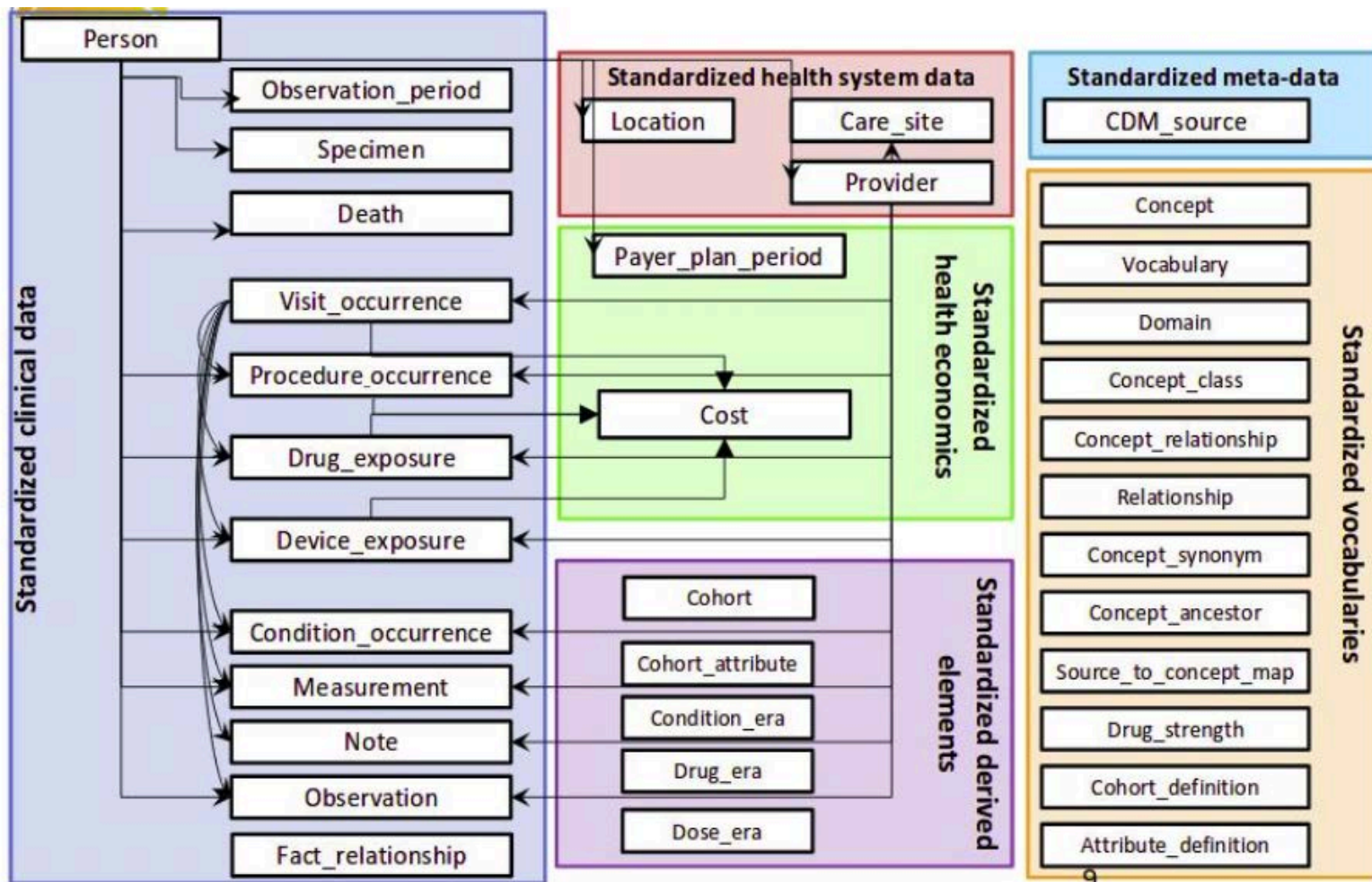
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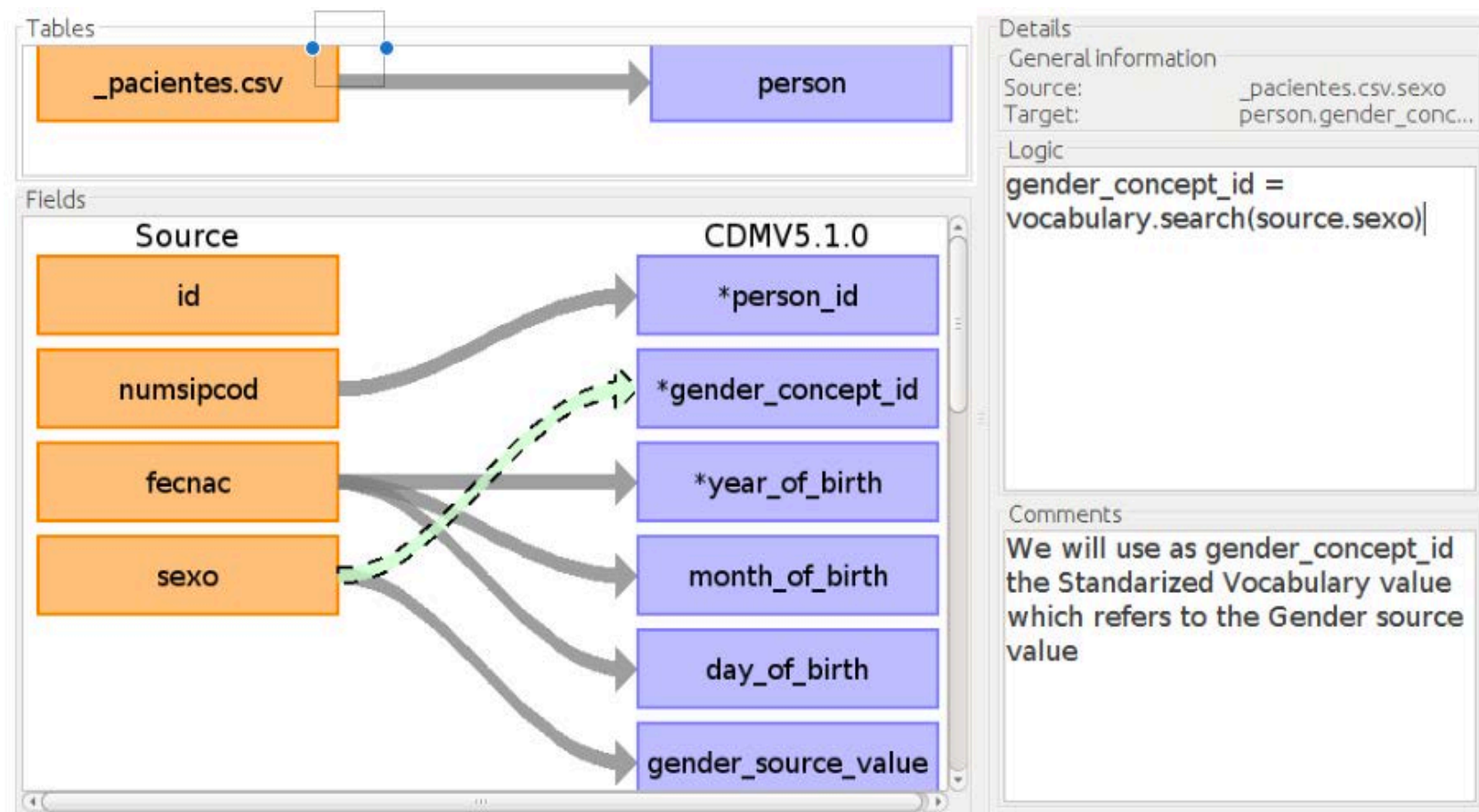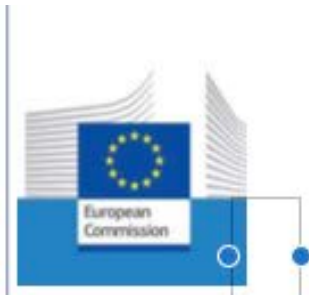
European Commission

BIG Medilotics

THE FRAMEWORK PROGRAMME FOR RESEARCH AND INNOVATION

HORIZON 2020

Project Proposal: Big Data for Medical Analytics

BIGMedil⊙tics

Call	H2020-ICT-2016-2017
Topic	ICT-15-2016-2017 Big Data PPP: Large Scale Pilot actions in sectors best benefitting from data-driven innovation
Type of Action	IA

35 partners: Netherlands, Spain, UK, Germany, Sweden, France, Denmark, Irland, Israel, Finland, Russia

Spain: INCLIVA, ITI, UPM, ATOS, Hospital Puerta de Hierro

Budget: 15M€

Framework
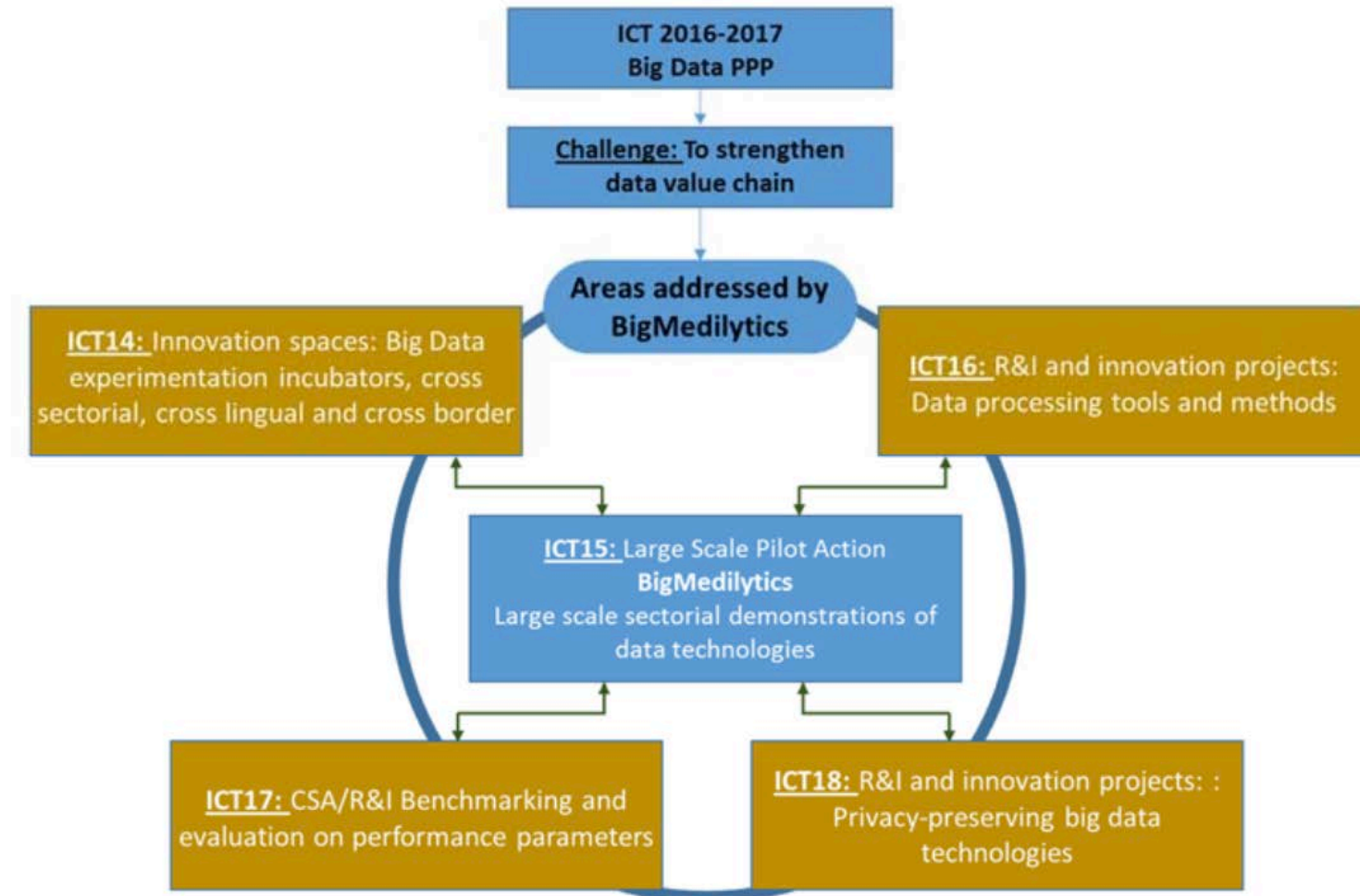
Excellence

BigMedilytics will transform Europe's Healthcare sector by using state-of-the-art Big Data technologies to achieve breakthrough productivity in the sector by – *simultaneously*.

(i) reducing cost

(ii) improving patient outcomes

(iii) delivering better access to healthcare facilities

BIGMedil**⊙**tics

Strategy

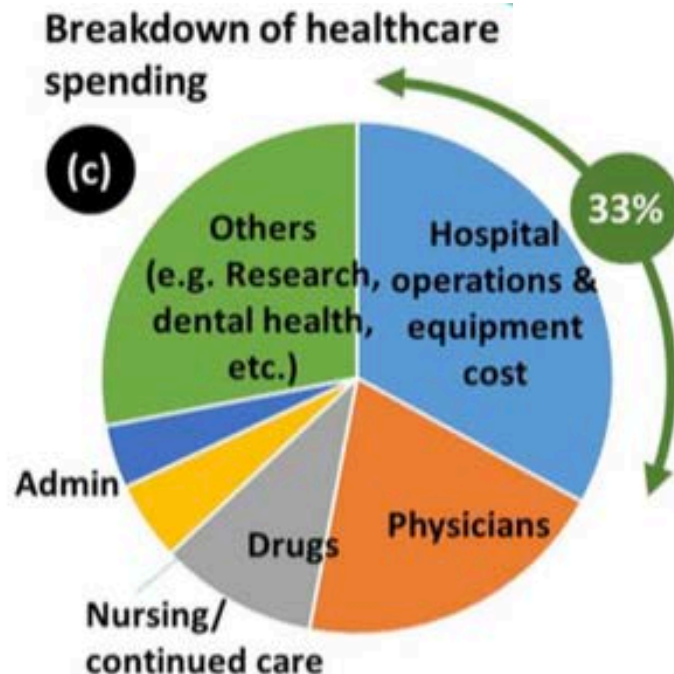- Addressing the largest disease group

- Data integration across all key players/data generators and "V" of Big Data

- Security/Privacy architectures to support different national privacy regulations

- Covering the entire healthcare continuum

- Best Big Data technology

BIGMedil**O**tics

Motivation of three themes, categorization of the pilots based on themes and their relationship to the health continuum

(a) Percentage of deaths from non-communicable diseases in Europe

THEME 1: Population Health & Chronic Disease Management

Pilot 1: Comorbidities
Pilot 2: Kidney disease
Pilot 3: Diabetes
Pilot 4: Asthma/COPD
Pilot 5: Heart Failure

THEME 2: Oncology

Pilot 6: Prostate cancer
Pilot 7: Lung cancer
Pilot 8: Breast cancer

Other (e.g. injury)
Oral conditions
Digestive diseases
Neuropsychiatric conditions
Cardiovascular disease
Cancer
Diabetes
Respiratory disease
Kidney disease

59%
19%

THEME 1: Population Health & Chronic Disease Management
THEME 2: Oncology

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Motivation of three themes, categorization of the pilots based on themes and their relationship to the health continuum

Breakdown of healthcare spending

(c)

Others (e.g. Research, dental health, etc.)

Hospital operations & equipment cost

33%

Admin

Drugs

Physicians

Nursing/ continued care

THEME 3: Industrialisation of Healthcare Services

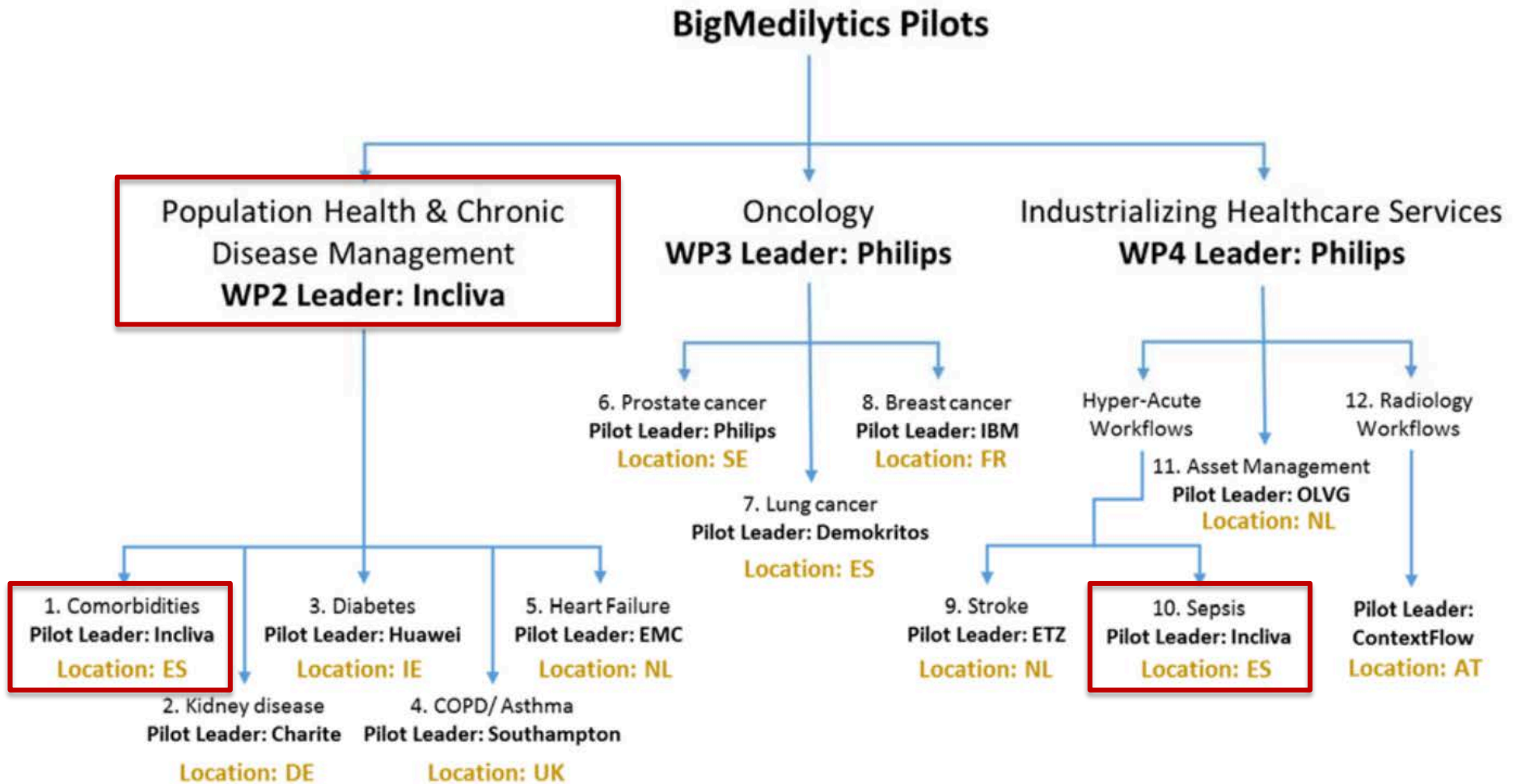**THEME 3:** Industrialisation of Healthcare Services

Pilot 9: Stroke workflows

Pilot 10: Sepsis workflows

Pilot 11: Asset management workflows

Pilot 12: Radiology workflows

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Pilots in the project

Objectives

		Population Health & Chronic Disease Management					Oncology			Industrialization of Healthcare Services			
		Comorbidities	Kidney	Diabetes	COPD/Asthma	Heart Failure	Prostate	Lung	Breast	Stroke	Sepsis	Asset	Radiology
No	Objective	Pilot 1	Pilot 2	Pilot 3	Pilot 4	Pilot 5	Pilot 6	Pilot 7	Pilot 8	Pilot 9	Pilot 10	Pilot 11	Pilot 12
O1	Improve chronic disease and cancer outcomes using Big Data	X	X	X	X	X	X	X	X				
O2	Optimize workflows through industrializing healthcare services using Big Data									X	X	X	X
O3	Guarantee replicability of Big Data concepts for healthcare	X	X	X	X	X	X	X	X	X	X	X	X
O4	Increase market share through data integration	X	X	X	X	X	X	X	X	X	X	X	X
O5	Establish secure and privacy preserving cross-border and cross-organisation healthcare services thus strengthening EU's Digital Market Strategy	X	X			X	X		X	X	X	X	
O6	Define Best "Big Data" practices	X	X	X	X	X	X	X	X	X	X	X	X
O7	Enable knowledge transfer	X	X	X	X	X	X	X	X	X	X	X	X

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Architecture

Architecture	Comorbidities	Kidney	Diabetes	COPD/Asthma	Heart Failure	Prostate	Lung	Breast	Stroke	Sepsis	Asset	Radiology
	Pilot 1	Pilot 2	Pilot 3	Pilot 4	Pilot 5	Pilot 6	Pilot 7	Pilot 8	Pilot 9	Pilot 10	Pilot 11	Pilot 12
Cloud-based approach			X						X		X	
Edge-computing approach	X	X		X	X	X	X	X		X		X
Multi-party computation approach					X				X			

Legend:
- Population Health & Chronic Disease Management
- Oncology
- Industrialization of Healthcare Services

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