The PRECIOUS Platform for diet, lifestyle and behaviour changes

EUROFIR FOOD SYMPOSIUM 2017
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Outline

- Project overview
  – Objectives and Motivation
  – Approach
  – Consortium
- Selected highlights
  – Developed solutions
  – Field Trials

Project Details

- Title: **PREventive Care Infrastructure based On Ubiquitous Sensing**
- Acronym: **PRECIOUS**
- Funding: EC FP7 Programme
- Duration: 3 years (11/2013 to 10/2016)
- 8 partners from 6 different countries

Objectives

- PRECIOUS aims to **enhance preventive care**
    - Understand how **user motivation** is built up and maintained in preventive care
    - Integrate **intelligent model** of **user's behavior** into the PRECIOUS preventive care system
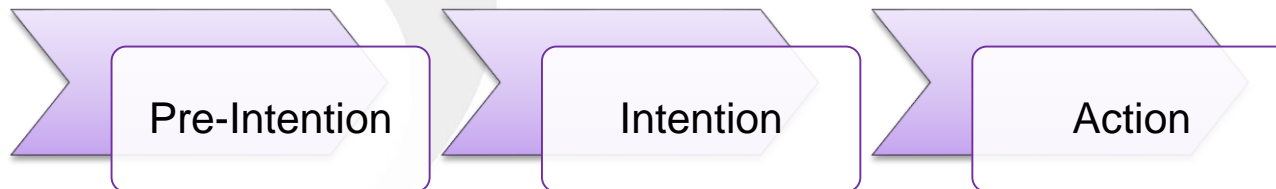   - Investigate **transparent and ubiquitous sensing** to support PRECIOUS usage scenarios

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Project Motivation 1(2)

- Proliferation of **behavioural intervention technologies** (BITs) such as, apps, wearables etc.

- Most apps lack solid framework guiding their design as BITs
    - Target mostly **action stage**

Three Stages of Behavioural Change

Pre-Intention	Intention	Action

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Project Motivation 2(2)

- Consequent shortcomings in term of:
  - Long-term motivation
  - Adherence to interventions
  - Sustained behaviour changes
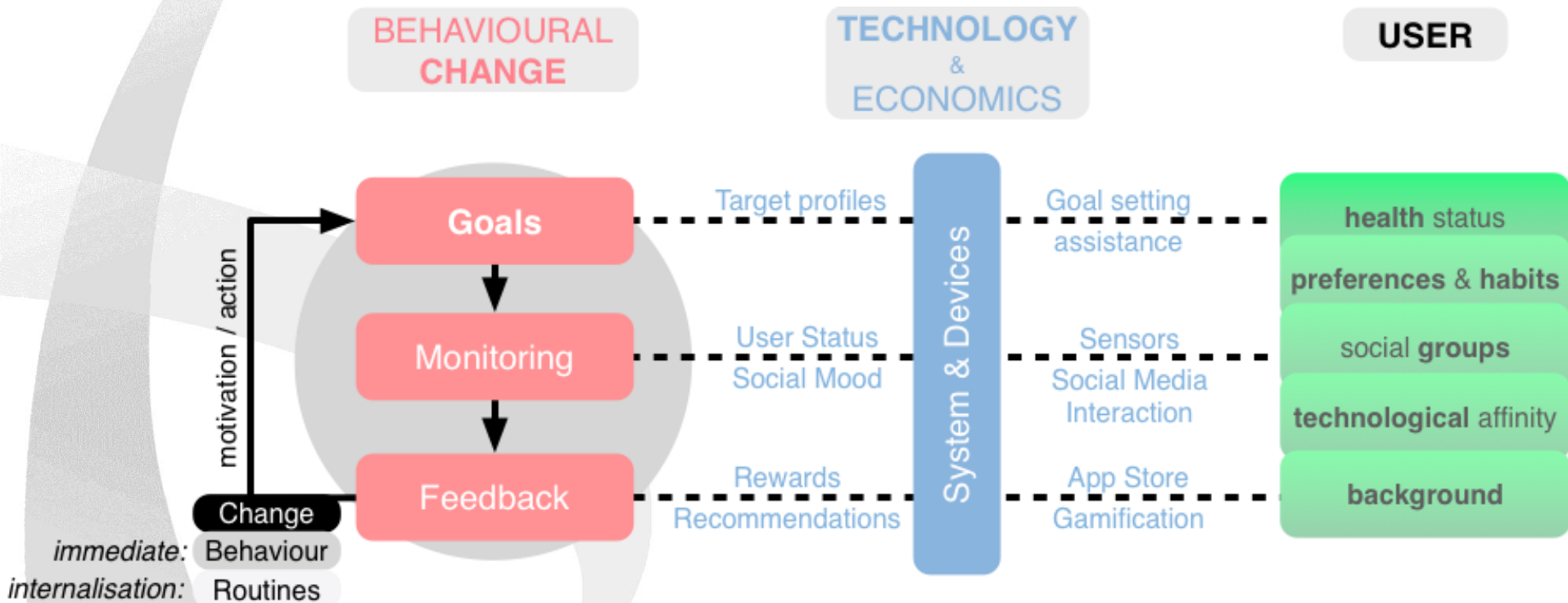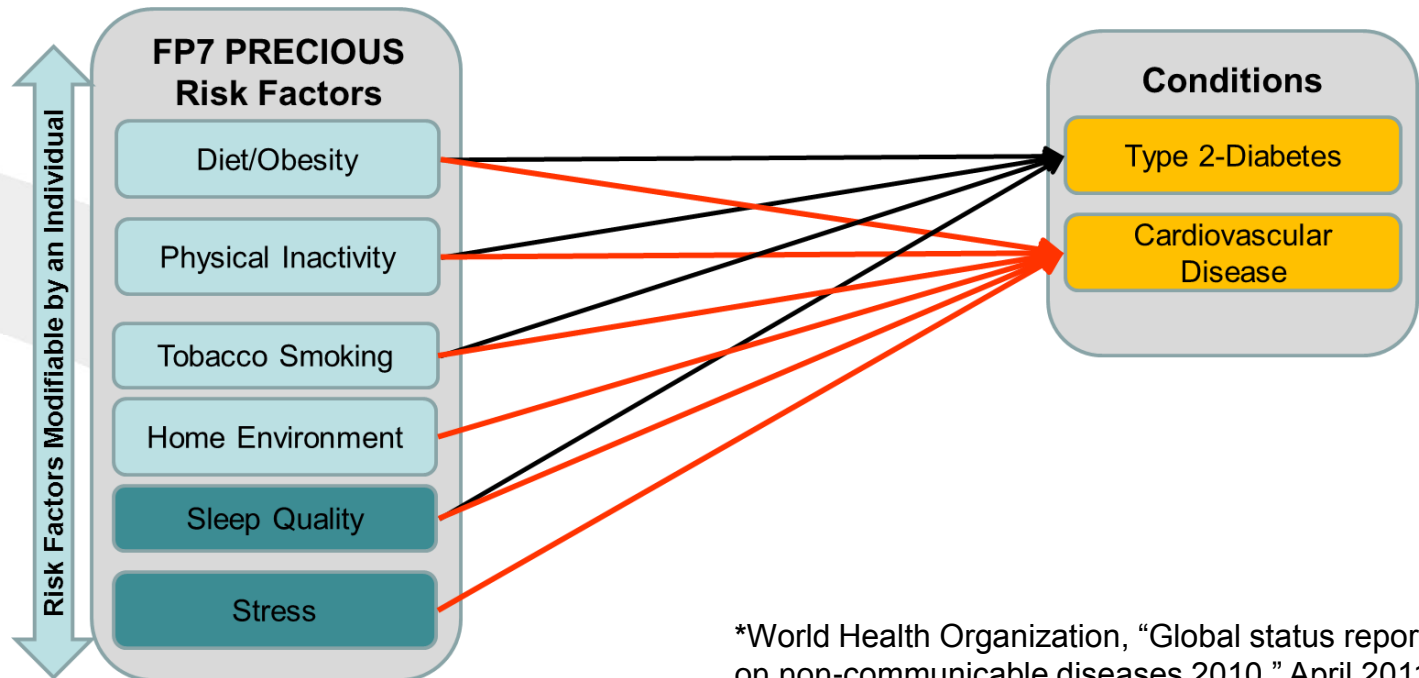
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PRECIOUS Approach 1(2)

- System to facilitate sustained motivation and internalisation of healthier behaviours over time
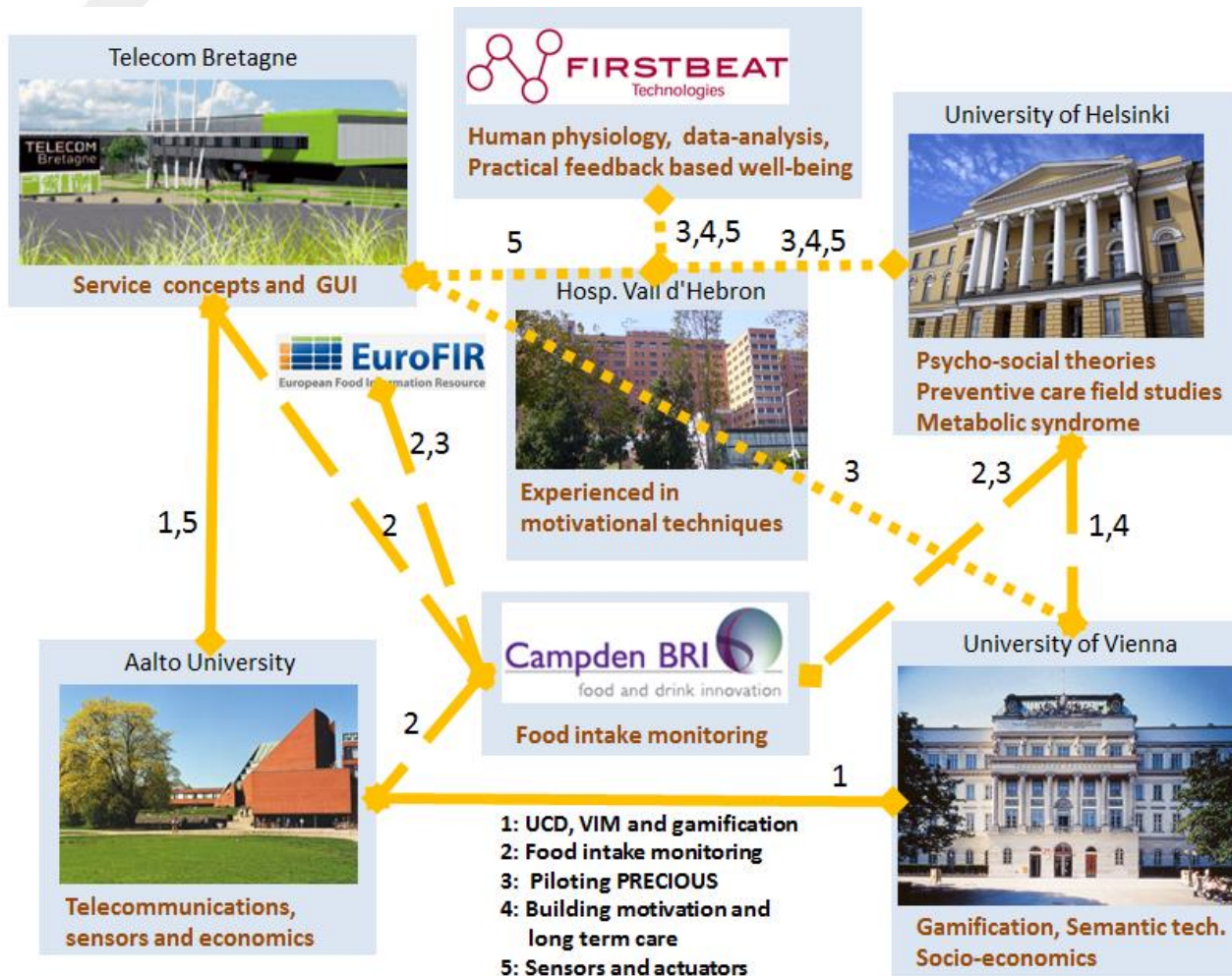
PRECIOUS Approach 2(2)

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

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Expertise and complementarities between PRECIOUS project partners

PRECIOUS System

END USERS

PRECIOUS CLOUD

FIELD EXPERTS

Wearable · Importance Ruler · Time Machine · What's next? · My favourites

Mobile app

Environmental sensors · Third-party sensors

VIM event trigger · Rules DB · Rules design server · Rules design in web-based service

Mobile client server · Third-party server · VIM DB · VIM access server · Evaluate, recommend
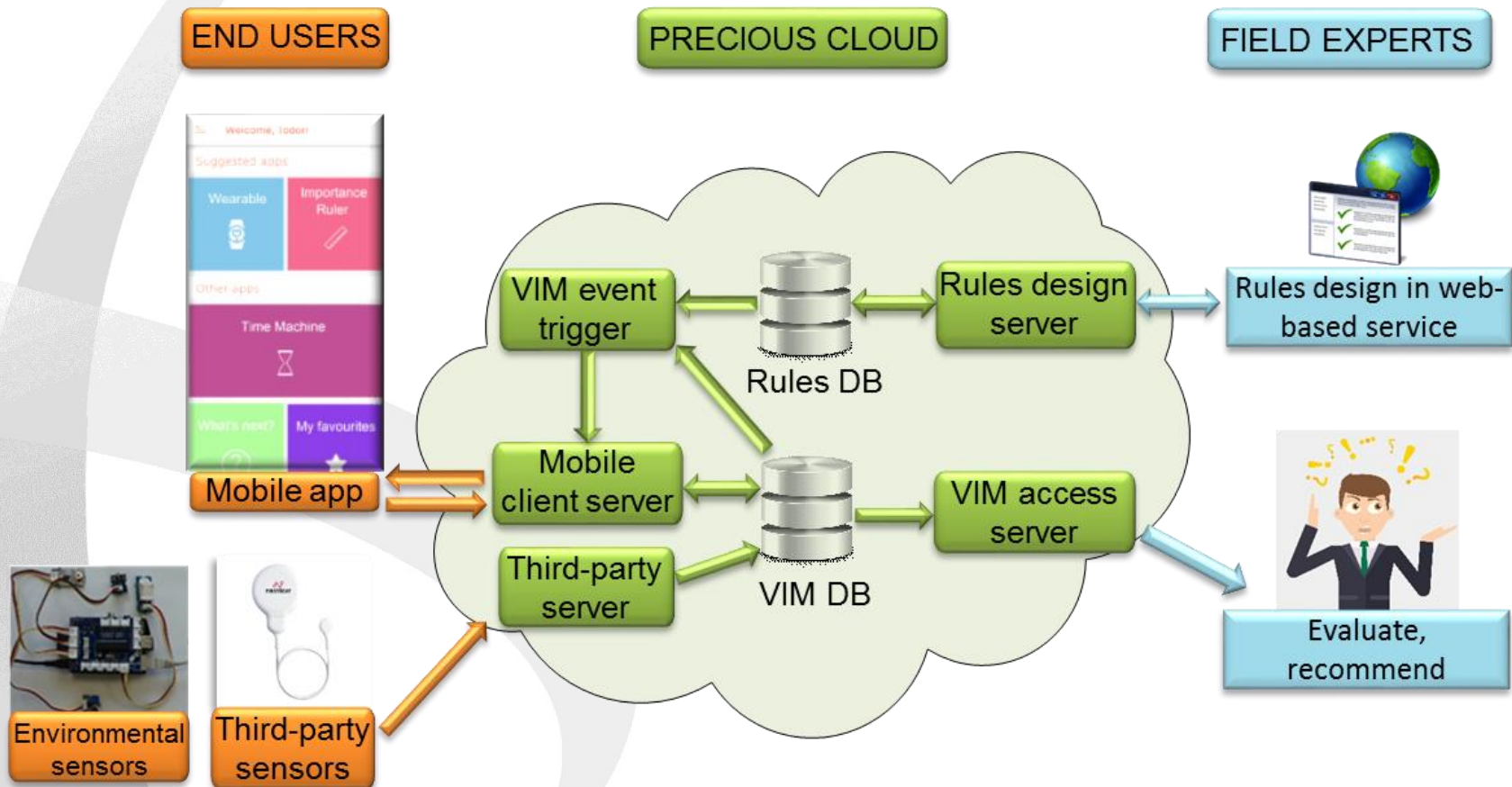
VIM: Virtual Individual Model

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# Selected Project Highlights (*Focusing on Food/Dietary aspects*)
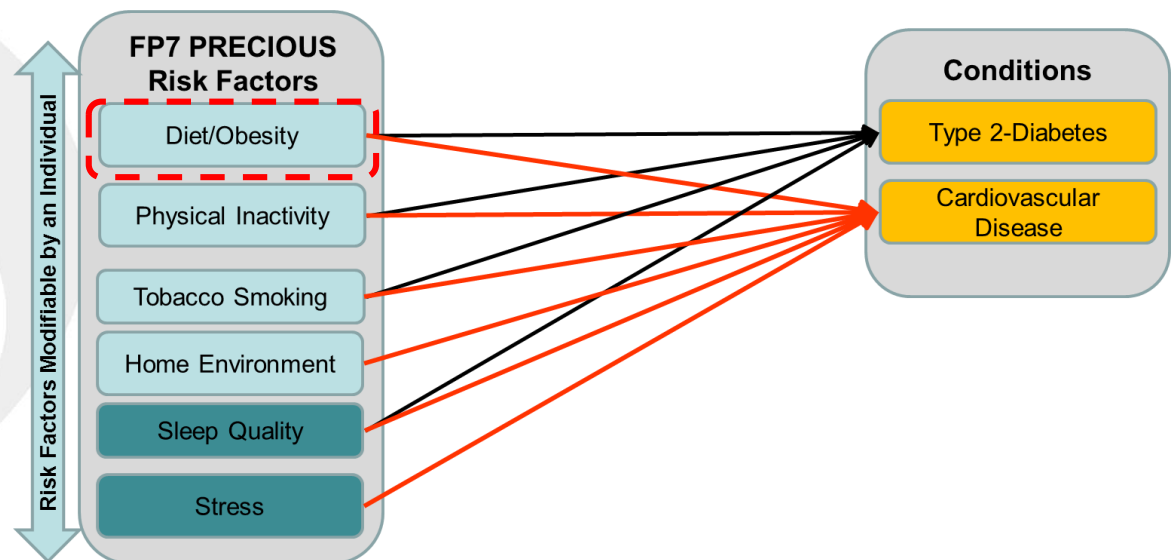
PRECIOUS Targets

- Investigate technologies for food intake monitoring

- Portable
  - On-the-go monitoring

- Connected
  - Real time sharing of retrieval of food information
  - Links with health/dietary professionals

- Fun/engaging
  - Games / graphics / competition / social

Developed Solutions 1(3)

- PRECIOUS app with food-related sub-apps

- PRECIOUS wearable device
  - Camera + accelerometer & gyroscope
  - Digital image processing to identify food type
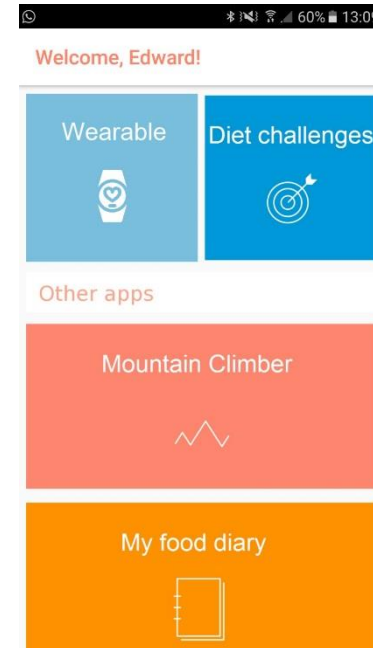
Developed Solutions 2(3)

- ## PRECIOUS food diary app
  - EuroFIR national Food Composition Datasets (Finland, UK, Spain)
  - UK Health Department colour coding scheme
  - EUFIC Guideline Daily Amounts (based on 2000 kcal daily intake)

Developed Solutions 3(3)

- ## PRECIOUS diet challenges app
  - Support start/stop dietary behaviours
  - For each challenge: *Set goals ➡ monitor progress ➡ reward achievement*
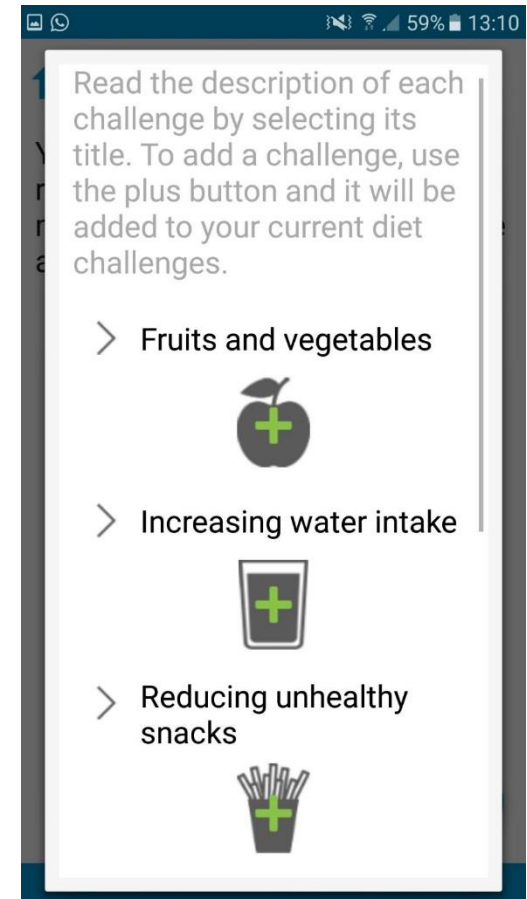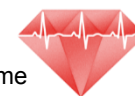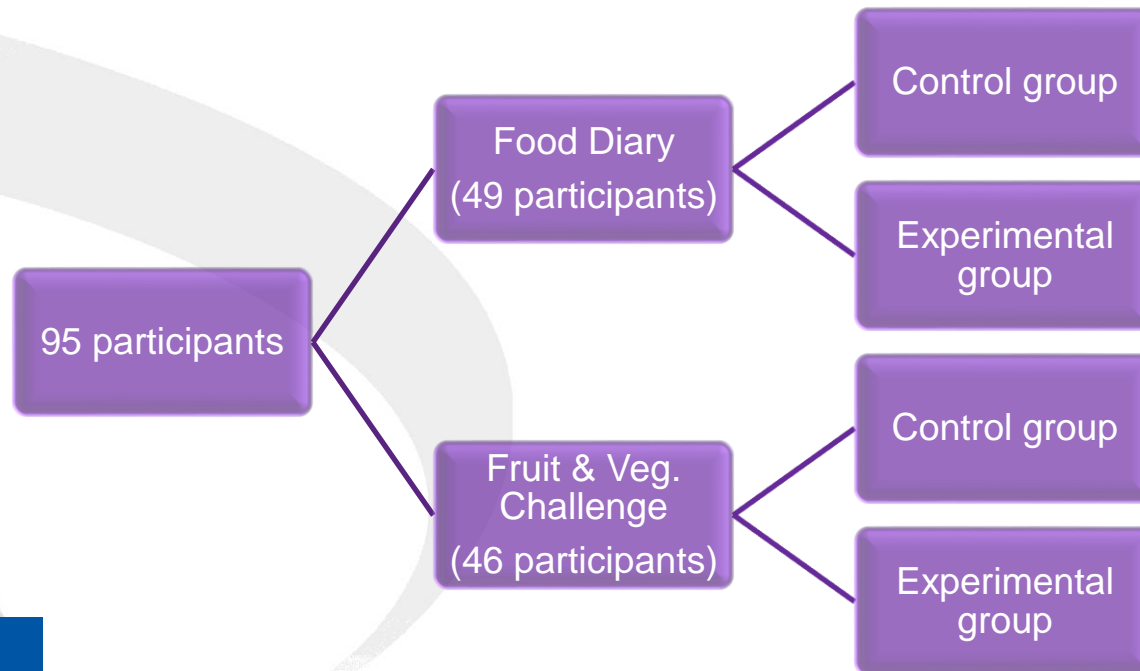
Field Trial 1(3)

- PRECIOUS intervention study on food intake (UK, summer 2016).
  - Aim: *Investigate whether motivational techniques could impact on user's usage of PRECIOUS system and perceived motivation in monitoring their food intake.*

Field Trial 2(3)

- **95 participants** (age range 26-60) completed trial over a **14-day period**
  - Control group (app motivational features OFF)
  - Experimental group (app motiviational features ON)

```
95 participants ─┬─ Food Diary          ─┬─ Control group
                 │   (49 participants)    └─ Experimental
                 │                            group
                 │
                 └─ Fruit & Veg.        ─┬─ Control group
                     Challenge           └─ Experimental
                     (46 participants)      group
```

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Field Trial 3(3)

- Intervention study findings:
  - …app increased interest, awareness and/or willingness to **improve what is consumed to some extent** amongst users even with app considered not user-friendly
  - …**motivational aspects had the ability to positively influence motivation** and food/drink intake logging behaviour

Word cloud for feedback from experimental group of food diary app intervention study

For more information, please visit:
www.thepreciousproject.eu

Thank you and acknowledgements to the PRECIOUS consortium

Support Slides

Food intake guidelines

Text	LOW	MEDIUM	HIGH	
Colour code	Green	Amber	Red	
Fat	≤ 3.0g/100g	> 3.0g to ≤ 17.5g/100g	> 17.5g/100g	> 21g/portion
Saturates	≤ 1.5g/100g	> 1.5g to ≤ 5.0g/100g	> 5.0g/100g	> 6.0g/portion
(Total) Sugars	≤ 5.0g/100g	> 5.0g and ≤ 22.5g /100g	> 22.5g/100g	> 27g/portion
Salt	≤ 0.3g/100g	> 0.3g to ≤ 1.5g/100g	>1.5g/100g	>1.8g/portion

UK Department of Health colour coding criteria for different macro nutrients in 100g of food

TABLE 1:
ADULT GDAS BASED ON A DAILY INTAKE OF 2000 KCAL (CALORIES)

	GDAs for adults
Energy	2000 kcal (Calories)
Total Fat	Not more than 70g
Saturated Fat	Not more than 20g
Carbohydrates	270g
Total Sugars	Not more than 90g
Protein	50g
Fibre	At least 25g
Sodium (Salt)	Not more than 2.4g (6g)

Example adult GDAs based on a daily intake of 2000 kcal

Each grilled burger (94g) contains

Energy 924 kJ 220 kcal	Fat 13g	Saturates 5.9g	Sugars 0.8g	Salt 0.7g
11%	19%	30%	<1%	12%

of an adult's reference intake
Typical values (as sold) per 100g: Energy 966kJ /230kcal
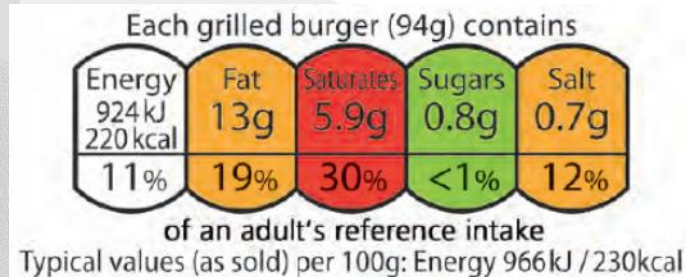
Example nutritional information display for a packet of 4 beef burgers sold raw

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Recent Developments

- Food composition scanners using **Infrared Spectroscopy** for sensing molecules

Changhong H2 Smartphone With SCiO Molecular Sensor Photo credit: Telegiz