



UNIONE EUROPEA
Fondo europeo di sviluppo regionale



Regione
Lombardia



POR FESR 2014-2020 / INNOVAZIONE E COMPETITIVITÀ

Sistema Integrato DomiciliarE e Riabilitazione Assistita al Benessere SIDERA^{^B}

L'essenza di SIDERA^{^B}: il modello di care in teleriabilitazione

Francesca Baglio

Milano, 19 Maggio 2021

TeleRiabilitazione domiciliare per i pazienti
cronici: i risultati del progetto SIDERA^{^B}



**Fondazione
Don Carlo Gnocchi**
Onlus



SIDERA^B: NASCE DAL BISOGNO DI RIABILITAZIONE

Global estimates of the need for rehabilitation based on the Global Burden of Disease study 2019: a systematic analysis for the Global Burden of Disease Study 2019

www.thelancet.com

Published Online

December 1, 2020

[https://doi.org/10.1016/](https://doi.org/10.1016/S0140-6736(20)32340-0)

S0140-6736(20)32340-0

Alarcos Cieza, Kate Causey, Kaloyan Kamenov, Sarah Wulf Hanson, Somnath Chatterji, Theo Vos

... we show that **rehabilitation is needed by 2.41 billion people** ...

... in addition, there is emerging evidence that many of the people affected by the **COVID-19 pandemic** have **long-term consequences** after the acute phase of COVID-19, thus **increasing the demand for rehabilitation** services globally ...

... **Rehabilitation** has often been construed to be a very specialised and expensive **service for the few** ...

... the only possible way **to scale up rehabilitation to reach all those in need** is through its integration into the health system and, specifically, for **rehabilitation services to be strengthened at the primary care level**

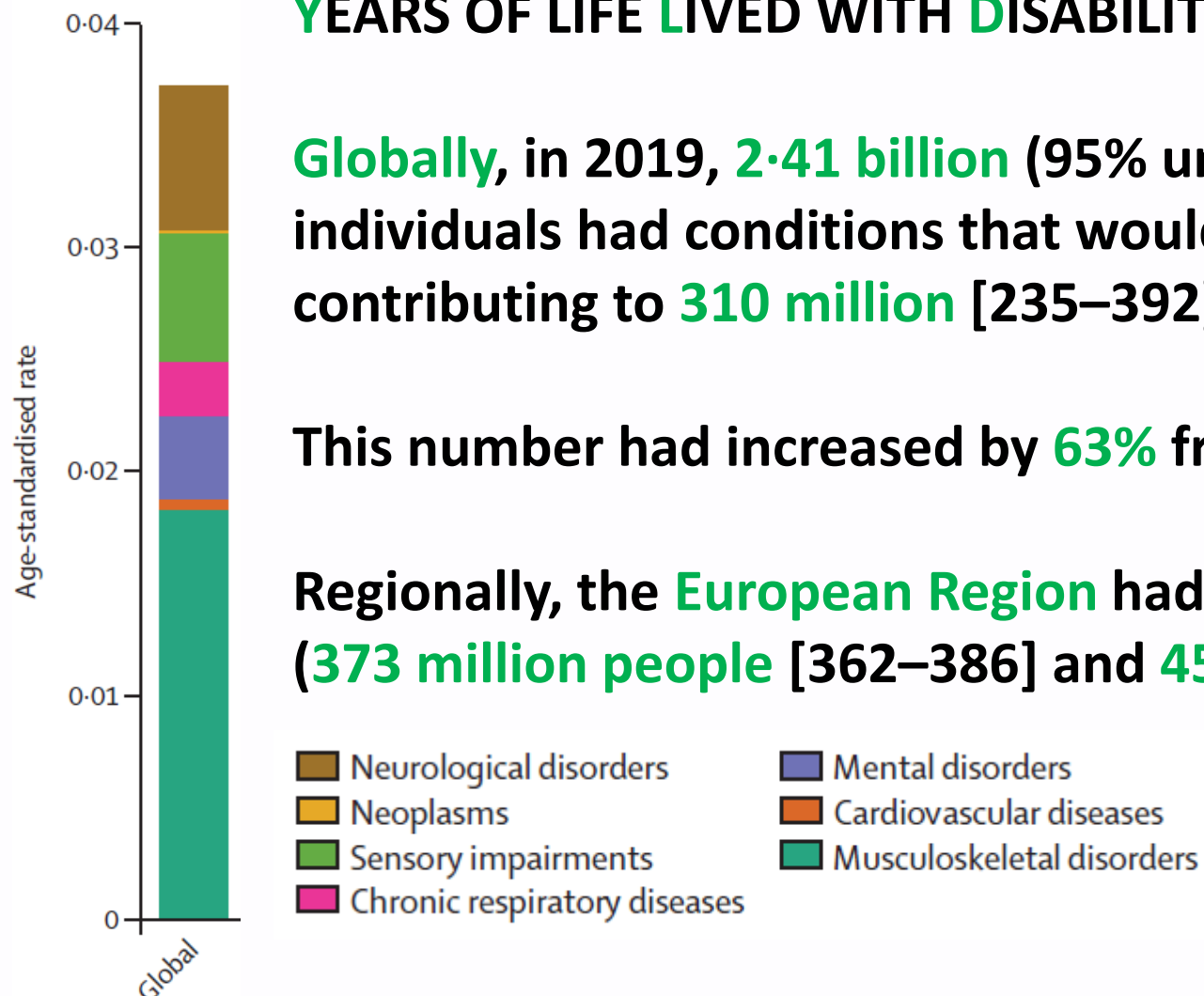
...

YEARS OF LIFE LIVED WITH DISABILITY - YLD

Globally, in 2019, 2.41 billion (95% uncertainty interval 2.34–2.50) individuals had conditions that would benefit from rehabilitation, contributing to **310 million** [235–392] YLDs.

This number had increased by **63%** from 1990 to 2019.

Regionally, the **European Region** had the need of rehabilitation services (**373 million people** [362–386] and **45 million YLDs** [34-58]).



CHI VIVE CON YLD: CRONICI [NON COMMUNICABLE DISEASE]



**SFIDA: POTENZIARE LA RIABILITAZIONE “FOR ALL”
NON DA SOLI MA COLLABORANDO**

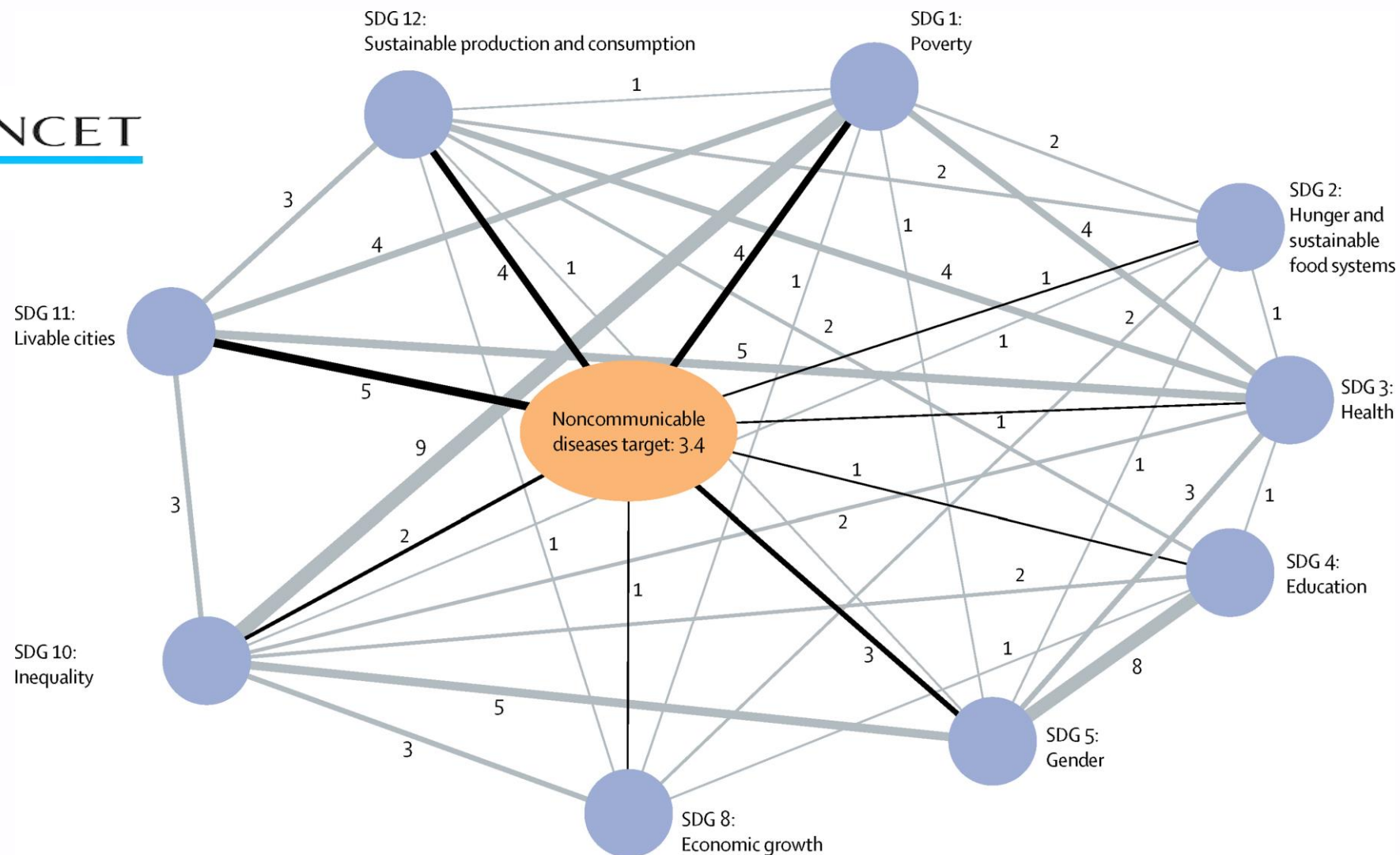
     



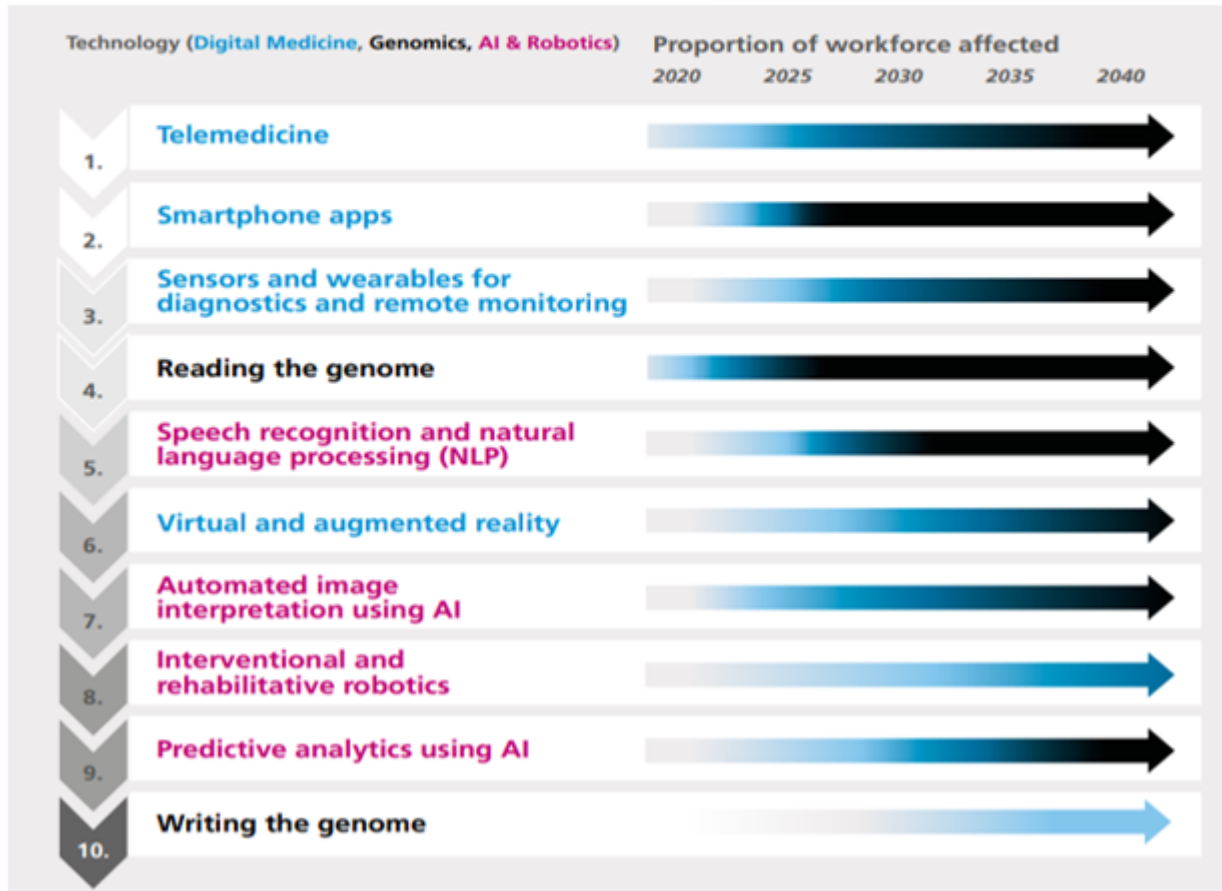
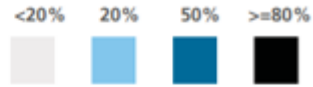
The SIDERA^ logo features a stylized yellow sun or star partially obscured by a dark blue arc, with a network of white dots and lines to the right. The text "SIDERA^" is written in white capital letters below the graphic.

THE LANCET



Sfida non isolata all' *Health* e da affrontare non con un unico punto di vista

3.0 The top digital healthcare technologies impacting the workforce



The Topol Review

Preparing the healthcare workforce to deliver the digital future

An independent report on behalf of the Secretary of State for Health and Social Care
February 2019



IN QUESTO CONTESTO LA TECNOLOGIA UN'OPPURTINITA' UNICA

WP1 – Project Management

WP2 – **Modello** e processo di riabilitazione multi-dimensionale

WP3 – **Modelli** e misure di benessere e di engagement

WP4 – Messa a punto degli **algoritmi** di analisi dei parametri vitali

WP6 – **Sviluppo** contenuti riabilitativi e system integration

WP5 – **Sviluppo** e integrazione della piattaforma di sensori e dispositivi

WP7 – Definizione della **sperimentazione** del sistema finale

WP8 – Definizione di un piano di divulgazione e sfruttamento dei risultati

Modello

Sviluppo

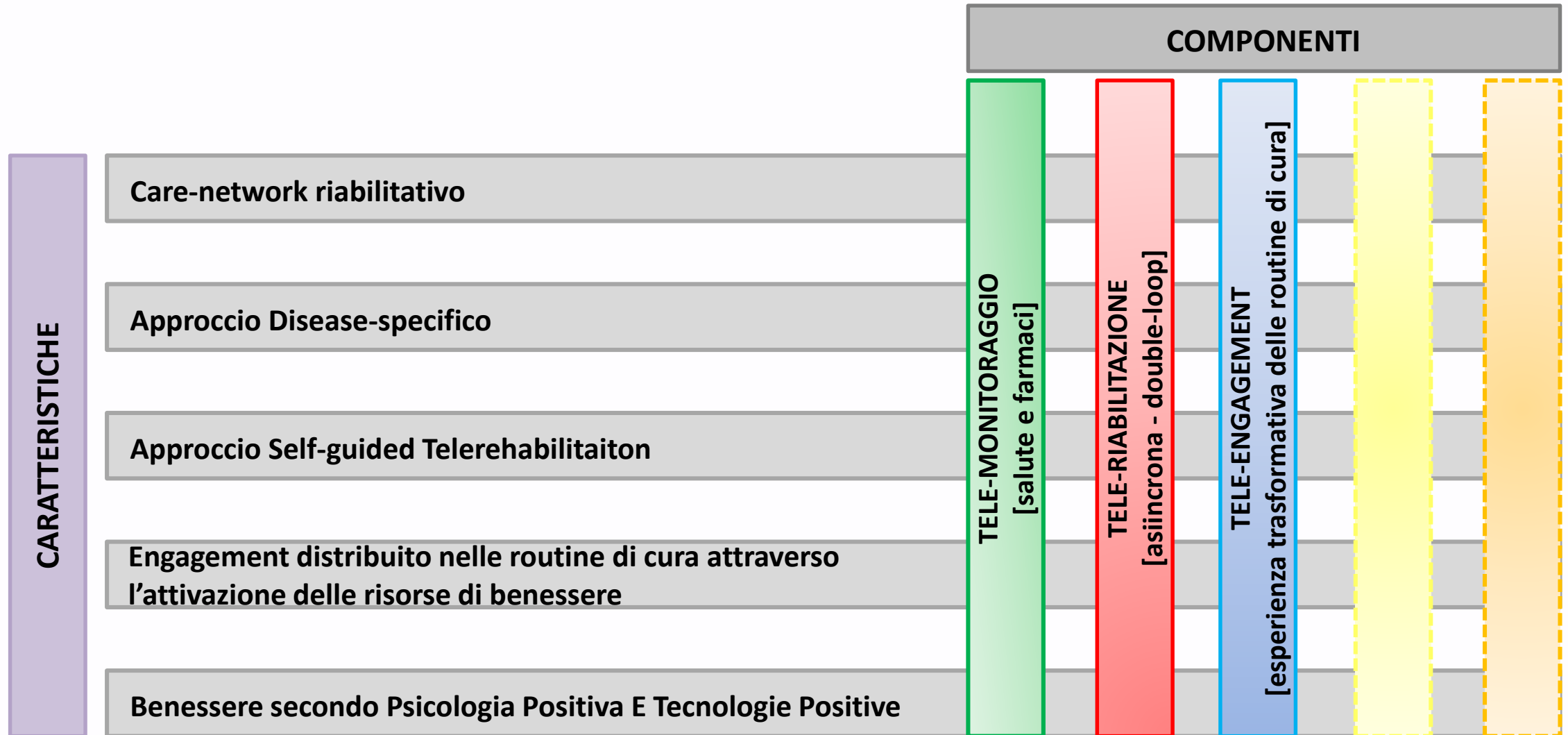
Valutazione

RI
SS



36 MESI: IL PERCORSO DI SIDERA^B

IL MODELLO SIDERA^B: L'INTERDIPENZA TRA COMPONENTI CLINICHE E DI BENESSERE

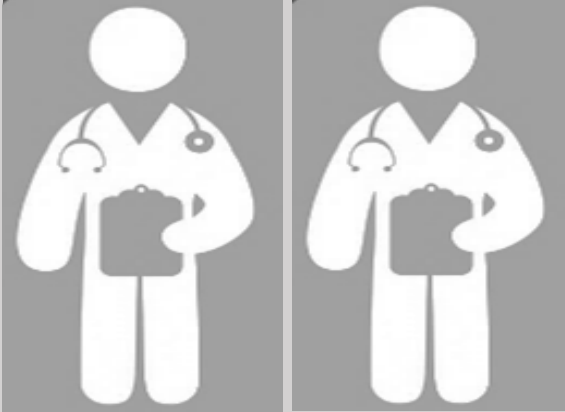


**REHAB
CENTRE**

HOME

«as is
sidera»

**communication
LOOP(s)**



[N=>1]

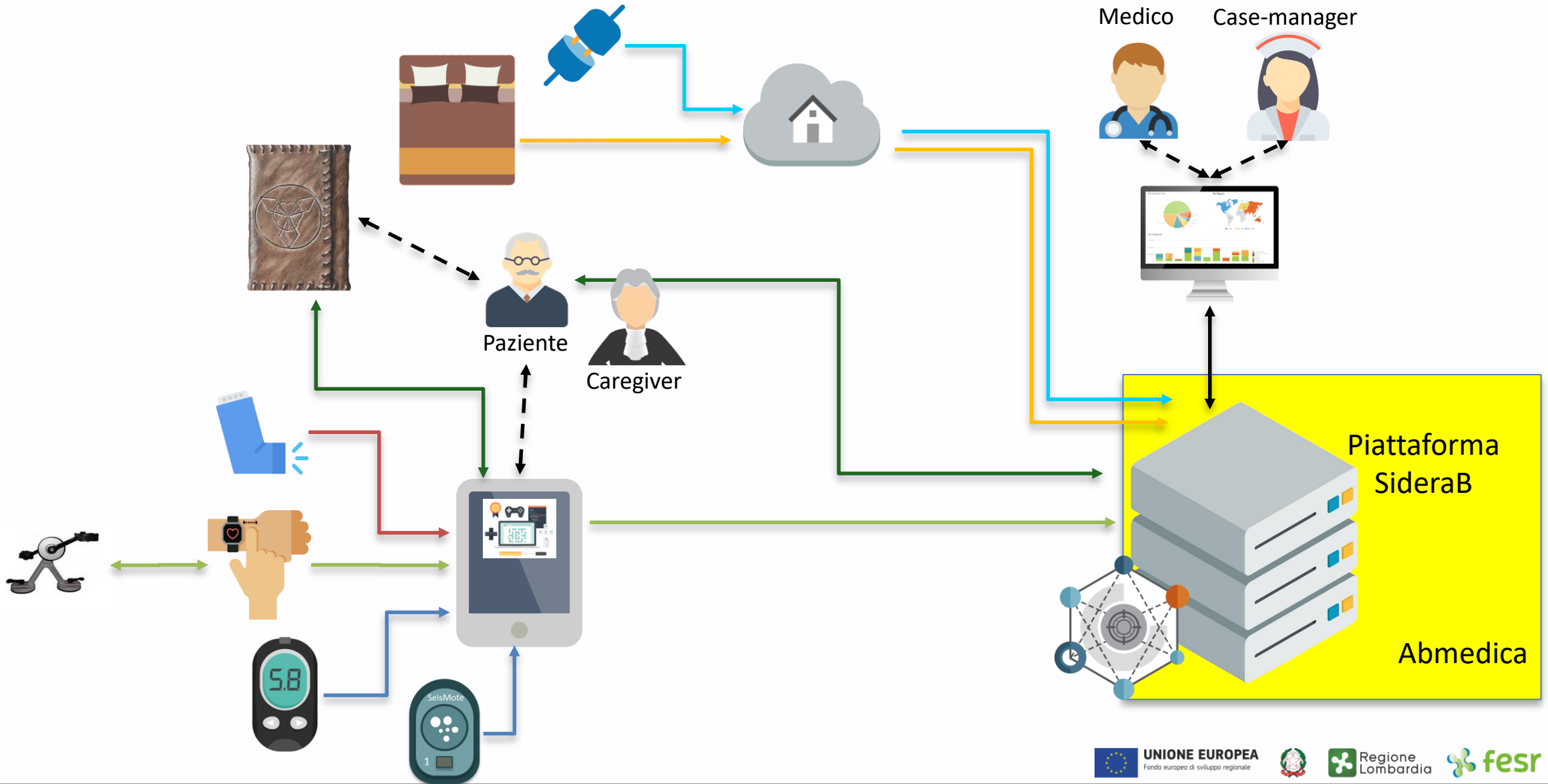


[N=1]

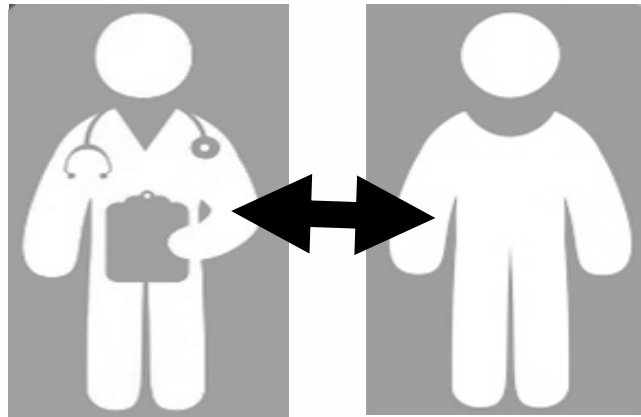
TELE-X

ASSESSMENT - MONITORING - DECISION - FEEDBACK

SIDERA^B: ARCHITETTURA DI RIFERIMENTO

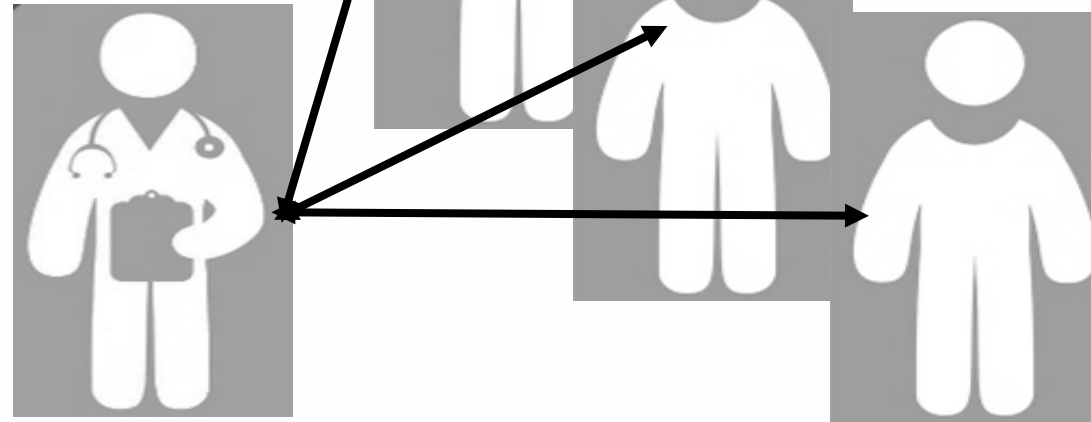


COME?



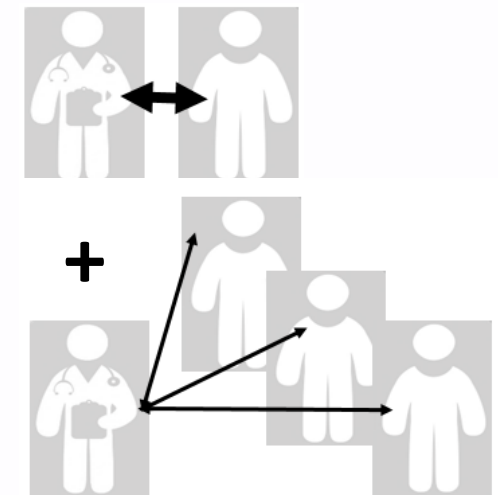
SINCRONA [a]

«face-to-face»



ASINCRONA [b]

oltre il «face-to-face»



MISTI [c=a+b]

ASSESSMENT - MONITORING - DECISION - FEEDBACK

«on-line»

«on-line» AND «on-line differito» - «off-line»
in prospettiva utente

SINCRONA [a]



«face-to-face»

ASINCRONA [b]



oltre il «face-to-face»

MISTI [c=a+b]

ASSESSMENT - MONITORING - DECISION - FEEDBACK

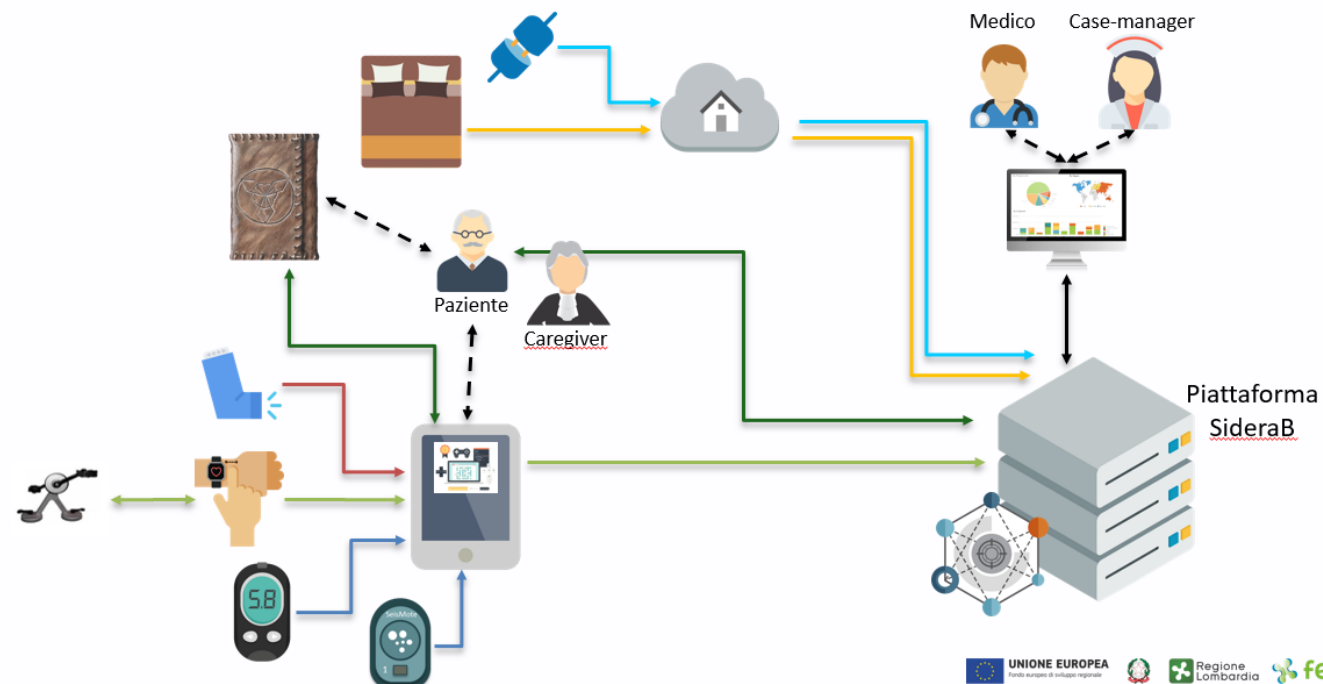
ECOSISTEMA COMPLESSO:

❖ DEVICES

[usabilità e servizio tecnico]

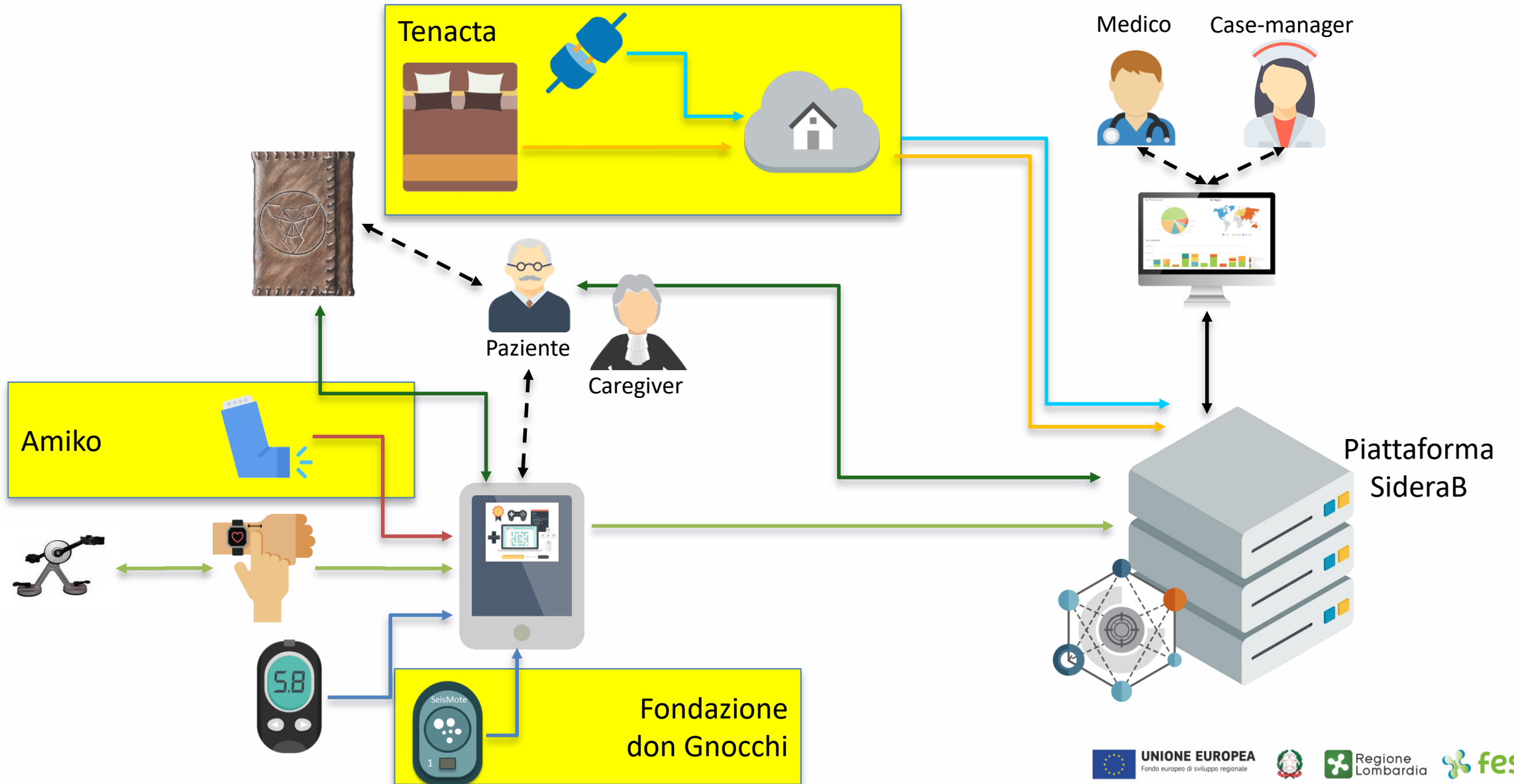
ASSESSMENT/MONITORAGGIO

- TERAPIA INALATORIA
- SONNO
- MOVIMENTO
- PARAMETRI (O2; PA, PESO...)



ECOSISTEMA SIDERA^B

SIDERA^B: ARCHITETTURA DI RIFERIMENTO



SINCRONA [a]

ASINCRONA [b]

MISTI [c=a+b]



«face-to-face»



oltre il «face-to-face»

ASSESSMENT - MONITORING - DECISION - FEEDBACK

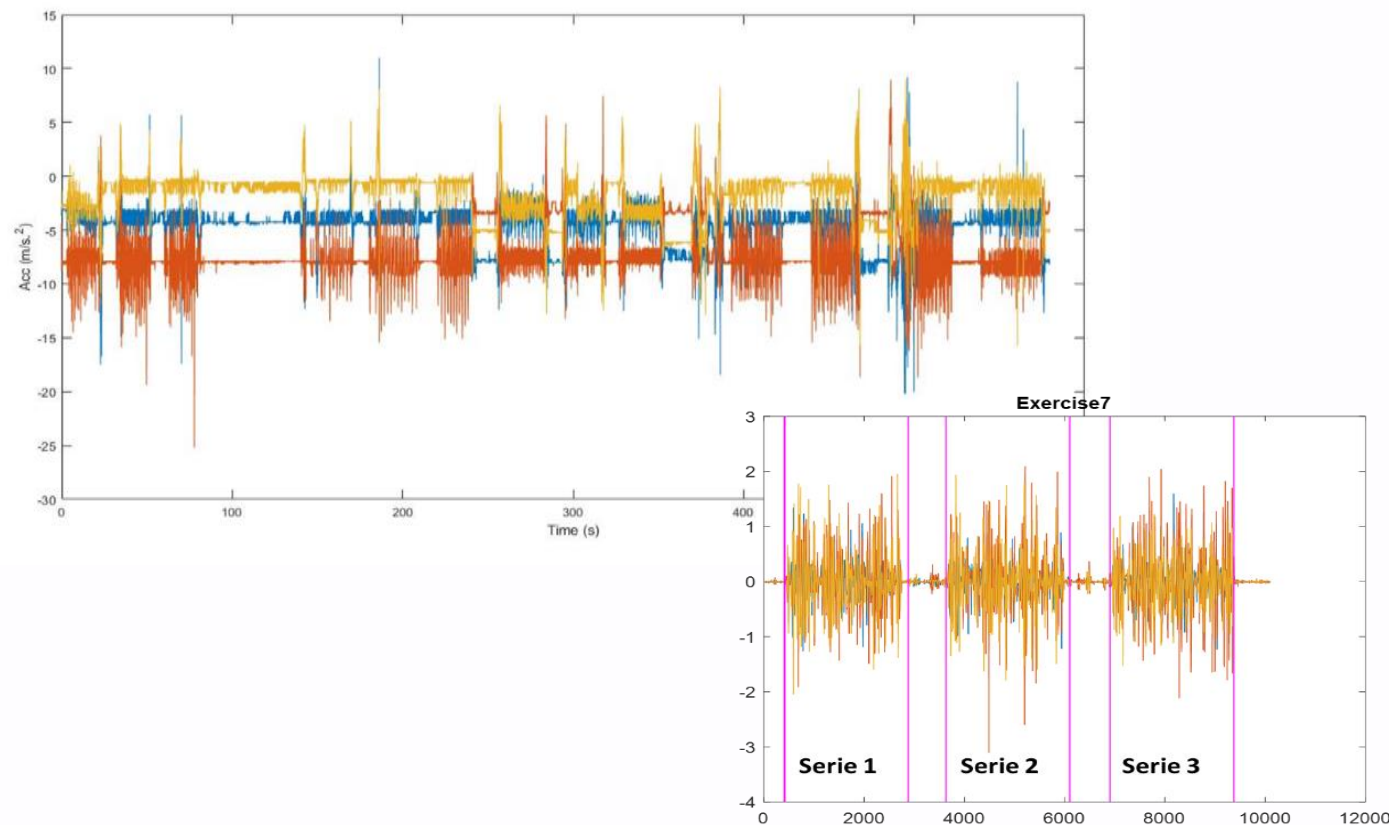
ECOSISTEMA COMPLESSO:

❖ ALGORITMI

[analisi dei dati]

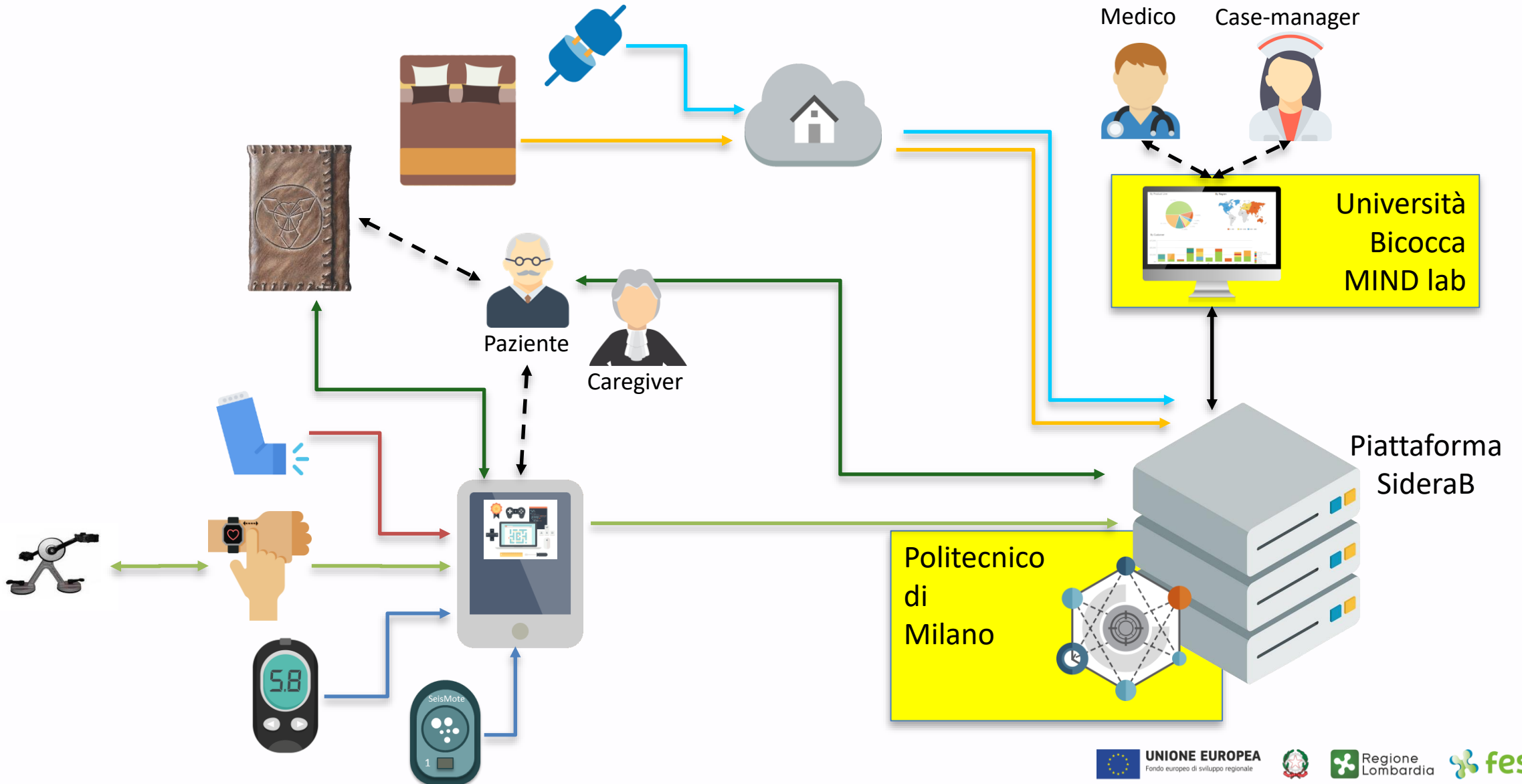
REPORT DATI DA SENSORI

REPORT VISUALIZZAZIONE DA
PIATTAFORMA



ECOSISTEMA SIDERA[^]B

SIDERA^B: ARCHITETTURA DI RIFERIMENTO



SINCRONA [a]



«face-to-face»

ASINCRONA [b]



oltre il «face-to-face»

MISTI [c=a+b]

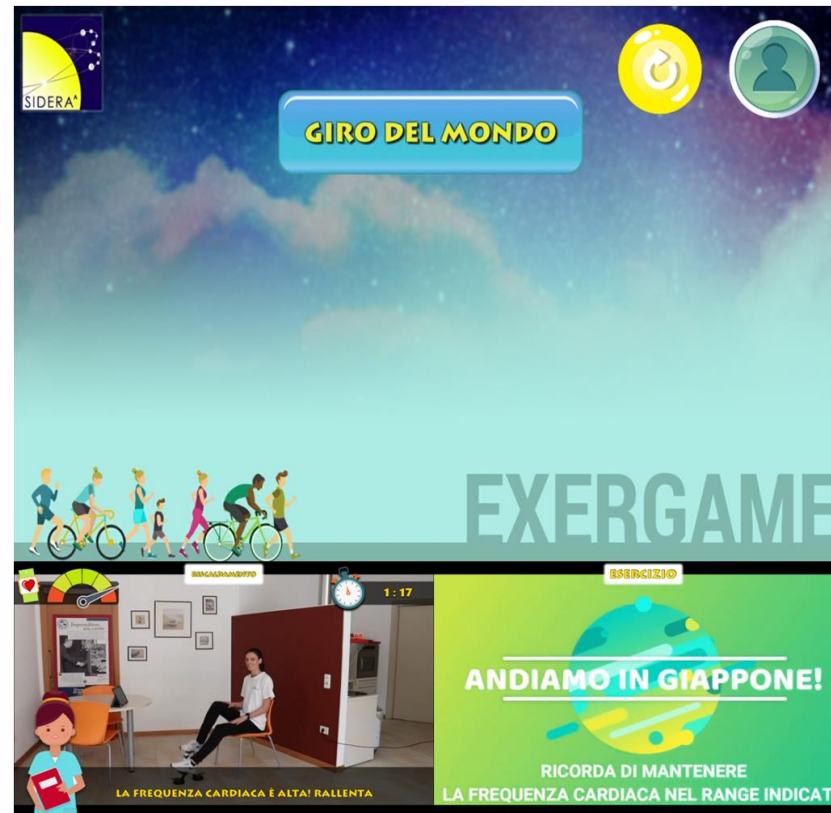
ASSESSMENT - MONITORING - DECISION - FEEDBACK

- ECOSISTEMA COMPLESSO:

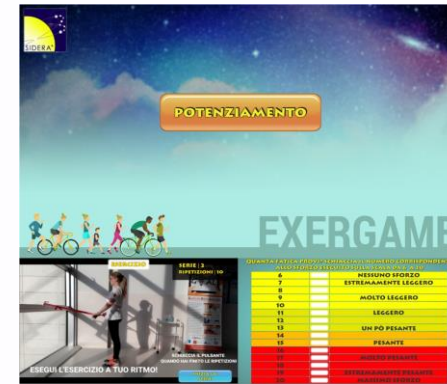
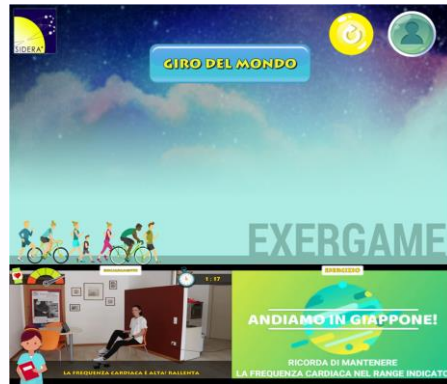
❖ DIGITAL CONTENTS

[MUST HAVE !]

- APP RIABILITATIVE [3 TRAINING]
- APP ENGAGEMENT [LIBRO VIVENTE]



ECOSISTEMA SIDERA^B



Kim et al, (2019). *American journal of physical medicine & rehabilitation*, 98(7), 613

General Aerobic Exercise

General Resistance Exercise

How often? 3–5 d/wk

How much? Gradually increase the duration of exercise from 20 to 60 mins over time.

How hard? These activities should be performed at a moderate intensity. Moderate intensity of exercise is usually 13 on the 20-point RPE scale.
Alternative way of measuring moderate intensity of exercise is 60%–80% HR_{peak} or 40%–60% HRR/VO₂R.

How to? Some options for activity include:

- Ergometry (arm, leg, or combined)
- Walking (overground or treadmill)
- Aquatics (including swimming)

2–3 d/wk

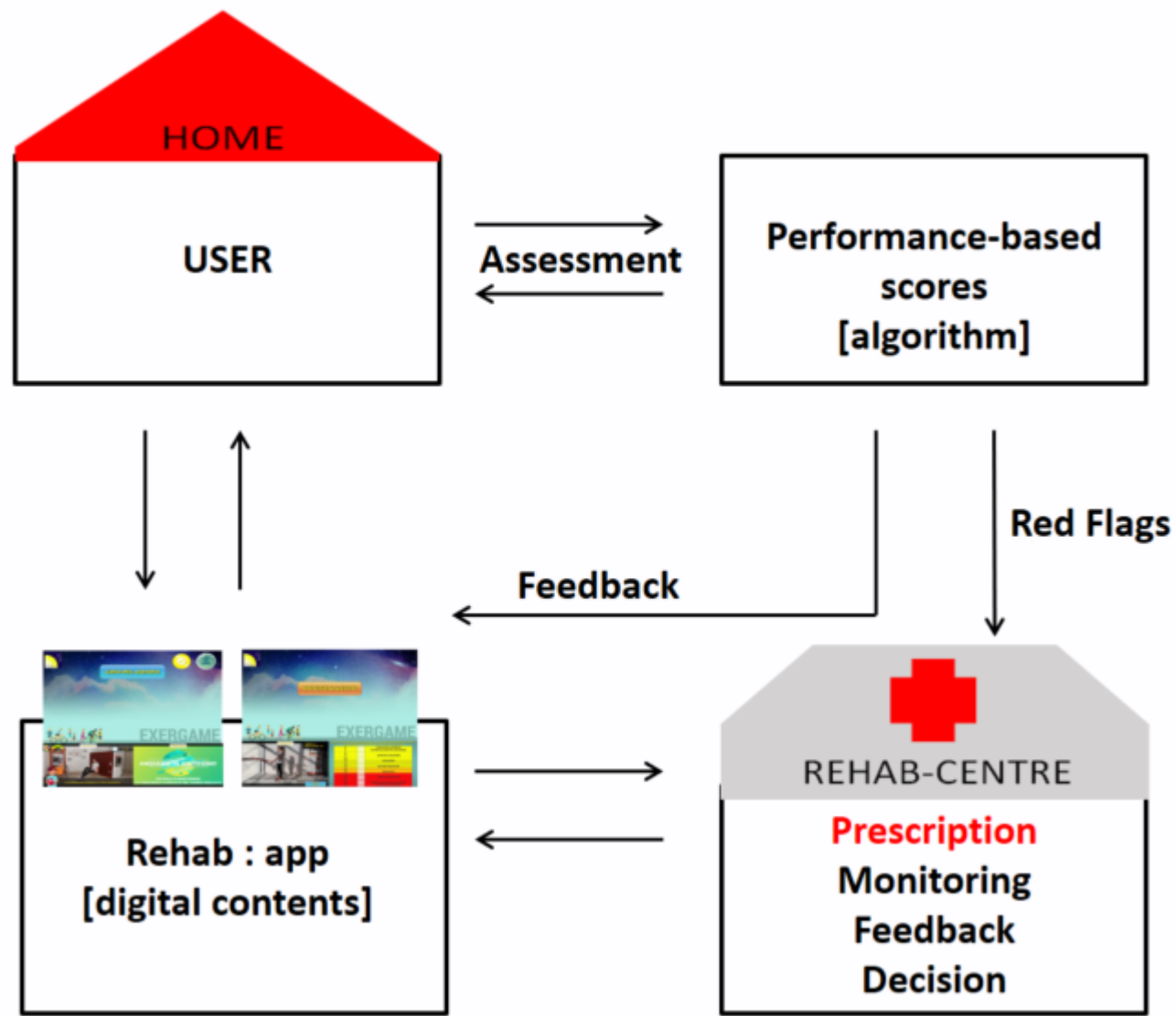
The exercise bouts should range from 1 to 3 sets of 8–12 repetitions of each exercise.

Pick a resistance between 40%–50% and up to 60%–80% of 1-RM.

Resistance training activities mainly target major/large muscle groups:

- Weight machines
- Free weights
- Elastic bands

SVILUPPO PARTECIPATIVO E INTEGRAZIONE IN PIATTAFORMA



FASE 1: PRESCRIZIONE E PIANIFICAZIONE

- Clinici -

Personalizzazione PRI



ATTIVI | ANAMNESI | FARMACI | PRESCRIZIONI | PIANIFICAZIONI | TELMONITORAGGIO | TIMELINE | NOTE | LAVORANDO

ATTIVITÀ

- GENERICA: Attività di tipo generico (es. passeggiata)
- VIDEO DIGITALE: Video con Kinect o Leap Motion
- SESSIONE: Sessione di riabilitazione
- RABILITAZIONE COGNITIVA
- GIOCO DIGITALE: Giochi REABILITY su tablet
- RABILITAZIONE MOTORIA
- ENDURANCE TRAINING: Giochi SOCRAB su tablet
- RESISTENCE: Giochi SOCRAB su tablet
- DANCE: Giochi SOCRAB su tablet
- VIDEO: Giochi SOCRAB su tablet
- IL LIBRO VIVENTE: Giochi SOCRAB su tablet

Mostra/ Nascondi weekend

ottobre 2019

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
	09:00 11 SESSIONE: Endurance Maurizi Presione s...	09:00 11 SESSIONE: Endurance Maurizi Presione s...	09:00 11 SESSIONE: Endurance Maurizi Presione s...	09:00 11 SESSIONE: Endurance Maurizi Presione s...									09:00 11 SESSIONE: Endurance Maurizi Presione s...	09:00 11 SESSIONE: Endurance Maurizi Presione s...	09:00 11 SESSIONE: Endurance Maurizi Presione s...	09:00 11 SESSIONE: Endurance Maurizi Presione s...	09:00 11 SESSIONE: Endurance Maurizi Presione s...									

16:49

TelbiosConnect

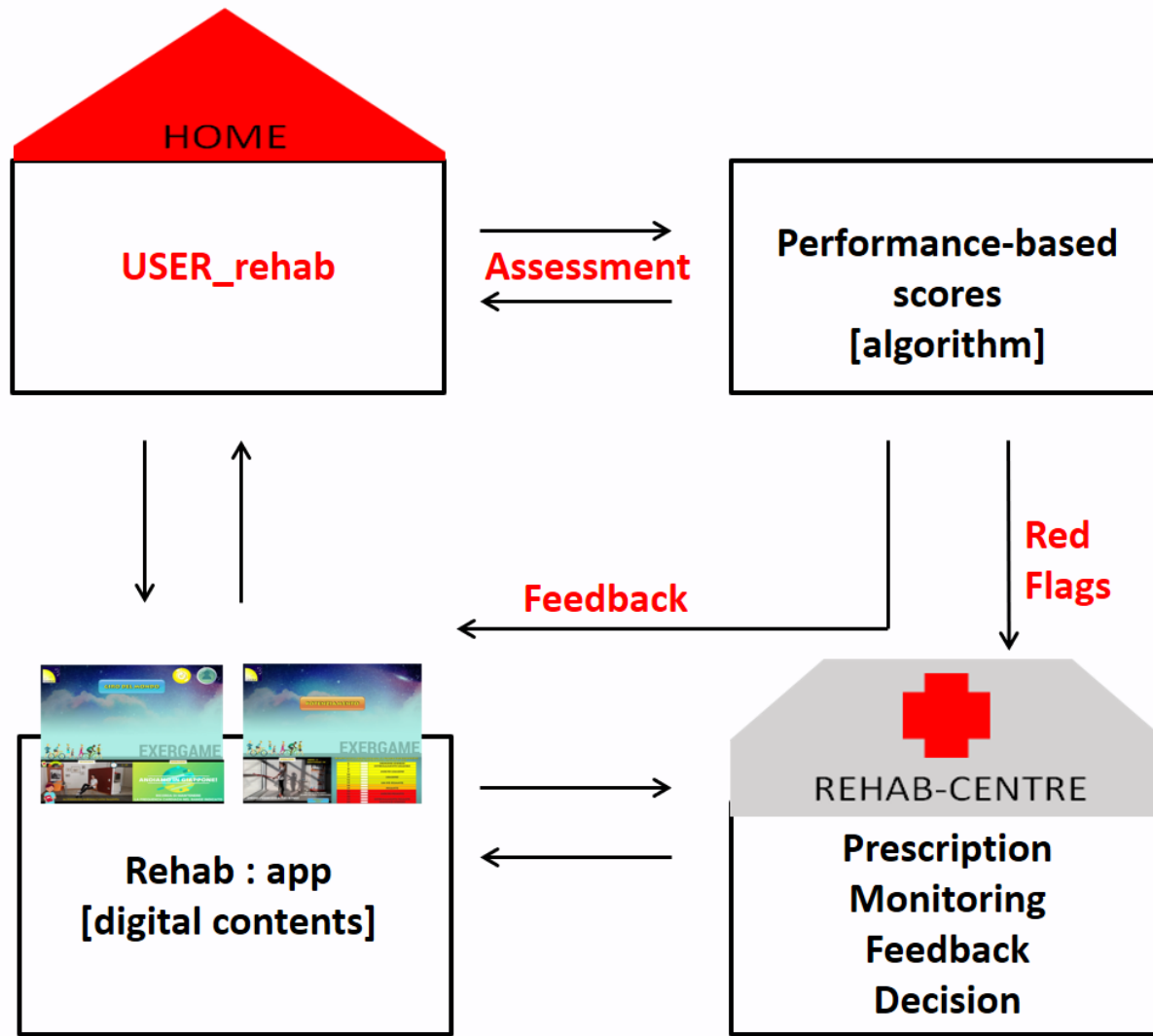
Ciao TCUBE_01

15/12/2020
0/2
rilevazioni

Attività

- Il libro vivente
- PEP bottiglia
Eseguire l'esercizio della bottiglia una volta al giorno lontano dai pasti
- Sessione di riabilitazione motoria

Home | Timeline | Storico | Lista dispositivi | Profilo



FASE 2A OPERAZIONALIZZAZIONE DEL DOUBLE-LOOP

- User -

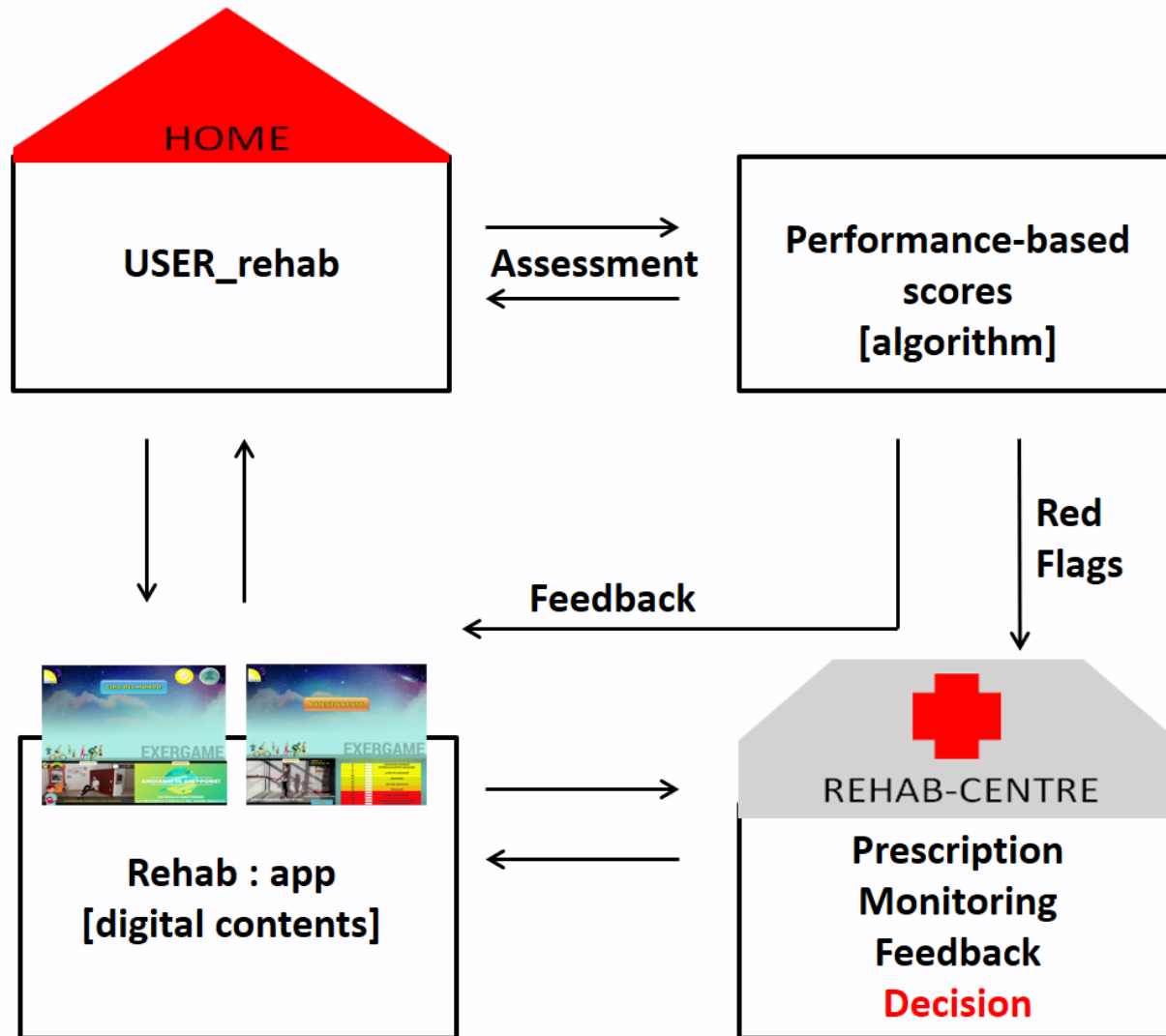
Assessment/Feedback



LOOP AUTOMATICI: SAFETY / SELF-GUIDED REHABILITATION

FEEDBACK / GAMIFICATION





FASE 2B OPERAZIONALIZZAZIONE DEL DOUBLE-LOOP

- Clinico -

Decision

Periodico

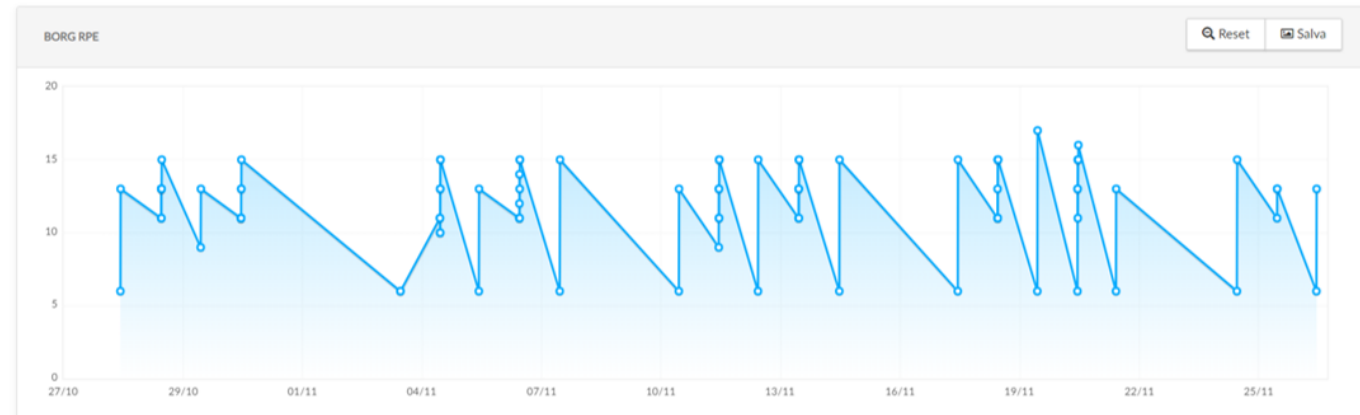
OUTPUT del SISTEMA: ADERENZA (N, %, min)



OUTPUT del SISTEMA: INDICI CLINICI (FC, RPE, PA ...)

QUANTA FATIGA PROVI? SCHIACCIA IL NUMERO CORRISPONDENTE ALLO SFORZO ESEGUITO SULLA SCALA DA 6 A 20

6		NESSUNO SFORZO
7		ESTREMAMENTE LEGGERO
8		
9		MOLTO LEGGERO
10		
11		LEGGERO
12		
13		UN PÒ PESANTE
14		
15		PESANTE
16		
17		MOLTO PESANTE
18		
19		ESTREMAMENTE PESANTE
20		MASSIMO SFORZO



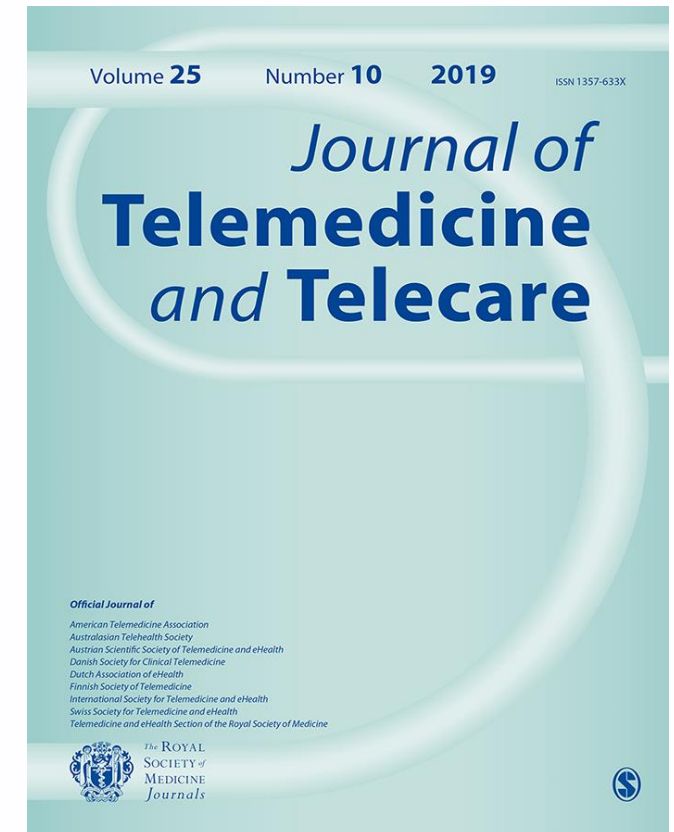
... “we used the term **integrated telerehabilitation approach (ITA)** to refer to rehabilitative care beyond the hospital setting in which there was technology that allowed for the **double communication loop** between the hospital and the patient.

This type of communication enables the **remote monitoring** of the patients’ performance and the response with appropriate **feedback to the patient**. In our vision, for an effective telerehabilitation approach, the presence of the ‘double loop’ is an essential requirement because of its pivotal role in the planning of **individualized patient-centred rehabilitation** interventions. In this case, the rehabilitation approach can be **modified according** to the actual **progress/performance of the patient**.

The lack of a ‘double loop’ renders the intervention equivalent to a prescription of home exercises without a real rehabilitative component”

...

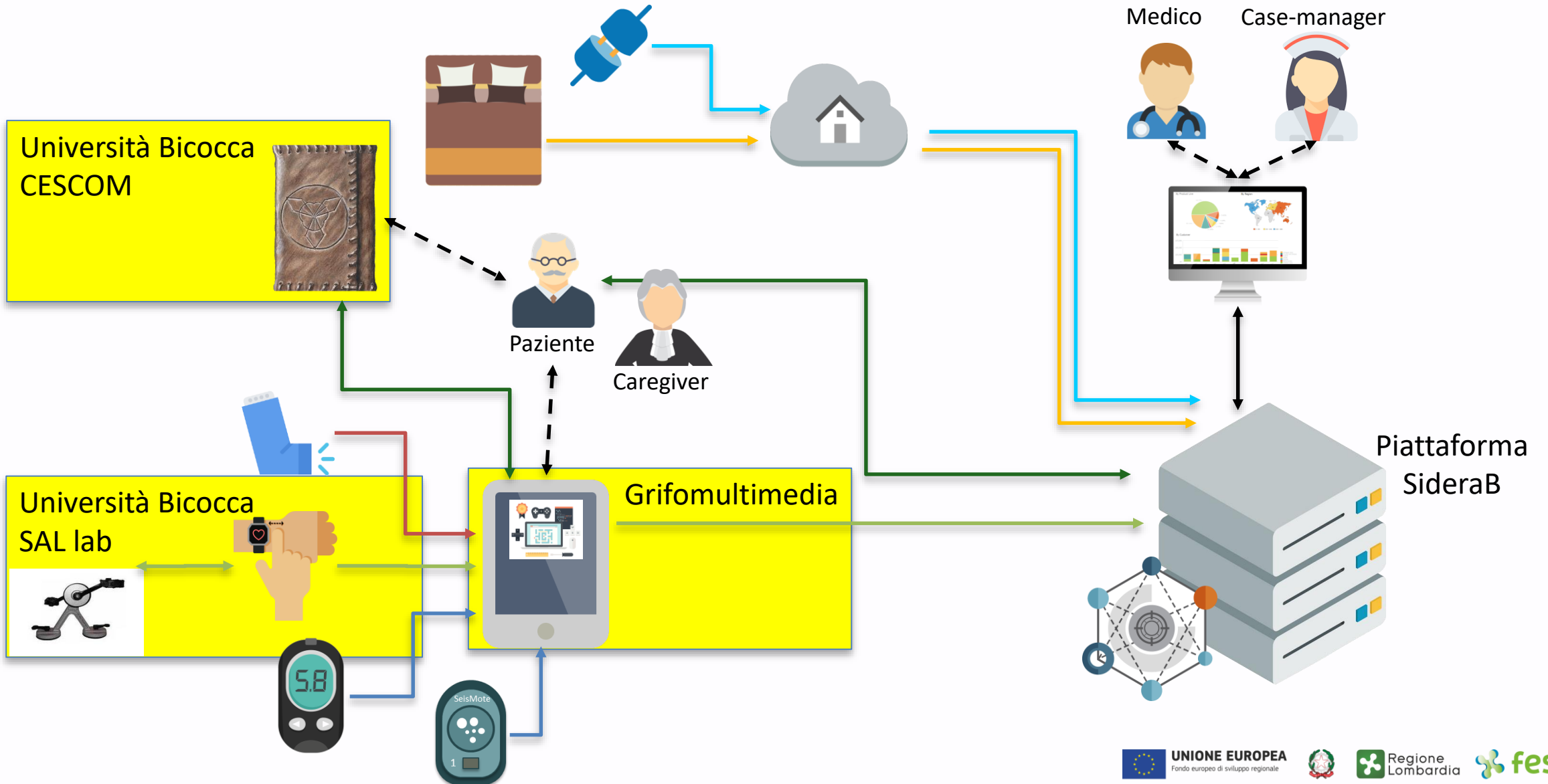
[Di Tella, S., Pagliari, C., Blasi, V., Mendozzi, L., Rovaris, M., & Baglio, F. (2020). Integrated telerehabilitation approach in multiple sclerosis: A systematic review and meta-analysis. *Journal of telemedicine and telecare*, 26(7-8), 385–399.]





**Applied Games / Game per trasformare l'esperienza
APPROPRIAZIONE DELLE ROUTINE DI CURA**

SIDERA^B: ARCHITETTURA DI RIFERIMENTO



GRAZIE PER L'ATTENZIONE

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POR FESR 2014-2020 / INNOVAZIONE E COMPETITIVITÀ



grif multimedia



POLITECNICO
MILANO 1863



con la collaborazione di:

