The FrailSafe system

Konstantinos Deltouzos

FrailSafe Consortium

October 19th 2018
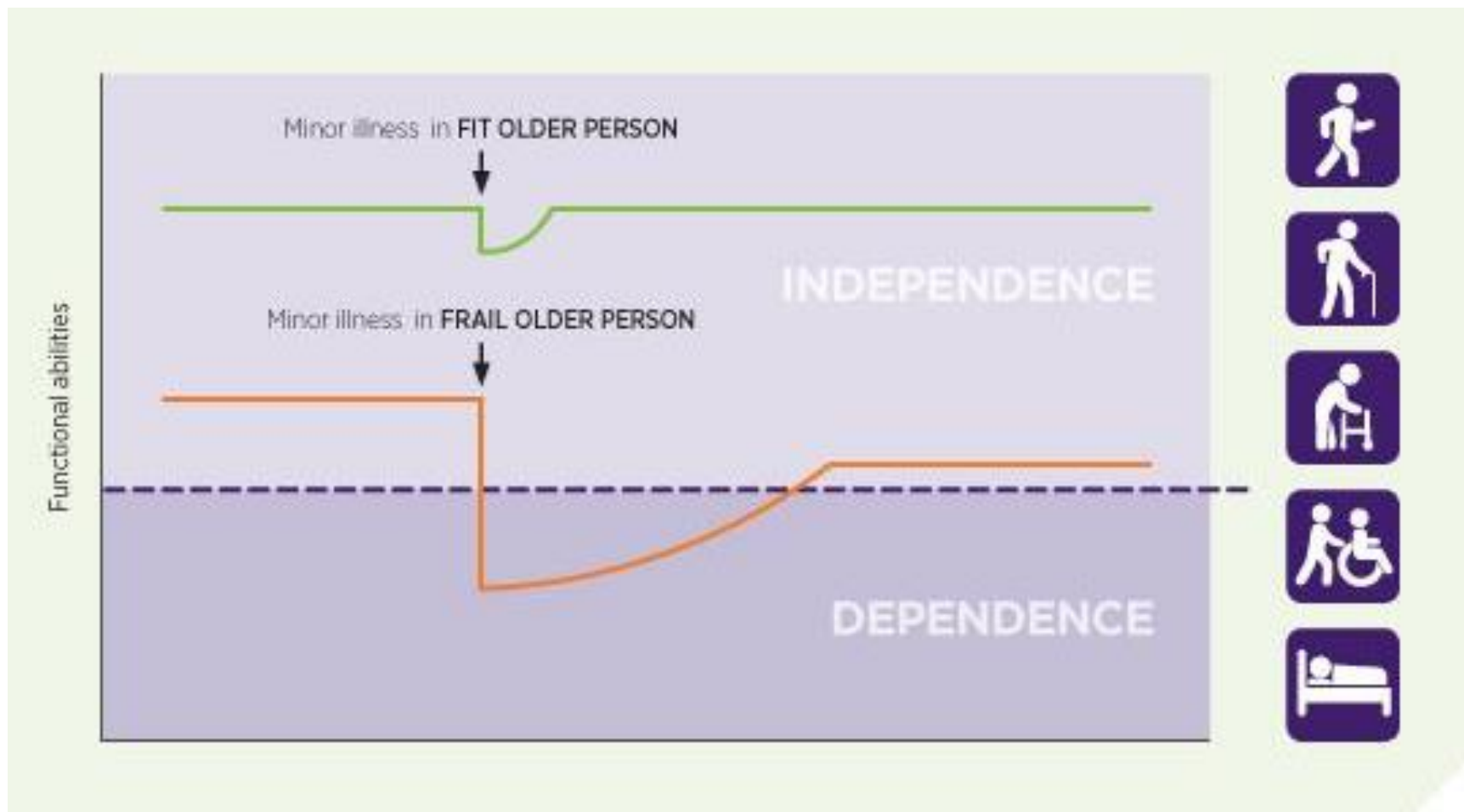
www.frailsafe-project.eu

What frailty is?

- Frailty is not a disease

- Frailty is loss of physiological reserve

- Frailty makes individuals vulnerable to stressors

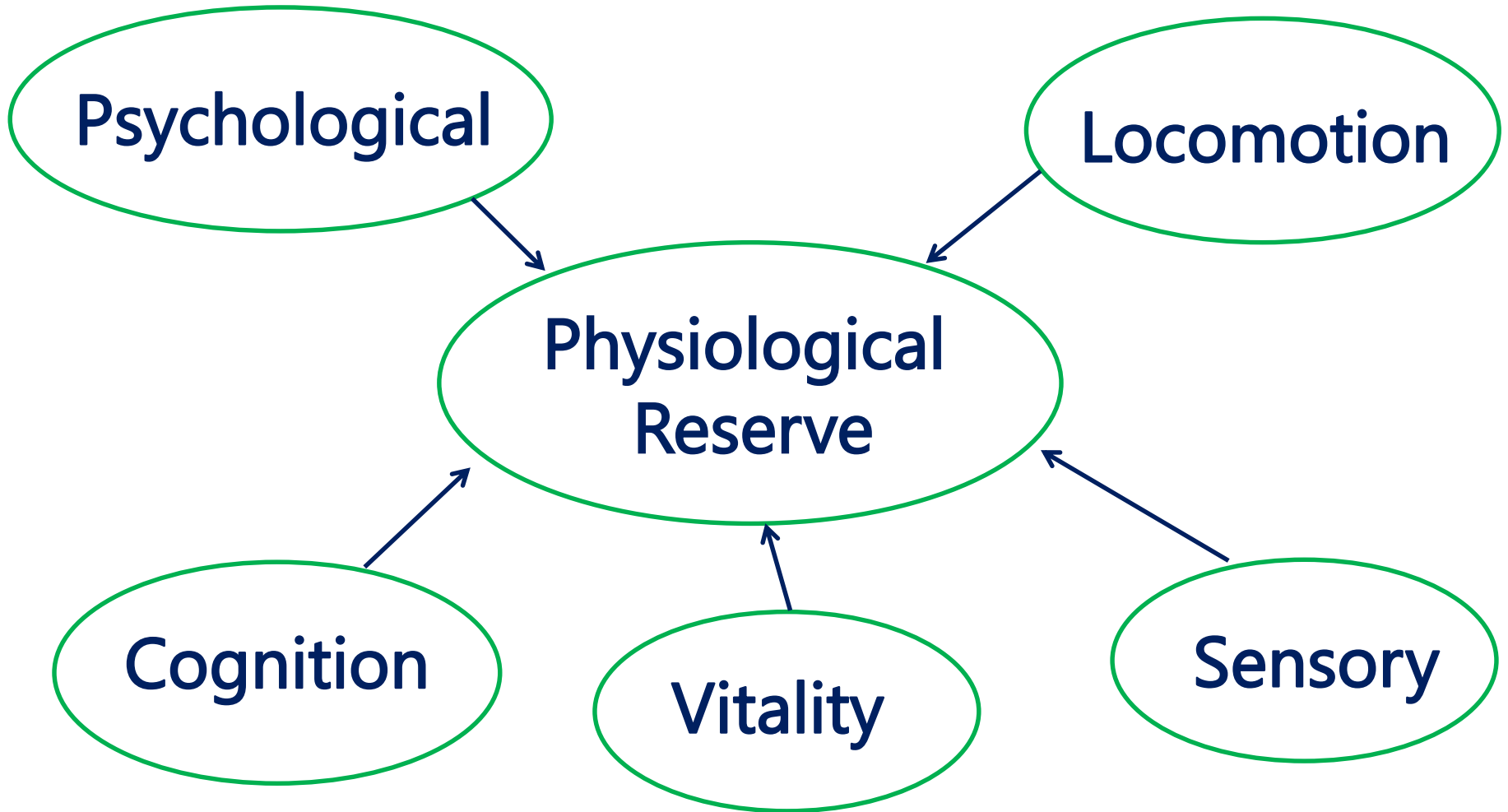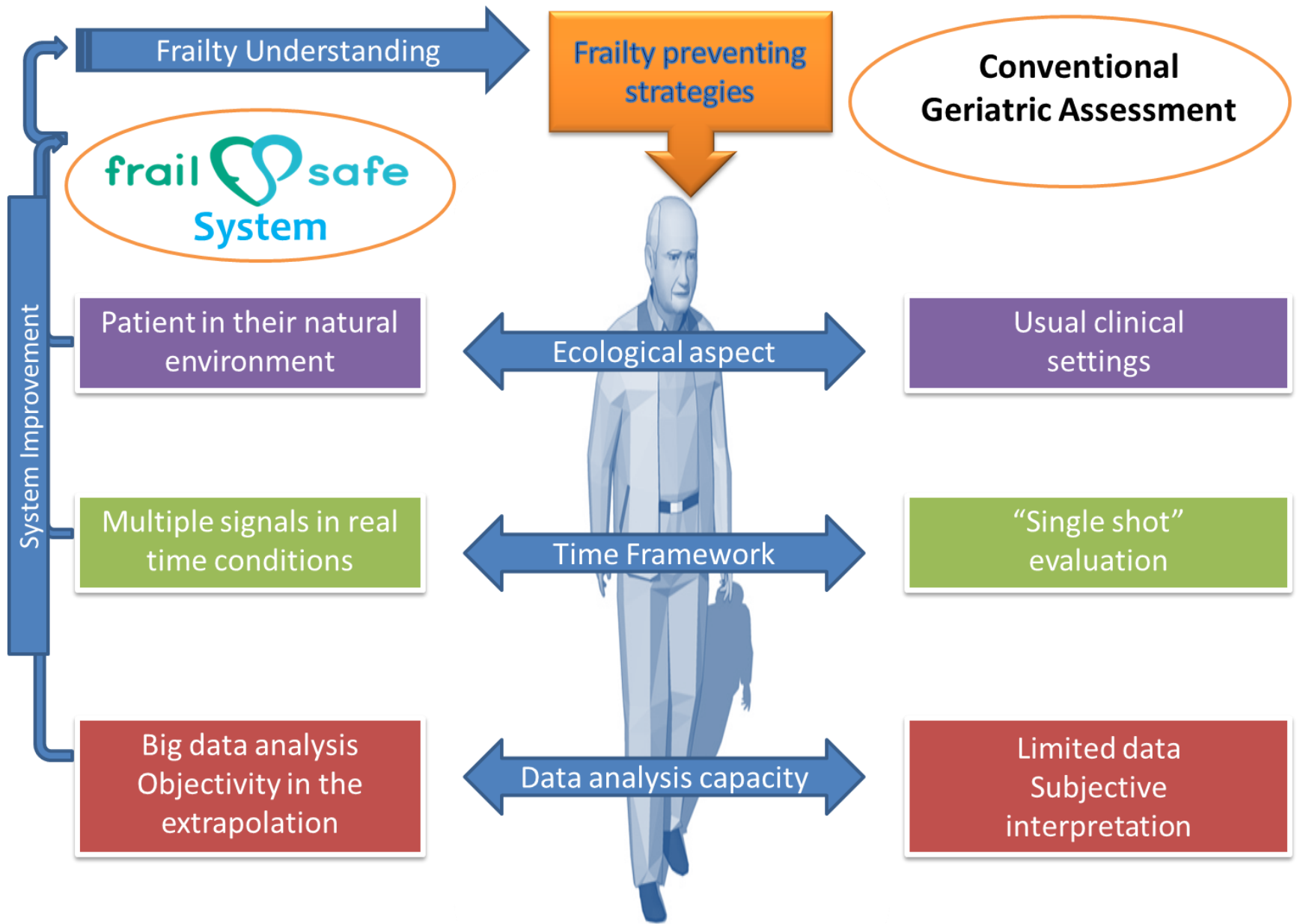Frail older people display low resilience to minor stressors (e.g. urinary tract infection)

Clegg et.al, Lancet 2013

www.frailsafe-project.eu

What frailty is:

- Common 25-50% of people over 80yrs

- Progressive

- Episodic deteriorations

- Impact to quality of life

- Expensive

- Preventable components

Components of frailty

Psychological

Locomotion

Physiological Reserve

Cognition

Vitality

Sensory

Frailty Understanding

Frailty preventing strategies

Conventional Geriatric Assessment

frail safe System

System Improvement

frailSafe System		Conventional Geriatric Assessment
Patient in their natural environment	Ecological aspect	Usual clinical settings
Multiple signals in real time conditions	Time Framework	"Single shot" evaluation
Big data analysis Objectivity in the extrapolation	Data analysis capacity	Limited data Subjective interpretation

www.frailsafe-project.eu

Measurable parameters and units of measurement

Smart garment with 9 DoF IMUs (Smartex) ⟶ Heart rate, respiration rate, posture and activity, steps/minute, falls, instability

Blood pressure monitor ⟶ Blood pressure

Mobil-o-graph ⟶ Arterial stiffness

Dynamometer ⟶ Grip strength

Impedance scale ⟶ Body Weight / Body Mass Index

Questionnaires ⟶ Nutrition, Social Interaction, Cognitive state

Medical record ⟶ Co-morbidities

AR Serious Game ⟶ Cognitive state and Behaviour, Physiological state, Motor state

Smartphone/Tablet ⟶ Indoor/Outdoor activities, Physiological state, Motor state, Social Interaction

Smart Garment

- Continuous monitoring of **ECG/Heart Rate** and **Breathing Rate**

- Collect data used to identify **movement** (Sitting, standing, lying, walking, climbing stairs)

- Why it is **important**

  - Update **clinical profile** of the older person and check for **irregularities** in heart rate and breathing rate

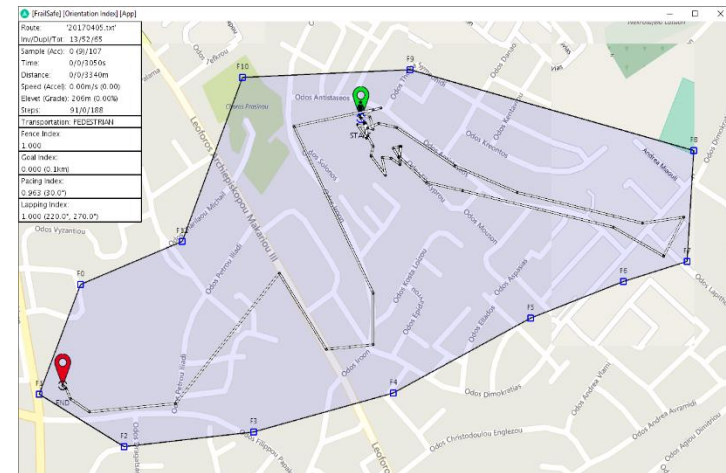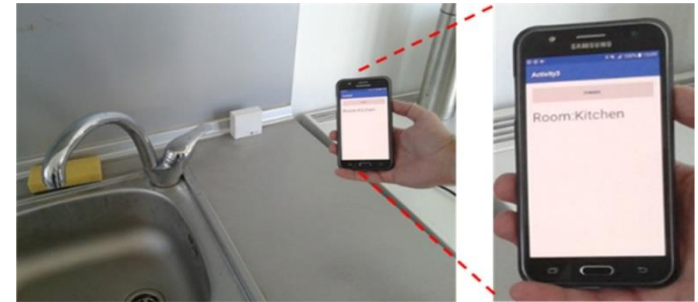 - Identification of **dangerous states/events** (fall, loss of balance)
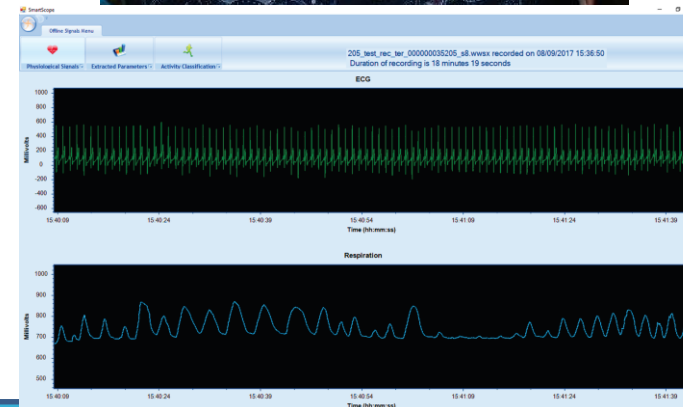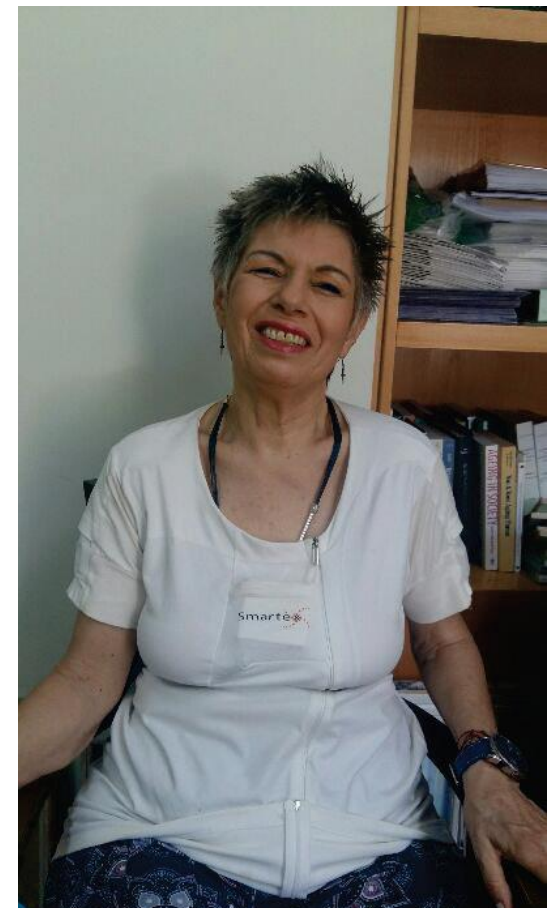
Smart Garment

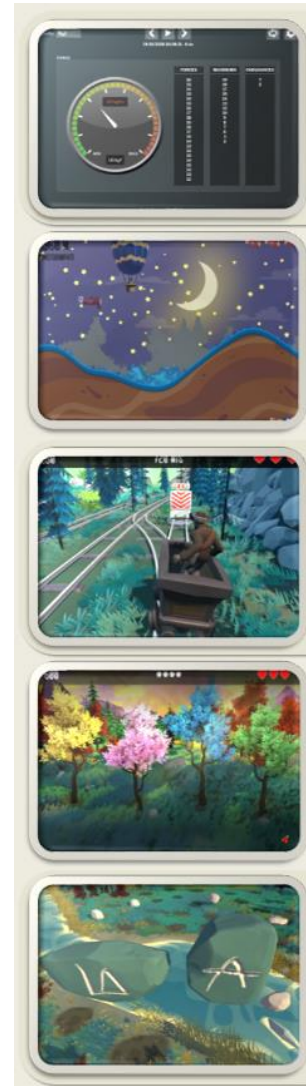- Fall Detection smartphone app

Indoor & Outdoor monitoring

- Indoor and outdoor monitoring systems (smartphone/beacons)

- Why it is important

  - Understanding of behavior and lifestyle

  - Identification of dangerous states/events (loss of orientation)

FrailSafe Games

- Collect cognitive (memory, concentration etc) and physiological (strength, endurance, balance etc) data

- Why it is important
  - Allows us to collect data about the older person in an unobtrusive way
  - Apply personalized interventions for older persons in order to train their skills at home and reinforce their intrinsic capacities (i.e. play the "Simon" game to train your memory)

FrailSafe Conceptual Philosophy

BiG DATA

Monitors
Designs Interventions
(adjustment of
drugs/drug dosage,
lifestyle
recommendations)

Older Person

Guidelines

Virtual Patient Model (VPM)

Clinician
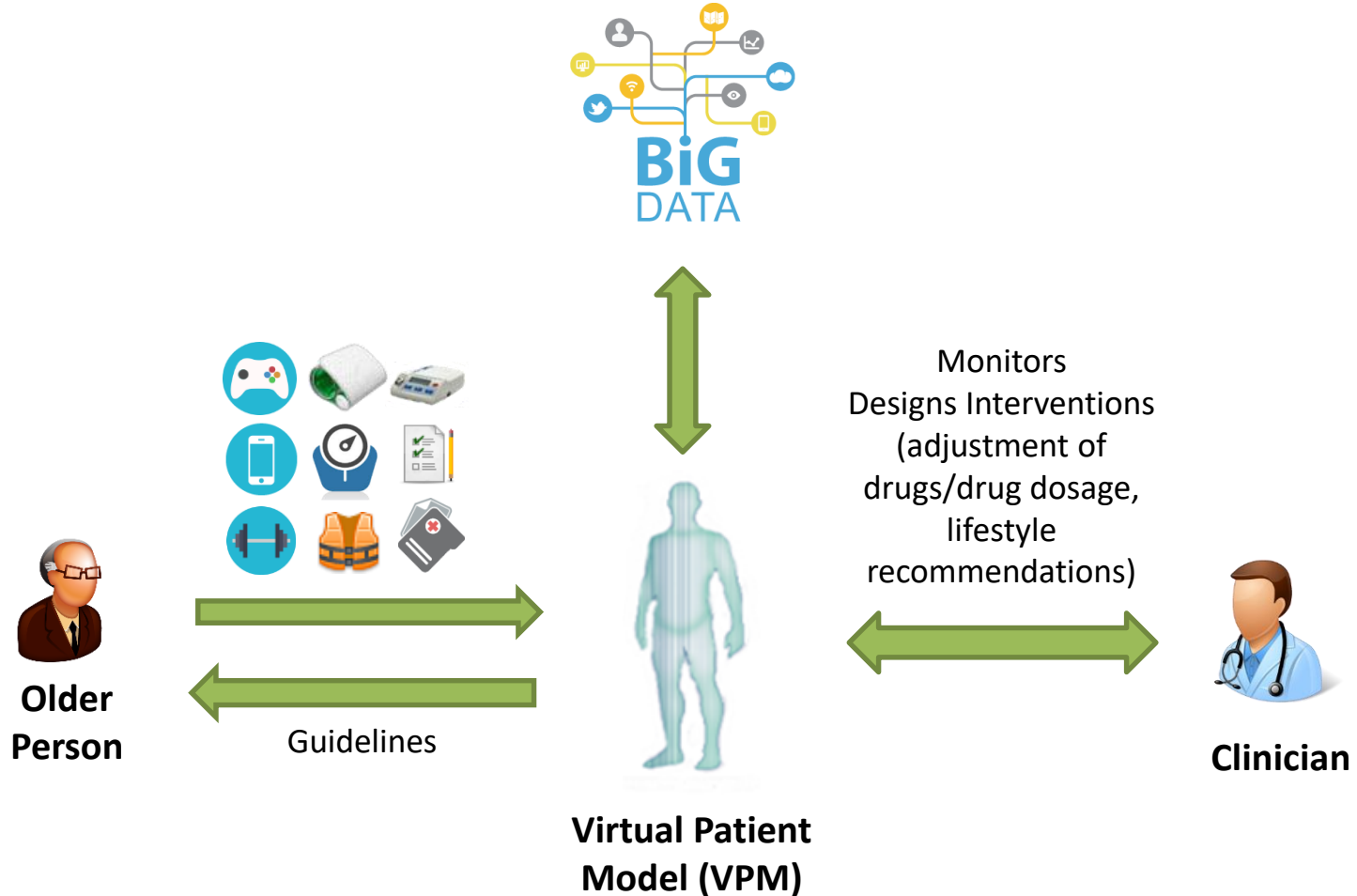
DASHBOARD

Dashboard

- What it does

  - Older person dashboard

    - Clinical state (physical, cognitive, social etc)

    - Alerts and interventions

- Why it is important

  - Visualization of alerts and proposed interventions

  - Personalization of settings

  - Clinicians / researchers can use the summaries of profiles of older people for monitoring and analysis

DASHBOARD

frail safe

- For older people and their families

Dashboard
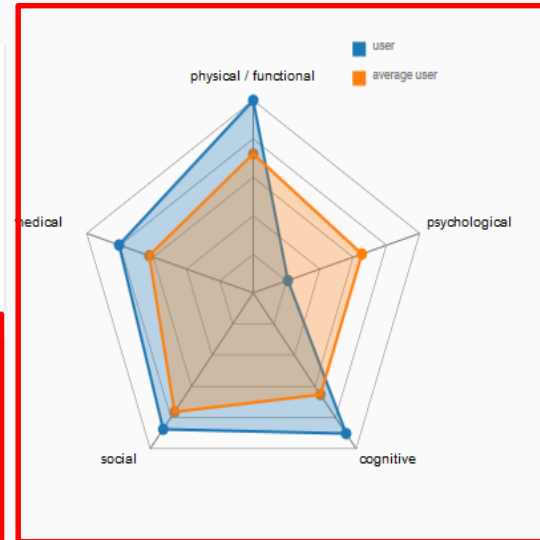
DASHBOARD

- For older people and their families
  - Recommendations

Dashboard

To increase your cognitive level in an entertaining way, playing FrailSafe's "Memory", "Simon", "Supermarket" or "Reflex" games frequently is recommended.

DASHBOARD

- For clinicians / medical professionals

Check individual older person's dashboard

Dashboard
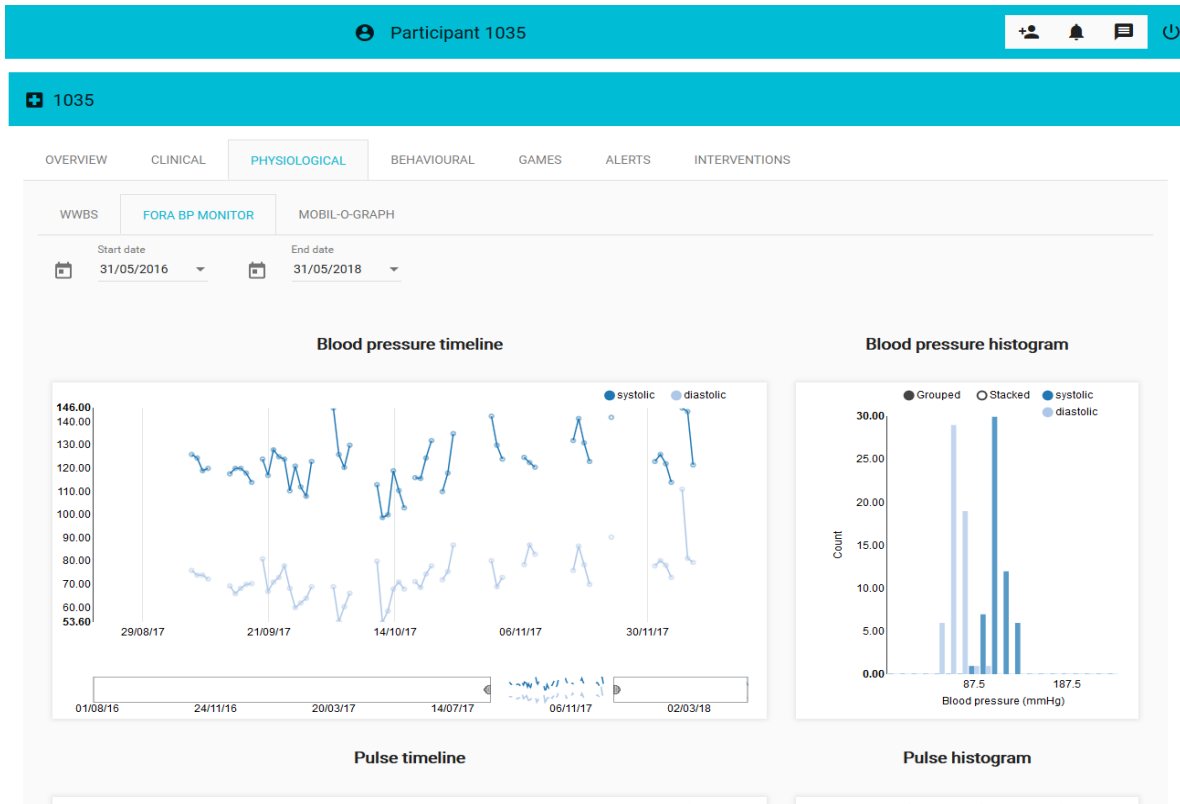
DASHBOARD

- For clinicians / medical professionals

Collective view of older people data

Dashboard
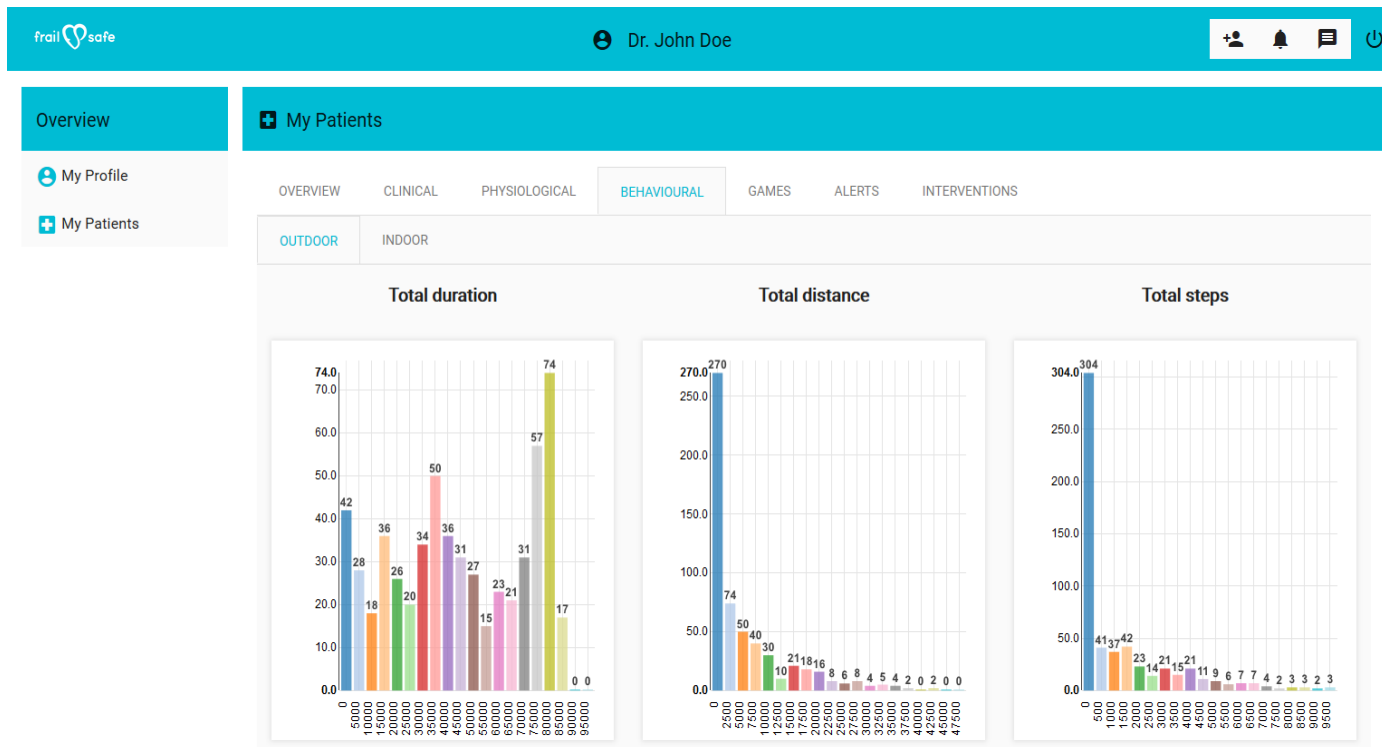
DASHBOARD

- For clinicians / medical professionals

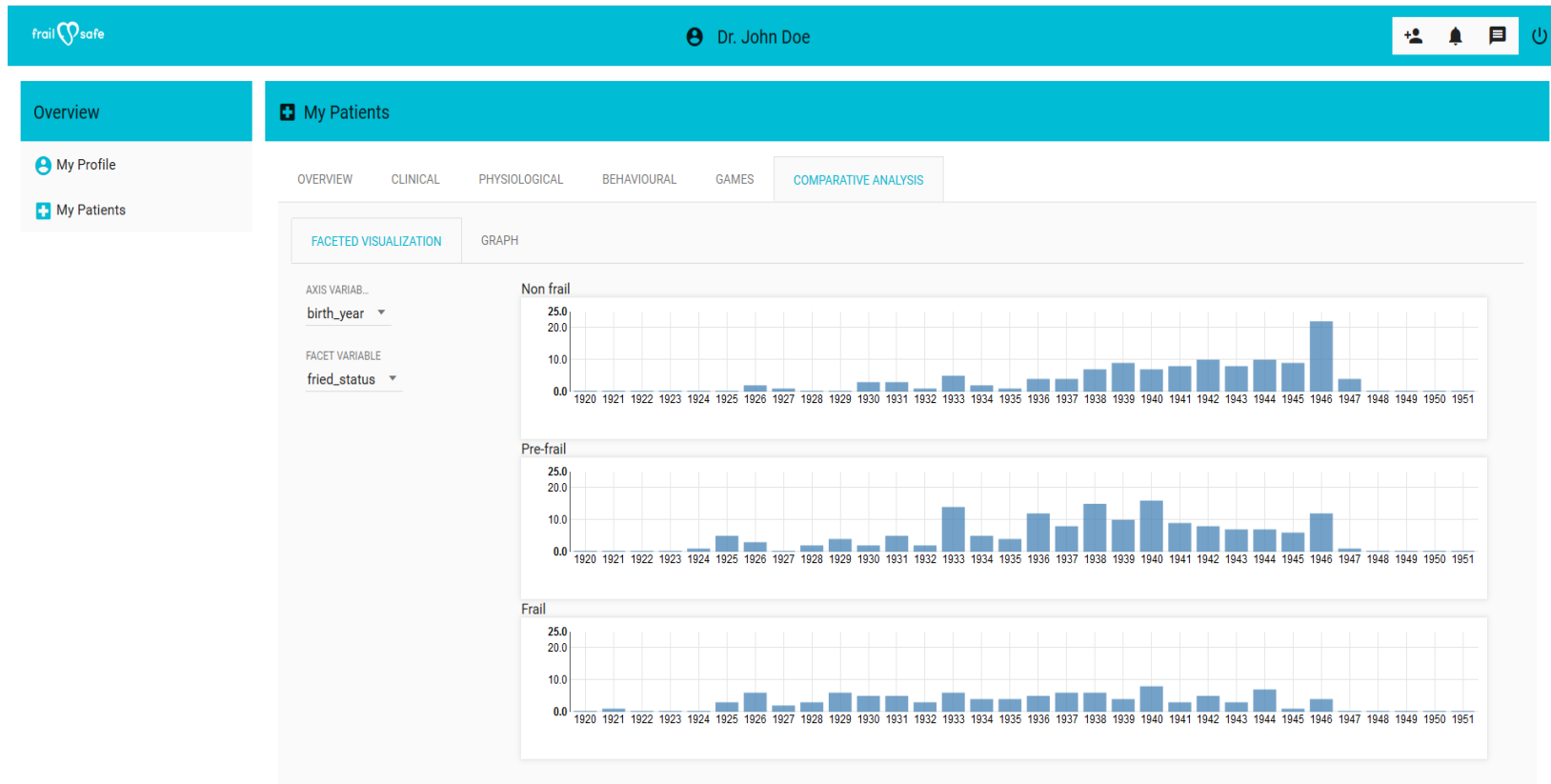Panel for alerts (and customization) and rules for interventions

Dashboard

DASHBOARD

- For researchers

Group Analysis

Dashboard

DASHBOARD

- For researchers

Correlation graphs

Dashboard
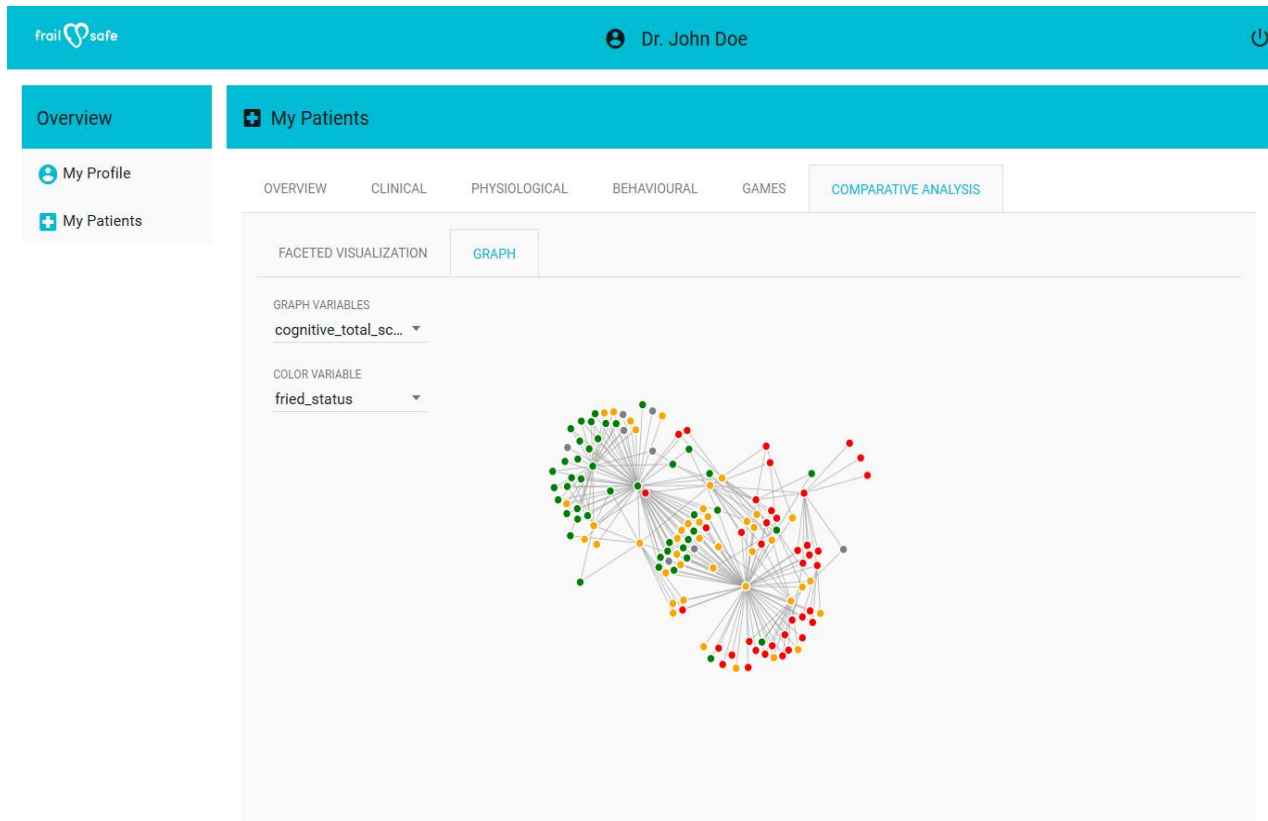
Thank you
for your attention!

www.frailsafe-project.eu