

# PRECIOUS: PREventive Care Infrastructure based On Ubiquitous Sensing

ICT Call 10

Coordinator

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**BUILDING MOTIVATION FOR  
PREVENTIVE CARE!**

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**“What fits your busy schedule better, exercising  
one hour a day or being dead 24 hours a day?”**

# Outline

- Background
- PRECIOUS approach
- PRECIOUS summary objectives
- Progress beyond the state of the art
- Work breakdown structure
- Management structure and procedures
- Overview of the consortium
- Envisioned PRECIOUS impacts

# PRECIOUS - PREventive Care Infrastructure based On Ubiquitous Sensing

Background

# Background 1(2)

- **Full title:** PREventive Care Infrastructure based On Ubiquitous Sensing
- **Acronym:** PRECIOUS
- **Duration:** 36 months (3 years)
- **Type of project:** STREP
- **Objective:** Objective ICT-2013.5.1 Personalised health, active ageing, and independent living, Target A
- **Project coordinator:** Aalto University
- **Consortium size:** 8 partners
- **Total budget:** 3,68m EUR
- **EC requested contribution:** 2,81m EUR

# Background 2(2)

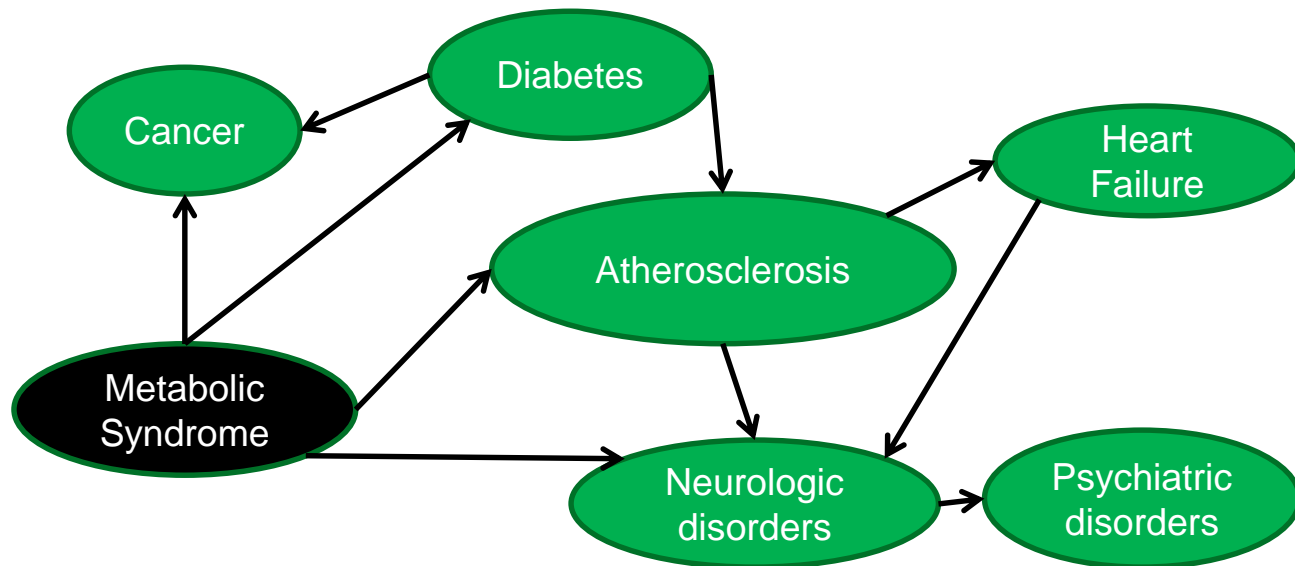
- PRECIOUS aims to **enhance preventive care** with advanced, transparent sensing and developed feedback structures. Specifically:
  - Understand how **user motivation** is built up and maintained in preventive care
  - Study how **intelligent model** of **user's behavior** can be seamlessly built into the PRECIOUS preventive care system
  - Investigate **sensing** and **middleware techniques** for transparent and ubiquitous sensing and inter-application communications to support PRECIOUS usage scenarios

# Framework of Health



# Metabolic Syndrome

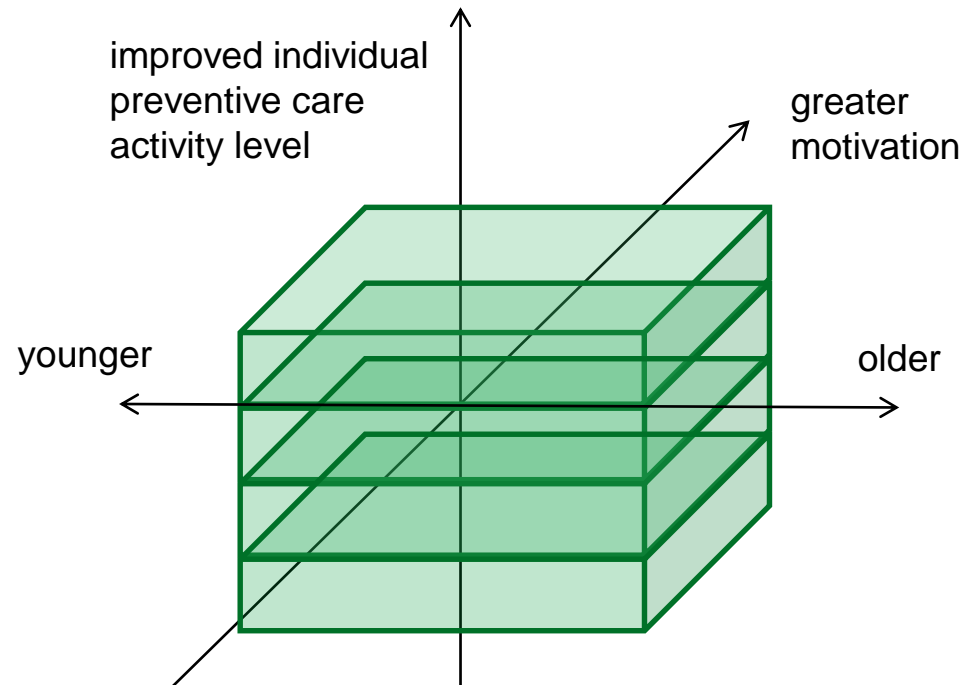
*“We need more powerful methods to identify individuals at the highest risk for the major chronic diseases- atherosclerosis, heart failure, cancer, diabetes, and neurodegenerative and psychiatric disorder –  
That accounts for the bulk of health care expenditures”*





# Research questions in building up of motivation...

- How **active control of well-being** can be best obtained in various age groups?
- How relating **motivation** can be best supported in different ages?
- What are currently the biggest **obstacles** in building up motivation?
- How complex **multimodal** measurement data should be best reflected back to the users to support sustainable motivation?
- Which features in **gamified** services currently support motivation? How these should be converted to support especially preventive care?
- Which **age groups / user profiles** are first targeted in PRECIOUS and why?



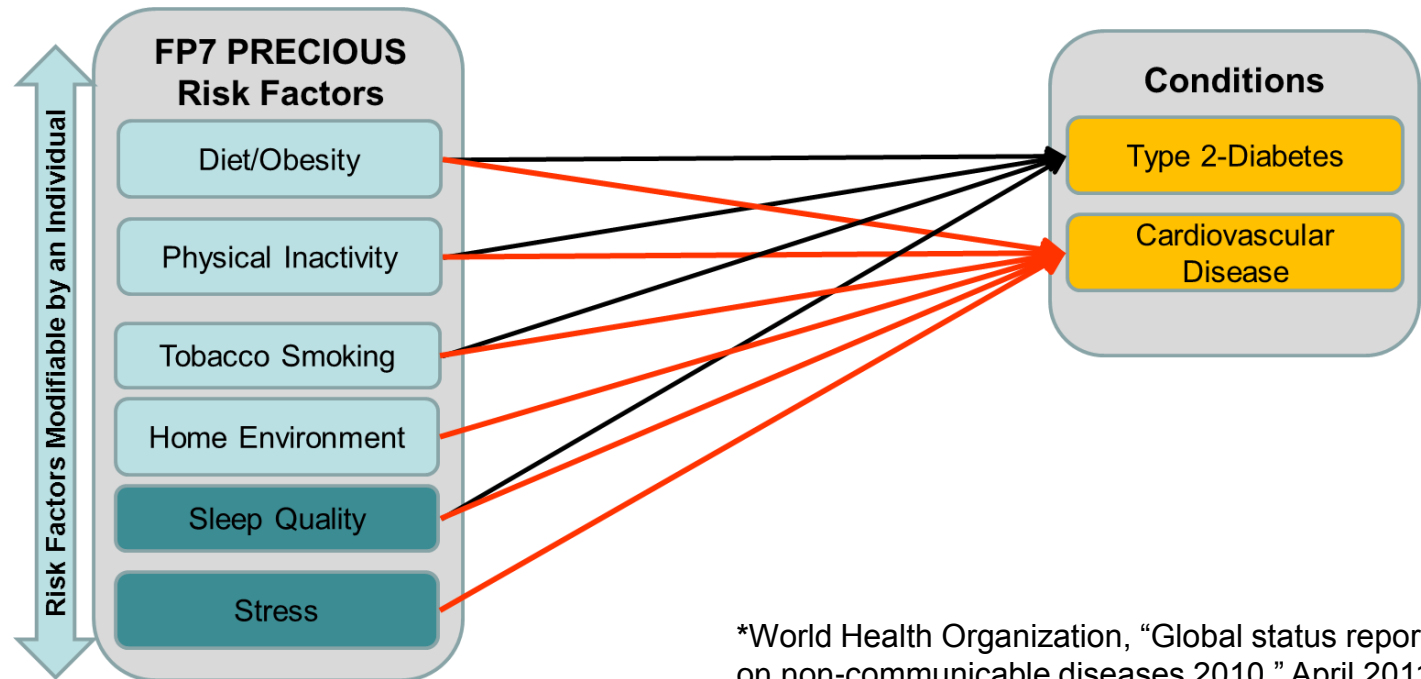
PRECIOUS aims to support greater self-motivation over all age groups in order to increase respective individual preventive care activity level

# PRECIOUS - PREventive Care Infrastructure based On Ubiquitous Sensing

Approach

# PRECIOUS Approach

- Focus on **risk factors** associated with 2 of the leading eight **non-communicable diseases** (NCDs)\*:
  - Type-2 diabetes
  - Cardiovascular disease

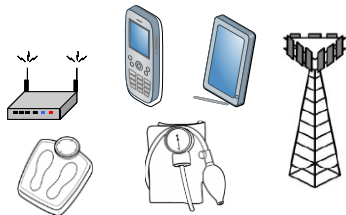


\*World Health Organization, "Global status report on non-communicable diseases 2010," April 2011

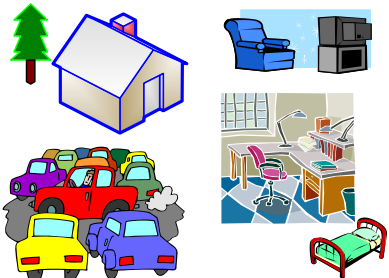
# PRECIOUS Approach ...

## RISK FACTOR DATA COLLECTION

Context elicitation  
Sensing and monitoring  
Data transfer



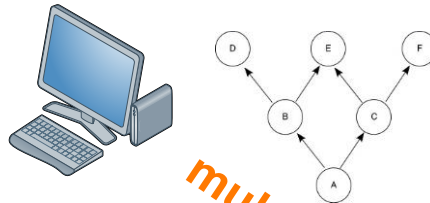
Heterogeneous connected devices



Diverse environments and activities

## DATA PROCESSING

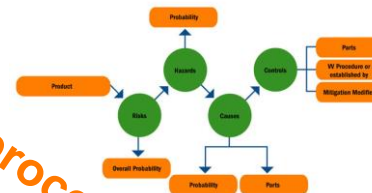
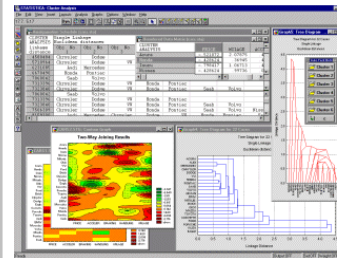
Data harmonisation  
Data warehousing  
Data fusion  
Data mining



Health records, activity records etc.

## ANALYSIS AND MODELLING

Virtual individual modelling  
Lifestyle trend analysis  
Risk analysis



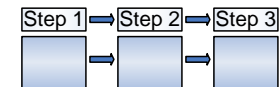
multimodal data processing

## FEEDBACK AND RESPONSE

Feedback and actuation  
Stakeholder interventions  
Behavioural changes



Personalized feedback



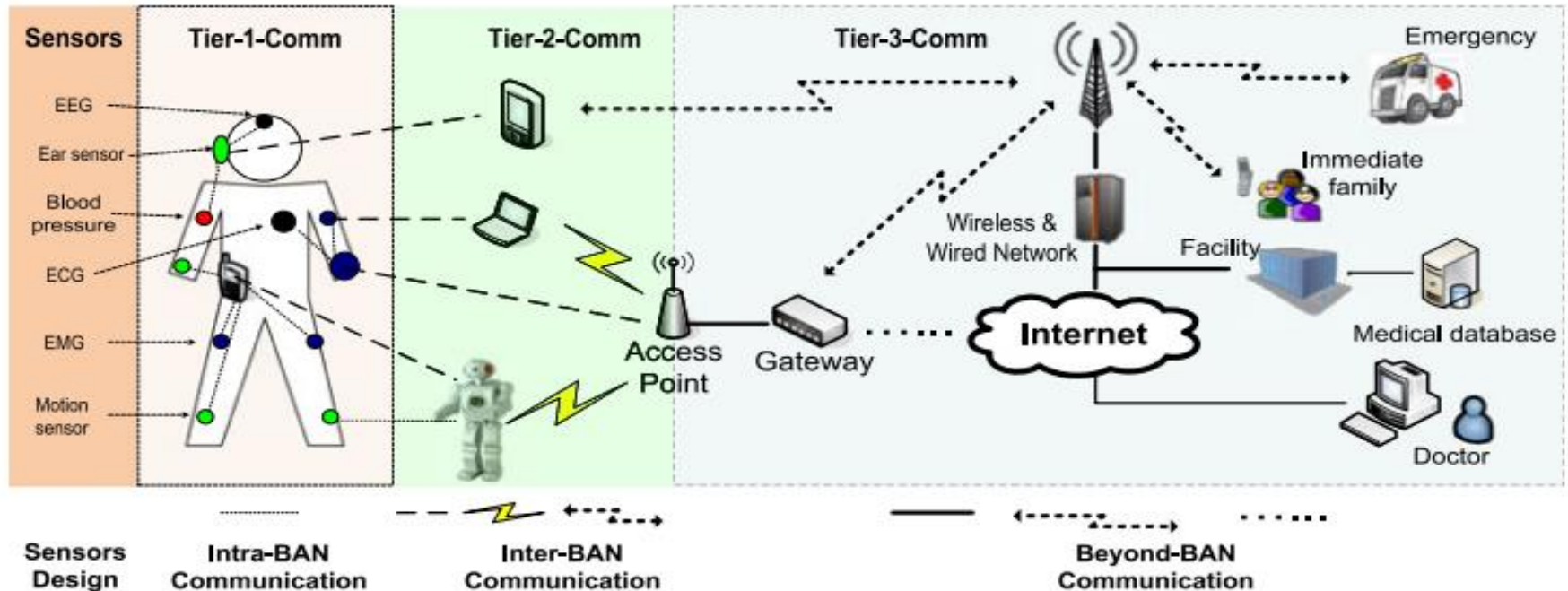
Stakeholders (health, insurance, family etc.)



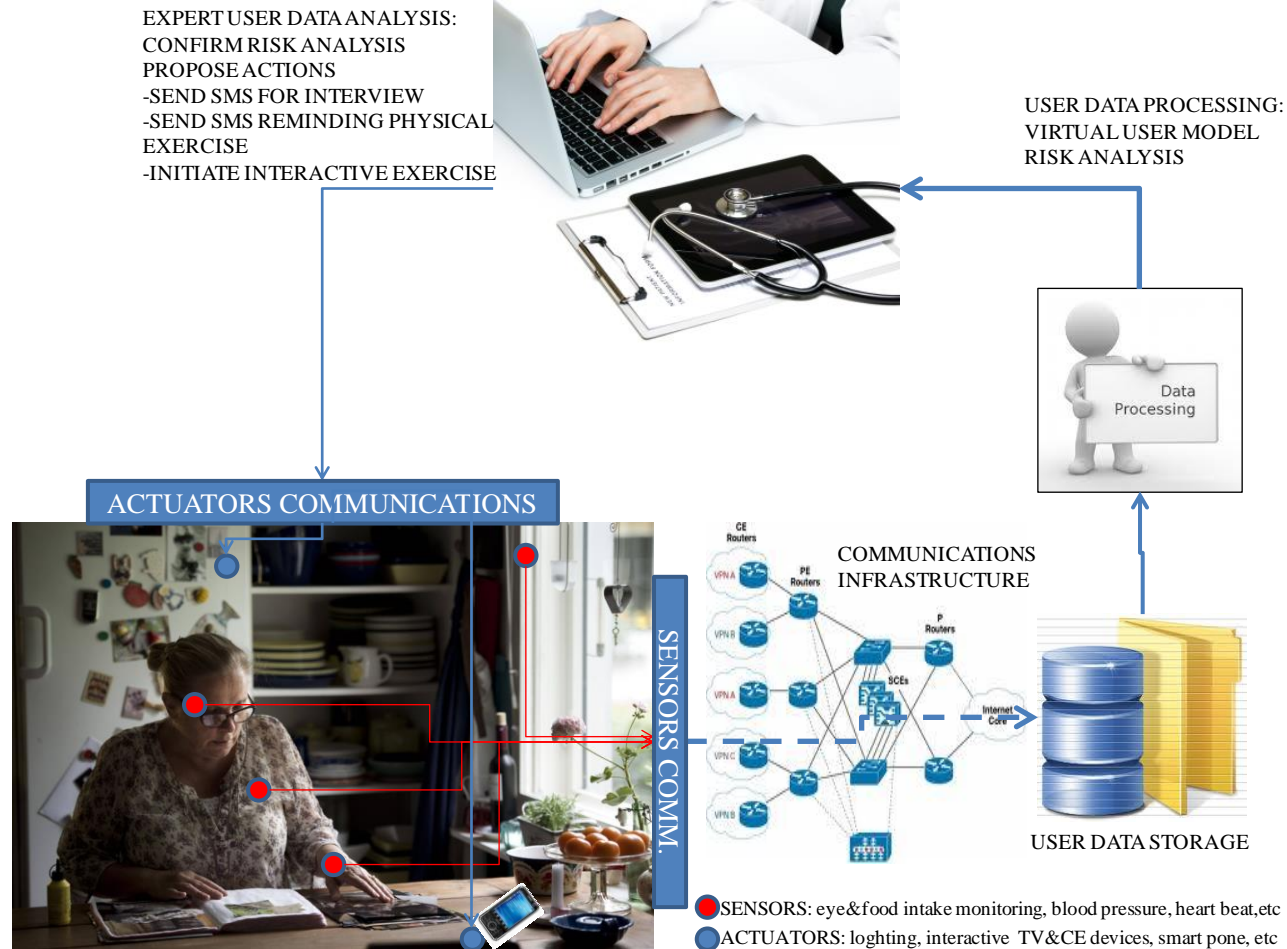
Individual decisions and choices

**PRECIOUS workflow for lifestyle management and disease prevention**

# Framework of Body Area Networking (BAN)



# Usage Scenario Example



**PRECIOUS usage scenarios**

# PRECIOUS - PREventive Care Infrastructure based On Ubiquitous Sensing

Summary of Objectives

# Summary of Objectives

- **Objective 1:** Motivational system to reduce unhealthy habits in users
  - **Objective 2:** Ubiquitous and transparent multimodal sensing platform with personalized user interfaces and actuators
  - **Objective 3:** Preventive care services and applications following the virtual individual model
  - **Objective 4:** End-to-end system validation in field tests
  - **Objective 5:** Research relating socio-economic modeling
  - **Objective 6:** Develop and utilize agile project management practices for large-scale organizations
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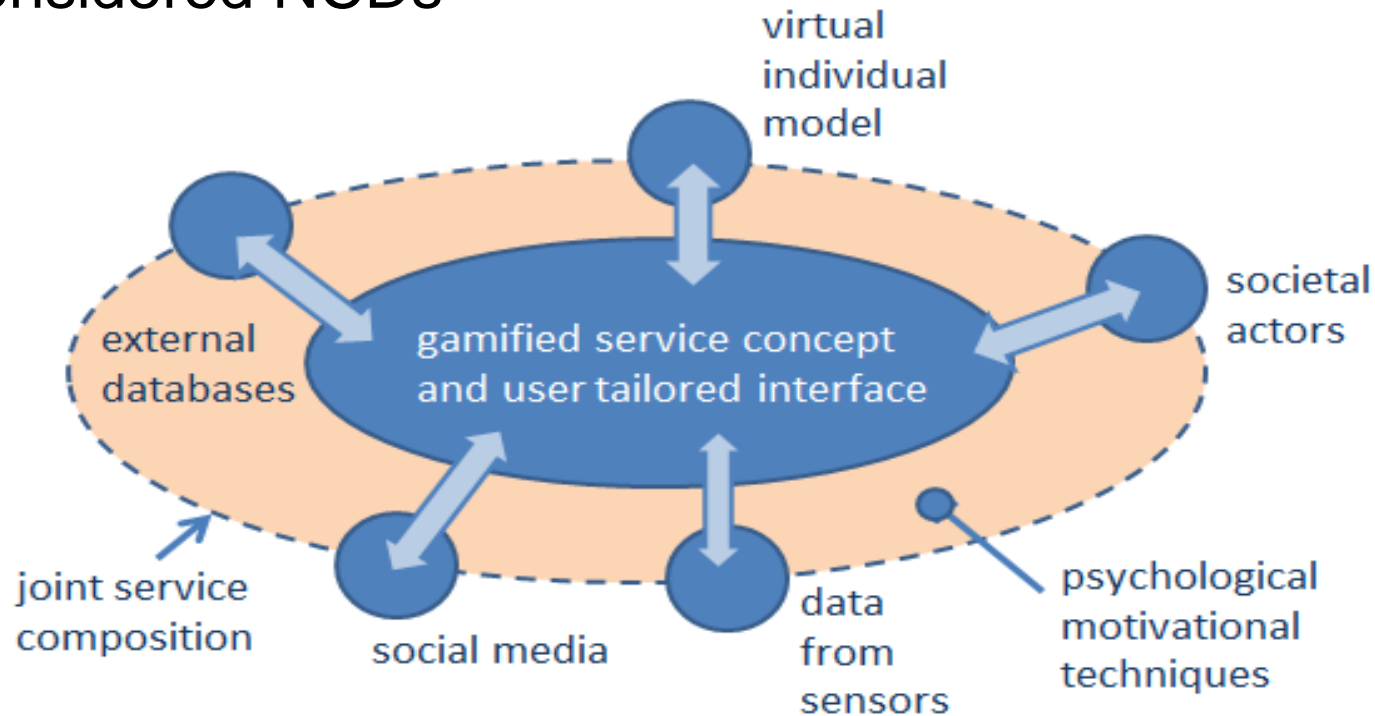


# PRECIOUS - PREventive Care Infrastructure based On Ubiquitous Sensing

Progress Beyond State-of-the-art

# Progress Beyond State-of-the-art

- **Integration** of multiple innovations for fostering and maintaining user motivation to reduce risk factors of considered NCDs

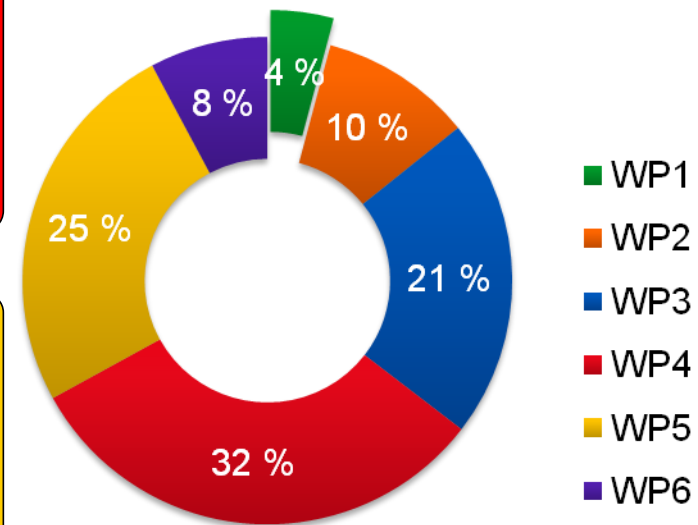
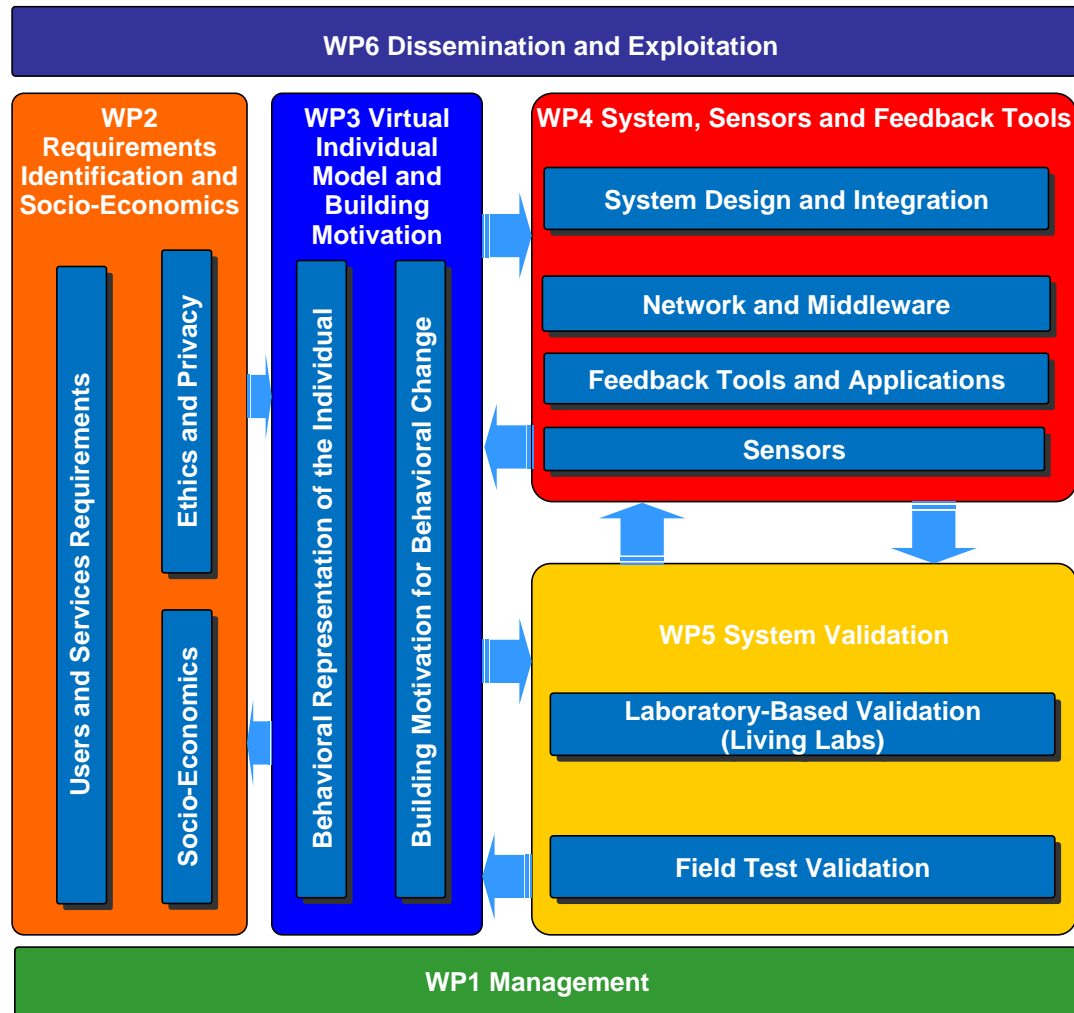


Integration of innovative contributions from PRECIOUS

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Work breakdown

# Work Breakdown Structure

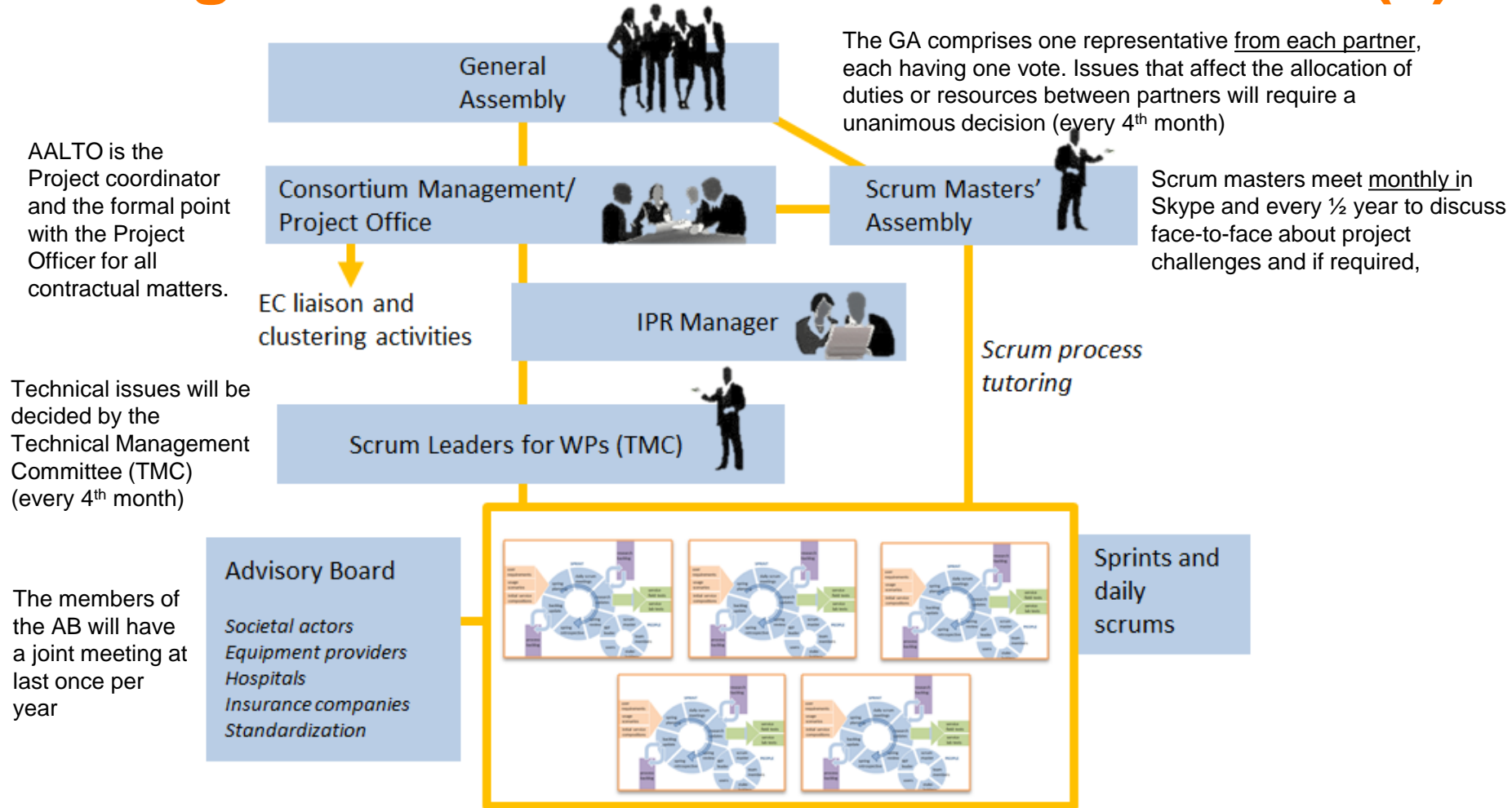


Effort distribution per WP

# PRECIOUS - PREventive Care Infrastructure based On Ubiquitous Sensing

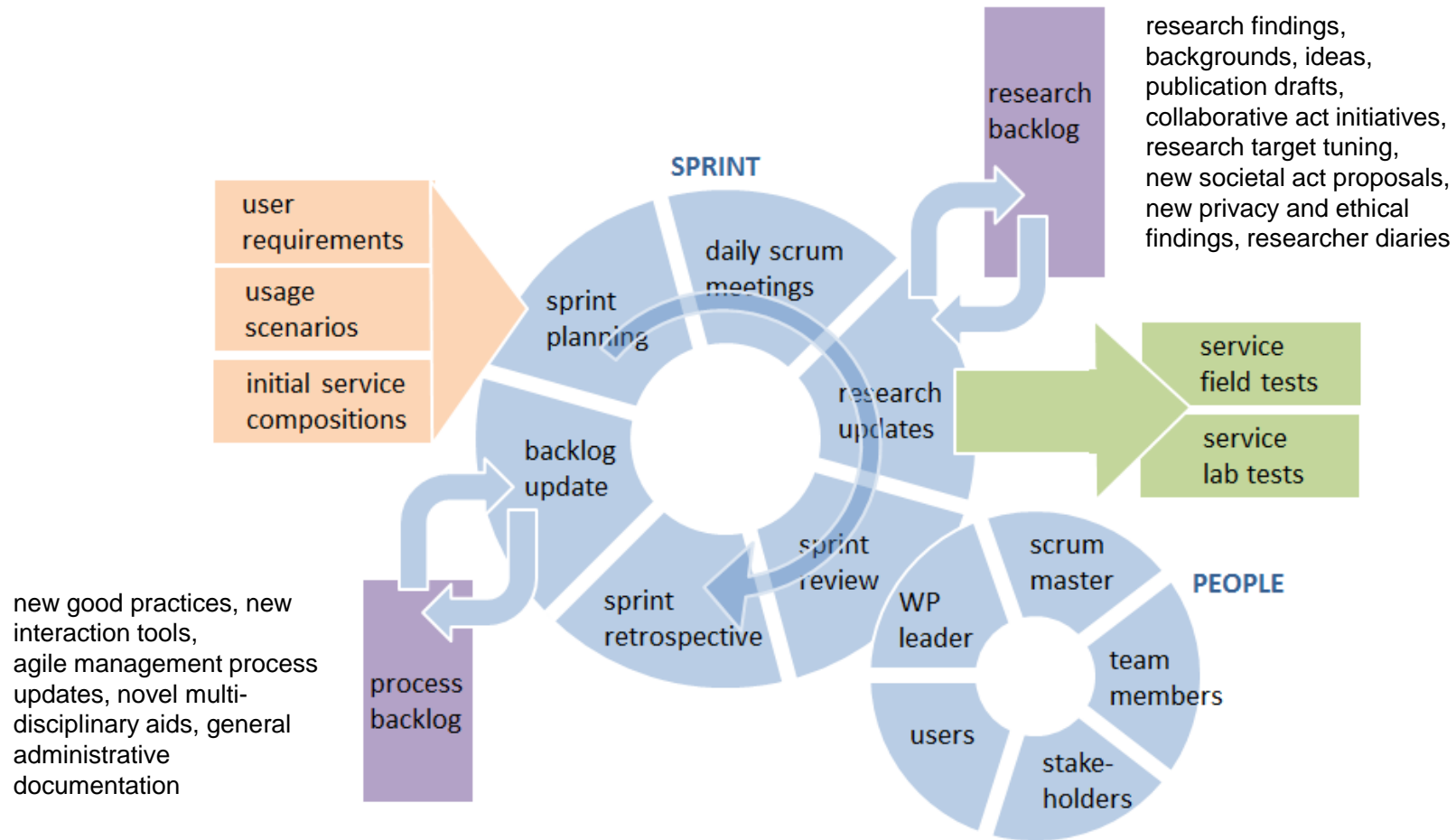
Management and procedures

# Management Structure and Procedures 1(2)



High level project management structure for PRECIOUS project

# Management Structure and Procedures 2(2)



## PRECIOUS project management at WP-level

# PRECIOUS - PREventive Care Infrastructure based On Ubiquitous Sensing

Overview of the Consortium



# Overview of the Consortium 1(2)

- **Eight participants:** 4 universities, one SME, one industrial research organisation, one university hospital and one non-profit organization
- **Six countries:** Austria, Belgium, Finland, France, Spain and UK

Aalto University  
University of Helsinki  
Firstbeat Technologies Ltd (FIN)

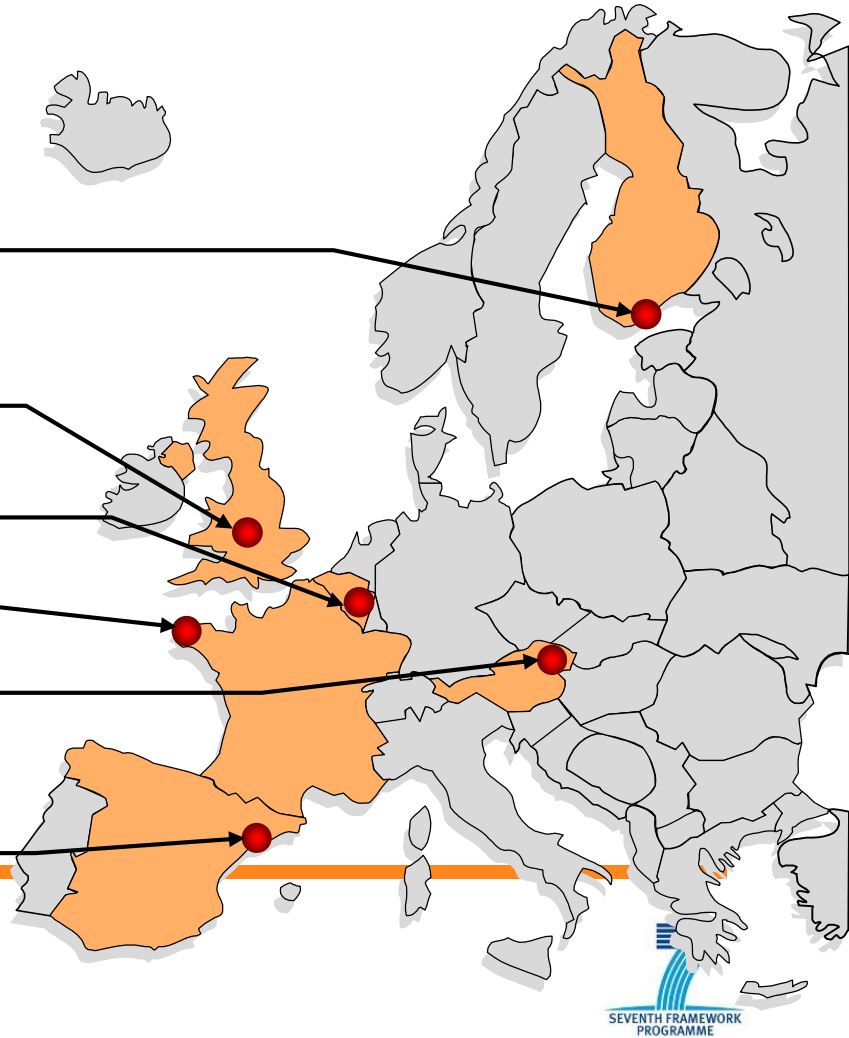
Campden BRI (UK)

EuroFIR AISBL (Belgium)

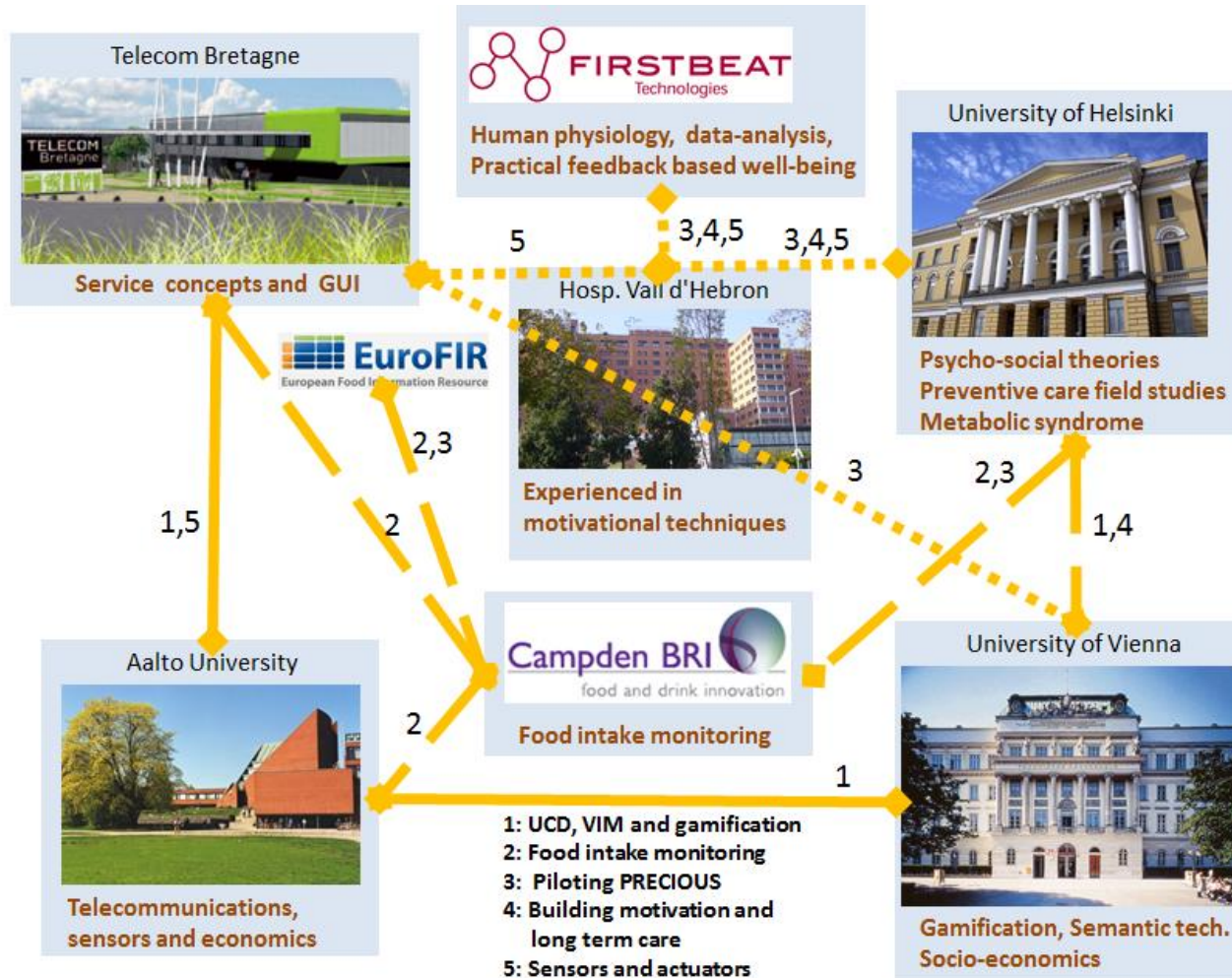
Télécom Bretagne (France)

University of Vienna (Austria)

Fundacio Hospital Universitari Vall  
D'Hebron - Institut de Recerca (Spain)



# Overview of the Consortium 2(2)



Expertise and complementarities between PRECIOUS project partners

# PRECIOUS - PREventive Care Infrastructure based On Ubiquitous Sensing

Envisioned PRECIOUS impact

# Envisioned PRECIOUS Impacts 1(2)

Expected impact listed for ICT-2013.5.1	Envisioned PRECIOUS impacts
Strengthened evidence of the impact of healthy behaviors on health and wellbeing.	Apply <b>multimodal sensing</b> and <b>intelligent actuators</b> to <b>foster motivation</b> and real-time <b>health feedback</b> combined to intelligent tutoring techniques that work in a <b>gamified environment</b>
Strengthened evidence on the impact of disease prevention on health and expenditure.	Improve the <b>awareness</b> and knowledge of people who have high preventive care <b>risk factor levels</b> . Produce tailored <b>user-centered intervention tool</b> for positive long term impacts on health and reduce costs of health care related NCDs.
Contribution to a more sustainable European healthcare system through reduction of avoidable disease burden	Principles of PRECIOUS based on <b>European targets</b> (e.g. from European Type 2 diabetes prevention program), will determine how PRECIOUS can improve the behavioral change targets to reduce risk levels.

# Envisioned PRECIOUS Impacts 2(2)

Expected impact listed for ICT-2013.5.1	Envisioned PRECIOUS impacts
<p>Develop a supportive environment to engineer awareness about healthy behaviors, offer personalized guidance and provide support to behavioral change</p>	<p>PRECIOUS supportive environment will be designed that also <b>fits the current living styles</b> where people are spending increasing times in <b>virtual worlds</b>. Development of Virtual Individual Model addresses important requirement for personalized guidance, with <b>goals and advice being adapted based on user-specific data</b> regarding their life-style.</p>
<p>Validated programmes and good practices for health promotion and disease prevention</p>	<p>Design PRECIOUS to make improvements following <b>current evidence-based guidelines</b> in chronic disease prevention.</p>
<p>Business ecosystem and new business models for promotion and co-production of health</p>	<p>Detailed analysis of the fundamental <b>value network</b> in the <b>preventive care sector</b> which includes all relevant stakeholders and their interactions and interdependencies.</p> <p>Present structure of the corresponding <b>business ecosystem</b> from a <b>comprehensive point of view</b> rather than based on individual products and services only.</p> <p>Analyze and adapting <b>commercially successful business models</b> from <b>gaming industry</b> to the e-Health sector.</p> <p>Strong focus on the <b>end user Quality of Experience</b> contributes to the success of the PRECIOUS system.</p>

**For more information, please visit:**  
**[www.thepreciousproject.eu](http://www.thepreciousproject.eu)**

**Contact:**  
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**email: [jose.costa@aalto.fi](mailto:jose.costa@aalto.fi)**