



CHERRIES
RESPONSIBLE HEALTHCARE ECOSYSTEMS

PROGRESS challenge

Murcia, March 24th 2021





CHERRIES

RESPONSIBLE HEALTHCARE ECOSYSTEMS



Presentación:



Esther Peñalver

Directora CEEIM



CENTRO EUROPEO DE
EMPRESAS E INNOVACIÓN
DE MURCIA

CHERRIES Murcia

Reto PROGRESS

Nuestros INVITADOS



Myriam Conesa
EMACC



José Antonio Pérez Vicente
JS Neurología
H. Cartagena



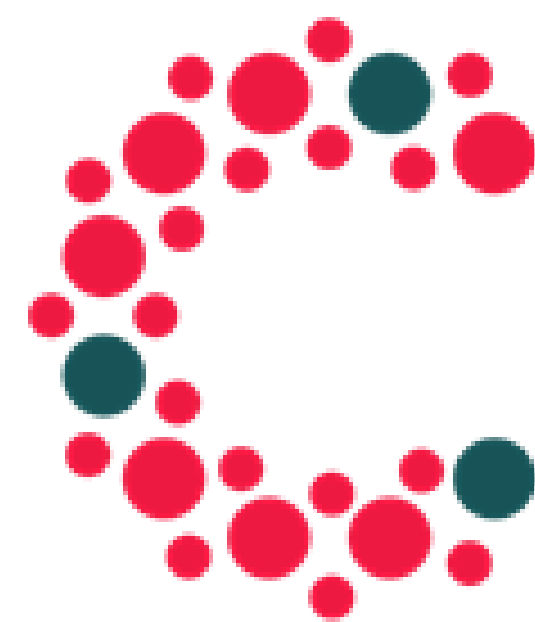
Joaquín Roca
Ingeniería Biomédica



Gorka Sánchez
SMS Innovación



Distancia entre industria y usuario



CHERRIES
RESPONSIBLE HEALTHCARE ECOSYSTEMS

“You've got to start with the
CUSTOMER EXPERIENCE and
work back toward the technology.”

- Steve Jobs





CHERRIES Murcia | Open Call for Solutions

Early detection of progression in Multiple Sclerosis

PROGRESS

Submit your solution by 15 April 2021



This project has received funding from the European Union's Horizon 2020 research and innovation programme under GA no 872873.



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PROGRESS challenge (Murcia, Spain)



- The **objective** of the challenge is to achieve the **early detection of the progression in Multiple Sclerosis (MS)** applying sensors to patients using the Internet of Things (IoT) beyond the **current face to face consultations** with neurologists and nurses every 6 or 12 months.
- The **need** is to **shorten the delay of detection** of MS progressions, which is estimated in 3 years.

PROGRESS challenge (Murcia, Spain)



The **methodology** of the challenge is a **prospective study** with at least **30 patients during 5 months**.

The **challenge team** is composed by:

- ☐ Local association of **patients** of MS (EMACC)
- ☐ Department of **Neurology** (Hospital of Cartagena)
- ☐ Department of **Biomedical Engineering** (Polytechnic University of Cartagena)

PROGRESS challenge (Murcia, Spain)



Development and validation of a solution for the collection, analysis and monitoring of the **daily activity** of patients with Multiple Sclerosis.

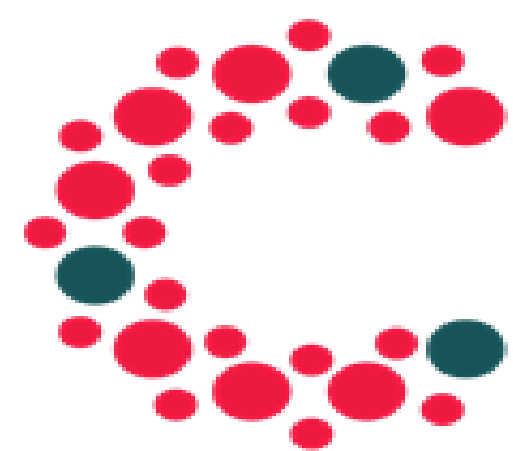
- MS prevalence is **1 per 1000** inhabitants.
- MS is the **main cause of neurological disability in young** adults.
- MS progress **slowly with undetected signs** in visits every 6 months.
- Patients and neurologists need a **faster and more sensitive** way to detect MS progression

PROGRESS objectives (Murcia, Spain)



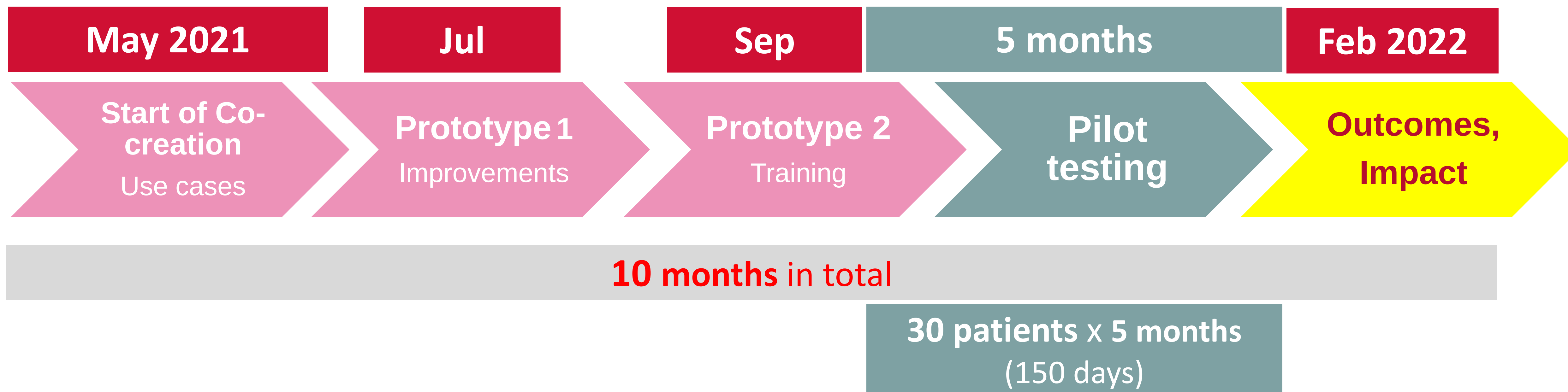
To create and validate a more agile, comfortable and sensitive solution for the detection of progression in MS based on the **daily recording of gait disturbances, manual dexterity and cognitive assessment.**

- Detection of possible **outbreaks** of MS
- Detection of treatable **symptoms**
- Detection of **progressive** deterioration
- Improved **quality of life**
- **Less trips** to the hospital and more specific consultations.
- Decrease in the incidence of **disability**



Co-creation timeline

(May 2021 – Feb 2022)



The solution will have to **record** the data of the 30 patients **continuously and simultaneously** during the 150 days



PROGRESS

VALORACIÓN NEUROLÓGICA - FASE PILOTO

- ✓ Pacientes con EMrr de 18 a 55 años de edad
- ✓ EDSS menor de 4
- ✓ Menos de 10 años de evolución de la enfermedad
- ✓ Sin brote al menos desde un mes previo
- ✓ Sin discapacidad diferente a la EM que afecte a la marcha

Valoración Inicial:

- Test 25F
- Marcha 2min
- EDSS
- MusQol
- M-FIS
- Beck Depresión
- Hamilton ansiedad
- BICAMS
- BRB Rao

Monitorización de la marcha, los tipos de desplazamientos y la actividad manual por dispositivo sensor escogido

OCT

NOV

DIC

EN

FEB

Valoración Final:

- Test 25F
- Marcha 2min
- EDSS
- MusQol
- M-FIS
- Beck Depresión
- Hamilton ansiedad
- BICAMS
- BRB Rao

- M-FIS
- Beck Depresión
- Hamilton Ansiedad



What about the requirements?



The InDemand project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under Grant Agreement No763735

PROGRESS compulsory requirements



- Automated patient data recording **service**:

Delivery, training, repair, replacement, collection, maintenance and support of the devices, ensuring their availability.

Components:

- ✓ DIGITAL ACTIGRAPH
- ✓ DOMESTIC GATEWAY
- ✓ CLOUD APPLICATION
- ✓ CLOUD STORAGE
- ✓ INFORMATION ACCESS AND **VIEWING MODULES**
(clinical, therapeutic, patients)
- ✓ **MANAGEMENT AND MAINTENANCE MODULE:**



*What are we **NOT** asking for ?*



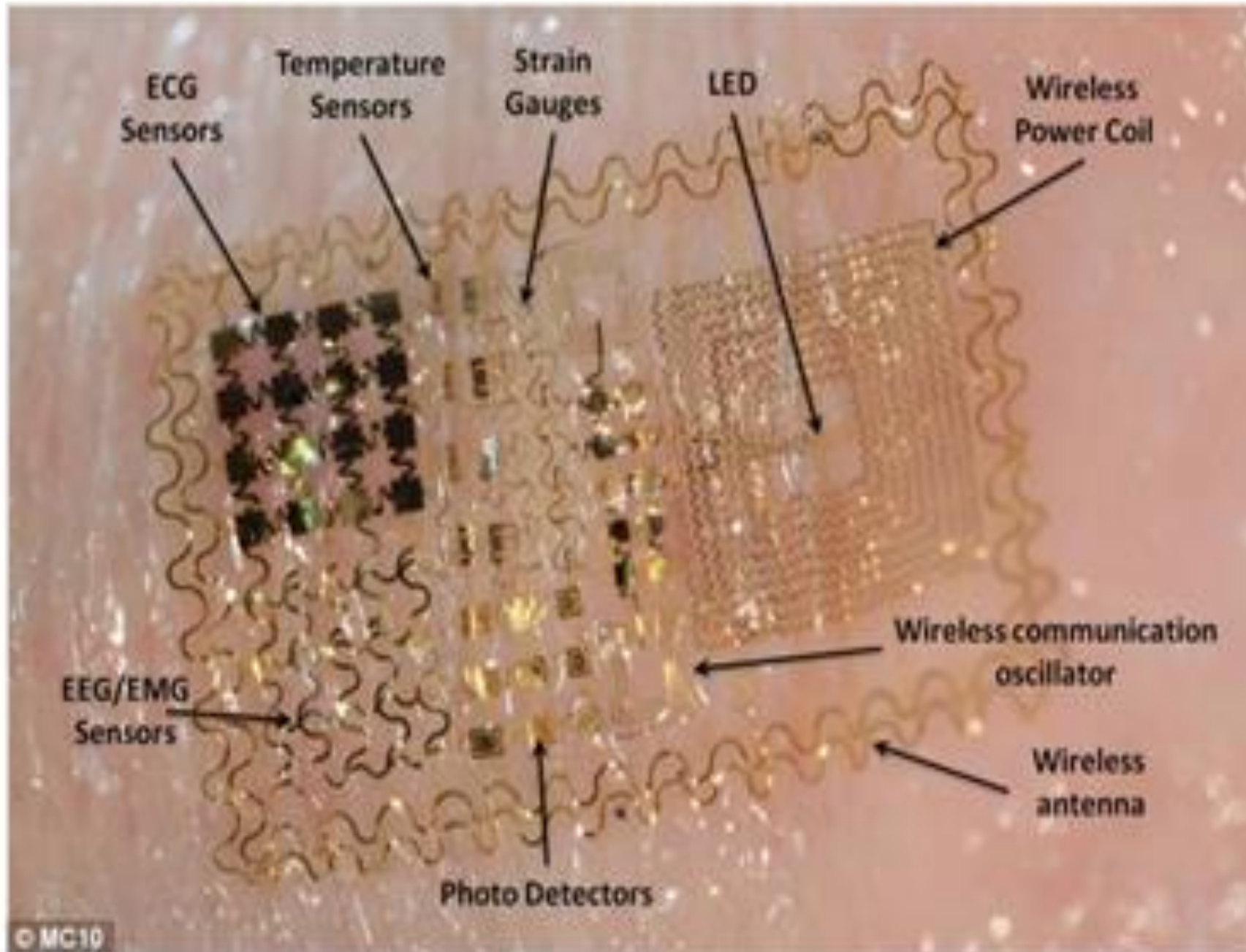
The Bionic Man

National Institute of Biomedical Imaging and Bioengineering
National Institutes of Health, 2014

Michael Snyder (foto de Steve Fisch)
Mirror, mirror on the wall, what organs age fastest of them all?
Nathalie Gerassimov,
ASBMB Today Vol. 20 / No. 1 / January 2021 pp.12-13
American Society for Biochemistry and Molecular Biology.



We are not talking about rocket science ... oh, Wait!



Epidermal electronics

Kim DH, Lu N, Ma R, et al. *Science*. 2011;333(6044):838-843
doi:10.1126/science.1206157



BioStamp nPoint

Fda 510(k) Cleared Class II Medical Device
MC10
Lexington, MA

Dedicated vs Common-Off-The-Shelf devices



Empatica E4
Boston, MA 02108
2019

Empatica EmbracePlus
Translational Research Institute for Space Health (TRISH)
NASA's Human Research Program (HRP)
Boston, MA 02108
2019



Withings Move ECG
2020

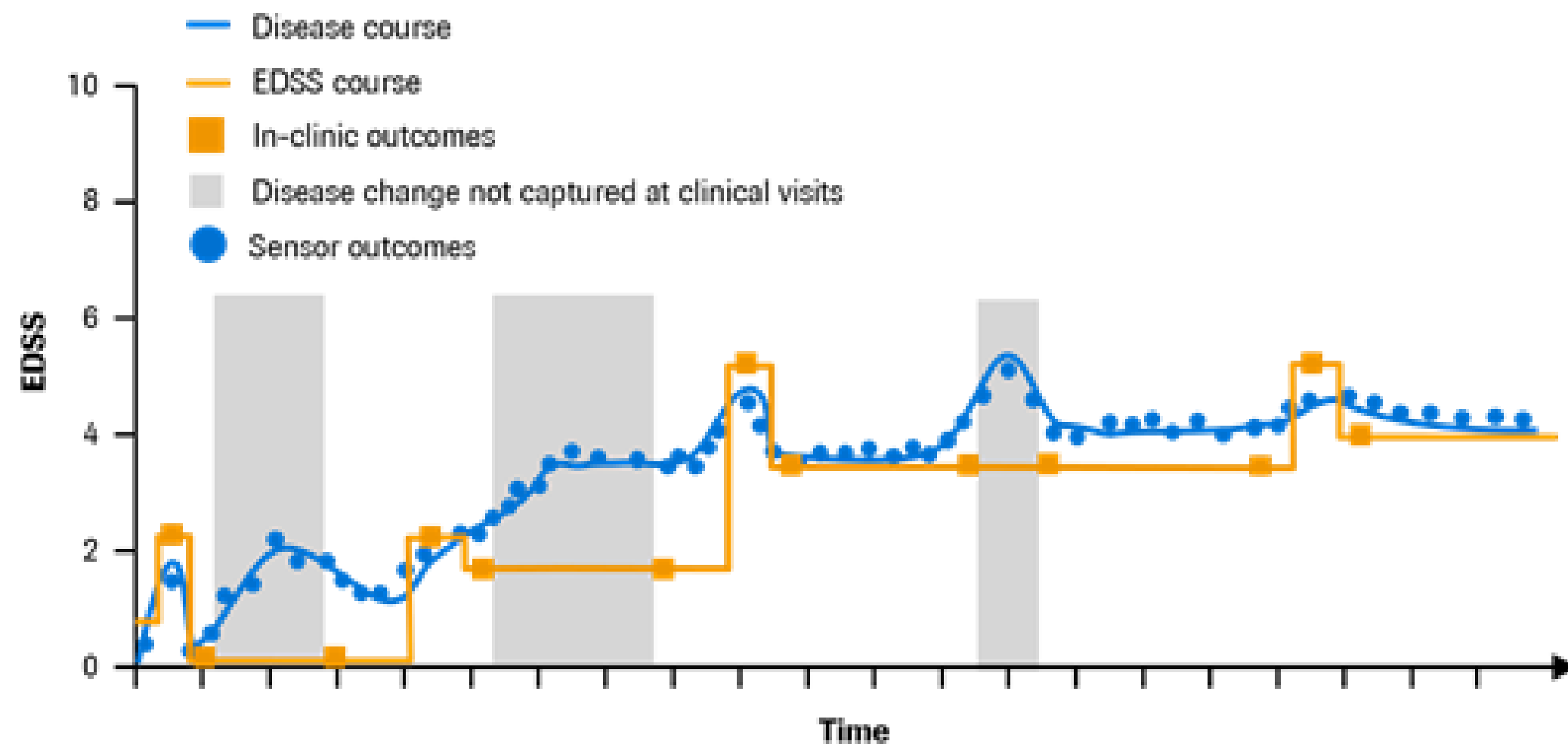
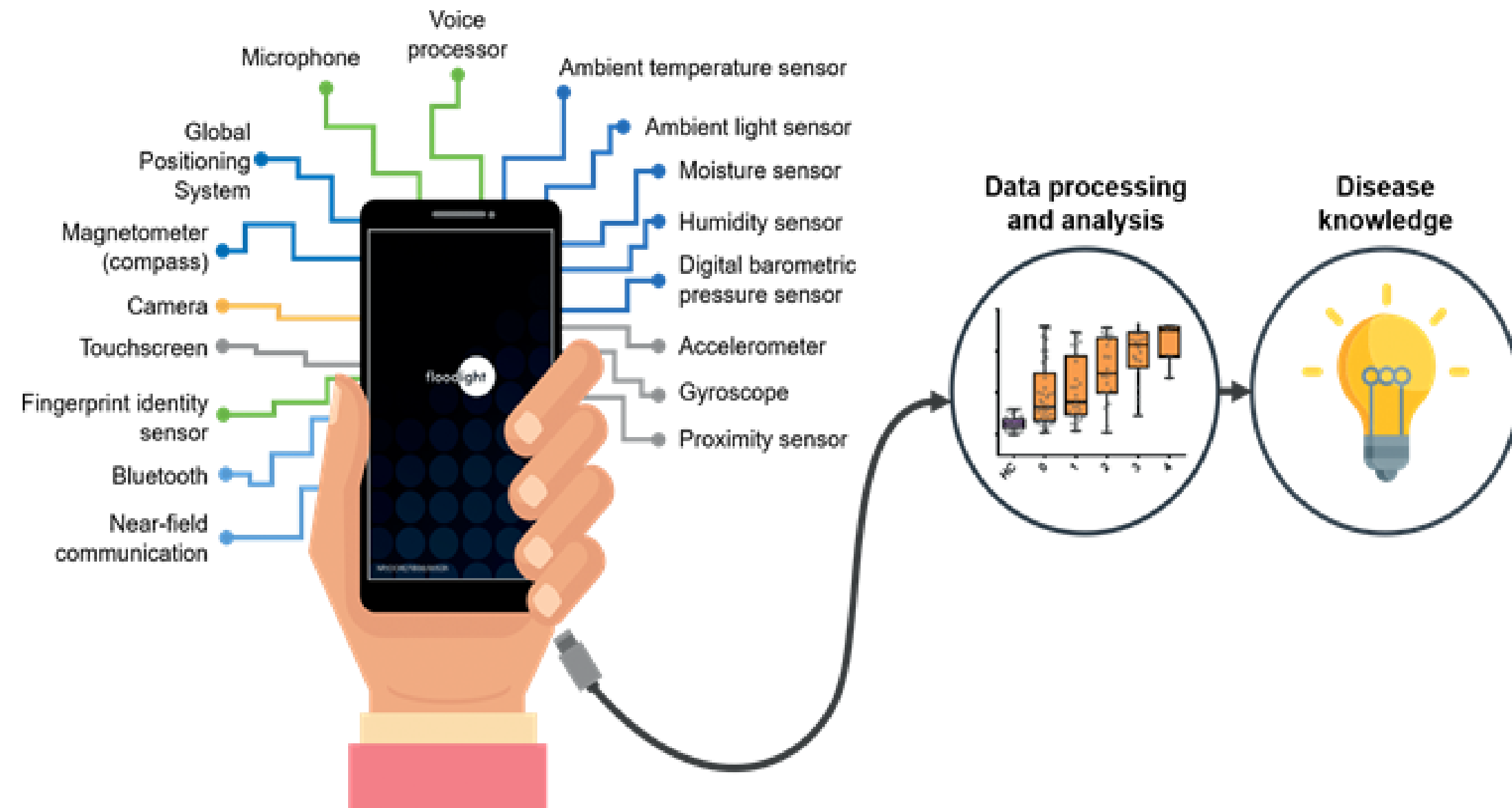


Fitbit Sense
2020



Hembeer
2020

APP-based knowledge extraction in Multiple Sclerosis



Data processing and analysis

Disease knowledge

Brain: To assess a person's mood and cognitive functioning



Daily Mood Question

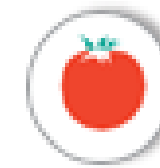
Quick daily questions about how the person feels to help understand well-being and mood



Matching Symbols

Matching symbols to digits measures how quickly information is processed

Hand: Hand motor function tasks designed to measure manual dexterity, strength and precision overtime



Squeeze a Tomato

Designed to measure changes in hand-eye coordination and fine motor skills



Draw a Shape

Measures the speed and accuracy of hand and finger movements

floodlight



Mobility: Walking and posture tasks measure changes in a person's mobility, stability, speed and balance



Two-Minute Walk

Walking quickly for two minutes measures stamina and mobility



Balance

Standing still for 30 seconds measures posture and stability



U-Turn

Task measures how the person walks and their ability to change direction

Passive Monitoring:



Passive Monitoring

Measures incremental changes in the way people move throughout the day
Gathering information through the smartphone sensor on step counts/duration and asymmetry

Roche

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PROGRESS optional requirements



- Presentation of the **walking data by sections**. (+10 points)
- **Distance to home** by geolocation. (+20 points)
- Location of patients within the **different rooms of the home**. (+20)
- Wrist movements **distinguishing walking and static** periods. (+20)
- Presentation of **heart rate** data depending on the activity. (+10 points)
- **Labelling of sleep periods** depending on depth and/or quality. (+10)
- **Internal memory of the device** in days of recording. (+20 points)

PROGRESS optional requirements



- **Battery life** and a single **daily synchronization** of data (+20 points).
- **Recharge time** required for full charge (+20 points).
- Raw **recording** of data and sampling rate (+2 for each variable, +5 if it also has the best sampling rate).
- **CE marked** medical device (+20 points).
- Proprietary **4G/5G** connectivity (+20 points).
- **Other** functionalities: Possibility to mark events, add voice notes, launch emergency messages, etc. (up to +20 points).

PROGRESS Expected impact and KPIs



Health outcomes:

☐ Increase of detected progressions

Goal: detection of **3 MS progressions** among the 30 patients during the 5 months, not detected by the usual clinical method.

☐ Quality of life before / after

Valued through the **SF12** short questionnaire.

Goal: 20% improvement.

PROGRESS Expected impact and KPIs



Satisfaction:

☐ **Tool satisfaction** survey segmented by user roles (patient, neurologist...)

Goal: Customer Satisfaction Score (CSAT) >8/10 in each user role.

☐ **Patient experience**

Goal: Net Promoter Score (NPS) >+50

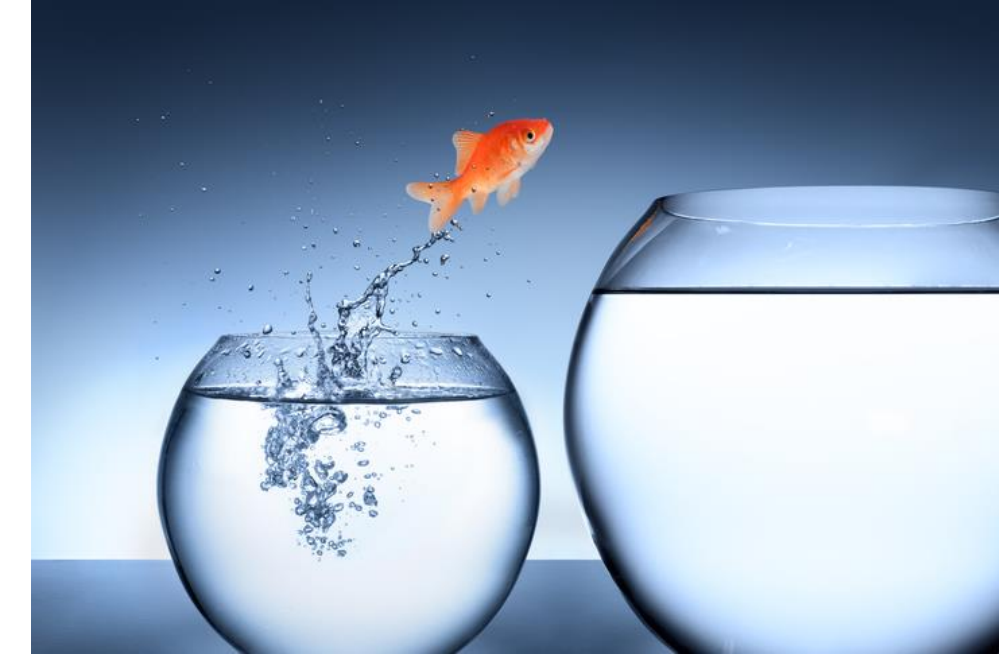
☐ **Patient usability** measured through.

Goal: System Usability Scale (SUS)>80

☐ **Level of service**

Goal: less than 1% (= less than 45 days/patient without service).

PROGRESS Business opportunity



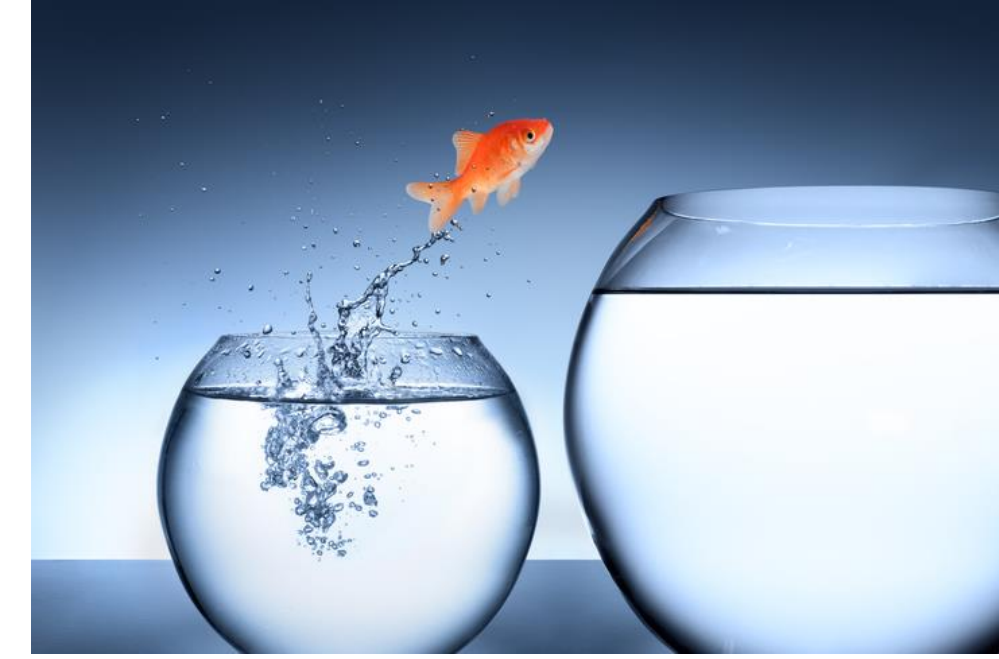
Target population:

- **1,500 patients** in Region of Murcia and **45,000** in Spain.
- It would be **applicable to any progressive degenerative neurological disease** (Parkinson >2,5 MS prevalence)

Offer of cooperation from the challenger group:

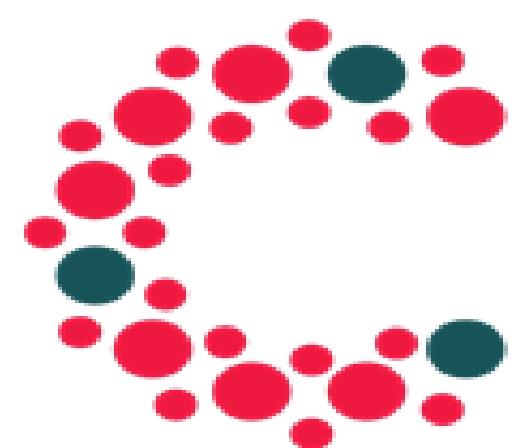
- ✓ Advice on **business model**.
- ✓ In case of success of the pilot experience, the SMS is **committed to managing a purchase for the subsequent expansion at the whole SMS**.
- ✓ **Dissemination of results** with the support of clinicians and patient associations.
- ✓ Collaboration with a **study of cost saving** as well as with its **publication & dissemination**.

PROGRESS Business opportunity



... **More offers** of cooperation from the challenger group:

- ✓ Identification and contact with other **potential customers**.
- ✓ Advice on **collaboration with the pharmaceutical industry** by shortening treatment evaluation times in collaborative clinical trials.
- ✓ The company will receive **free assistance to promote the solution internationally** through the *Enterprise Europe Network of the EU*, in order to look for possible business opportunities in other countries.
- ✓ The company will receive **free guidance on** the actions it should take for the **industrial/intellectual protection** of the project results.



CHERRIES milestones



1. **3 webinars (RRI & workshop)** Oct & Nov 2020
2. **Call for needs** Nov 5th – 30th 2020
3. **Selection of winning challenge** Dec 15th 2020
4. **Writing of requirements for solver** Jan 2021
5. **Call for solutions** Feb 15th – Apr 15th 2021
6. **Selection of winning solver** May 21st 2021
7. **Start of co-creation** June 3rd 2021



Only for CHAMPIONS

We are waiting you
Until April 15th



**Working
as a
TEAM**





SMS co-creation



experience

Any questions?

