



ChipsJü

WECS 2024  
GHENT BELGIUM  
5-6 December



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StorAige

This project has received funding from the ECSEL Joint Undertaking (JU) under grant agreement No 101007321. The JU receives support from the European Union's Horizon 2020 research and innovation programme and France, Belgium, Czech Republic, Germany, Italy, Sweden, Switzerland, Turkey



D. GOUBIER - STMicroelectronics

5 December 2024

## AI in the medical Domain a 'clear' view of the complexity



5-6 December

### Embedded Intelligence



#### Embedded Storage elements on next MCU generation ready for AI at the edge

**Challenges and objectives**

First 'silicon embedded' AI MCU hardware components ready for large volume AI at the edge applications.

StorAige will increase AI technology maturity and capitalize on 'the ones' who already have competences and insights to push one step up the full European eco-system and stay on/trust podium!



Consortium: 40 partners

**Technical goals**

The main aim of the StorAige project is to setup a world-class manufacturing platform for silicon with Artificial Intelligence capabilities, prototyping high performance, FD-SOI low power and secured & safety components enabling competitive AI at the edge applications.

StorAige project will put together experts to share insights, concepts, ideas, experiments, studies, to develop 'appropriate' and standard-grade AI solutions.

Three main applications areas will be targeted and demonstrated within the scope of this project: Automotive, Industrial and Secure

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The StorAige work plan structure follows "a value chain like" approach.

**Expected impact**

By providing the best-in-class silicon-based solutions and joining forces of the AI value chain in the EU, StorAige will help:

- to predict and define the tasks to which AI will be applied in edge devices tomorrow
- to support their widespread adoption
- Europe to maintain strong competitiveness and sovereignty

Moving AI from the cloud to the edge will orient the technological developments towards three interdependent challenges:

- Increase the computing power (high performance),
- Lower the energy consumption (energy-efficient),
- Implement adequate security & privacy level.



StorAige: 9 applications, 21 use-cases







IDEAS COME TRUE







...to make it simple and understandable by all the stakeholders

 Dalì • Image generator

# Challenges

- Data privacy



- SEPSIS
- Congestive Heart Failure (CHF)
- Erratic heart rate (paroxysmal atrial fibrillation (PAF/AF))

- Medical dataset



- Ethical validation



Folkhälsomyndigheten  
PUBLIC HEALTH AGENCY OF SWEDEN



- Integration challenges



Some documents are difficult to process even by AI!

Qté	P. unité	Ci	Indication	Base	Min.	Max.
2	0,00	344032617447	DOXICICLINE 500	0,00	0,00	05
1	1,16	344032624338	COLLAGIUM METALLOUM 1500	1,16	1,16	1500
1	1,16	344032624338	COLLAGIUM MET. SICH DO GLOB.	1,16	1,16	1500
1	1,33	344032624338	COLLAGIUM MET. SICH TOB GLOB.	1,33	1,33	1500
1	1,33	344032624338	COLLAGIUM MET. SICH TOB GLOB.	1,33	1,33	1500
1	1,33	344032624338	COLLAGIUM MET. SICH TOB GLOB.	1,33	1,33	1500
1	1,33	344032624338	COLLAGIUM MET. SICH TOB GLOB.	1,33	1,33	1500

② une dose de PALLADIUM 300u  
14 jours plus tard -

③ les autres jours:  
2 maines normale 9u  
+ [Kali nitricum 9u] 3 grande au  
alternance au  
coulée  
+ cicutu virosa 9u

# Impacts

- **1: Home Care for patients with light to moderate Congestive Heart Failure (CHF)**

- 100 000 Swedish patients (1% of population)
- Total annual saving per patient:
  - € 3825
- Total potential economic value for Sweden:
  - € 382 500 000

- **2: Nursing Homes with connected GP surgeries, patients with paroxysmal atrial fibrillation (PAF/AF)**

- 25 000 patients with PAF in Swedish nursing homes
- Total annual saving per patient:
  - € 3150
- Total potential economic value for Sweden:
  - € 7 875 000

- **3: Nursing Homes, Sepsis AI-screening**

- 8 000 sepsis cases with fatal outcome in Sweden
- 25% reduction of sepsis with fatal outcome -> 2 000 lives saved
- Estimated value of life saved:
  - € 150 000
- Total potential economic value for Sweden:
  - € 300 000 000

The direct economic value for Sweden amounts to €690 mn per annum.

EU has 44 times more inhabitants, so the **European economic value could exceed €30 000 mn per annum.**

Add to that saved production-loss for relatives not having to go to hospital with them.

The socio-economic value of the increased quality of life is hard to quantify at this stage.

Source: Sara Bern Strikersoft sweden

The logo for ChipsJU, featuring a stylized 'C' with circuit-like patterns and the text 'ChipsJU' with three stars above the 'U'.The main event title 'HEECS 2024 GHEENT BELGIUM 5-6 December' in a stylized, blocky font. 'HEECS' is in white, '2024' is in light blue, 'GHEENT' is in yellow, and 'BELGIUM' and '5-6 December' are in light blue.

**Call:** HORIZON-KDT-JU-2023-1-IA

**Type of Action:** HORIZON-JU-IA

**Acronym:** H2TRAIN

**Current Phase:** Grant Management

**Number:** 101140052

**Duration:** 36 months

**GA based on the:** HE MGA — Multi & Mono - 1.1

**Start Date:** 01 May 2024

**Estimated Project Cost:**

€24,050,477.23

**Requested EU Contribution:**

€7,276,633.50

**Contact:** [Georgi KUZMANOV](#)

The logo for H2TRAIN, featuring a stylized 'H2' in blue and yellow, followed by the word 'TRAIN' in white.

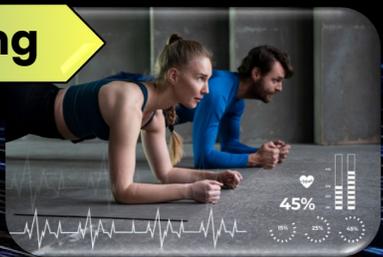
Enabling digital technologies for Holistic Health-lifestyle motivational and assisted supervision supported by Artificial Intelligence Networks

Juan Antonio Montiel-Nelson  
5<sup>th</sup> December 2024

**Intelligent Sport Coaching**

**Intelligent Sport Coaching**

**Remote Assisted Living**



**Technology Demonstrators**

**Foundational & Cross-Sectional Technologies**

 **TD1: Tattoo sweat sensing**

**Edge-cloud AI continuum**

**On Cloud for Data Analysis and Prediction**  
**On Edge for Self-Calibration & Data Extraction**  
**On Fog for Sensor Digital Twin**

 **TD2: Glycemic**

**Biometric cryptography**

 **TD3: pH**

**Glucose**

 **TD4: ECG, EMG & SpO2**

**Ph level**

 **TD5: Cortisol & Lactate on Graphene**

**ECG, EMG, SpO2 and SmO2**

**State-of-the-Art, Devices, Components & Models**

 **TD6: In-water activity tracker**

**Activity tracker**

 **TD7: Energy harvester**

**Energy harvester**

**More beyond State-of-the-Art**  
**1D & 2D Materials**  
**Optical – Colorimetry**  
**Electrical – Chronoamperometry**

 **TD8: Biometric cryptography**

**Cortisol and Lactate on Graphene**

 **TD9: Textile-integrated tracker**

**Sweat Tattoo Sensor**

 **TD10: Edge-cloud AI continuum**

**Textile-integrated Device**

Screen printed graphene sensor



- Commercial production devices and systems.
- Star-ups created.
- AIoT industry implementing H2TRAIN technology.
- Energy harvesting industry implementing H2TRAIN technology.
- Biosensing industry implementing H2TRAIN technology.

System architecture edge-cloud continuum



Project Development Timeline

Large Scale Demonstration stage TRL 7-8

Market implementation TRL 8-9

2024

2025

2026

2027

2028

2029

2030

Novel biosensing device integration (28 JUNE-4 JULY)

Embedded Intelligence (5 - 11 JULY)

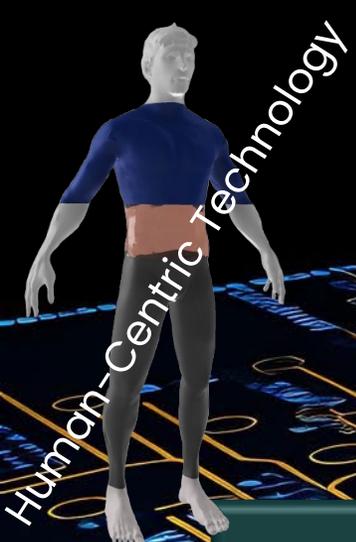
System of systems (12 - 18 JULY)

- Maturation and validation of the technology at larger scale.
- Key stakeholders engaged.
- Business case and business model towards commercialization developed.

Project Start at TRL 1  
Strong consortium  
Webpage created

Project End  
• TRL 5-6 Short Scale Demonstration stage.  
• Path for TRL 5-6 established.

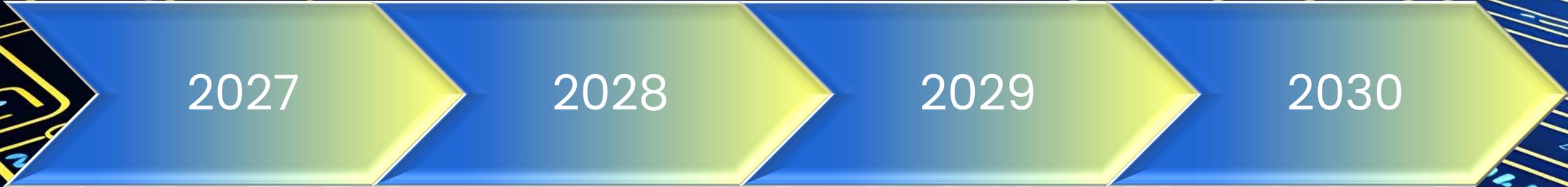
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- Commercial production devices and systems
  - TinyML-sensor, integrated textile systems of systems, edge gateways, and cloud servers.
- Star-ups created for textile integrated wearables, biomarker sensing, and data fusion.
- Artificial IoT industry implementing H2TRAIN technology based on digital twins for sensors, activity analysis and performance estimation.
- Energy harvesting industry implementing H2TRAIN technology.
  - RF, PZT and Thermoelectric Power Units
- Biosensing industry implementing H2TRAIN technology.
  - Biomarker screen-printed electrodes, biomarker sweat tattoo on flexible substrate, ad-hoc optical and electrical interface.

**Large Scale Demonstration stage TRL 7-8**

**Market implementation TRL 8-9**



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- Project End**
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A collage of three images illustrating different user scenarios. The top image shows an elderly person sitting in a chair using a laptop, with a circular icon of a person with a cane above it. The middle image shows a person lying in a hospital bed using a laptop, with a circular icon of a bed and a heart rate monitor above it. The bottom image shows a person on an exercise bike with a sensor on their chest, with a circular icon of a person on a bike above it. To the right of the collage is a vertical list of bullet points.

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- Business case and business model towards commercialization developed.

# H2 TRAIN

## Thank you

This research is supported by the European Commission and the National Authorities of Austria, Finland, Germany, Italy, Poland and Spain  
CHIPS-JU GA 101140052



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 <https://x.com/H2Train>



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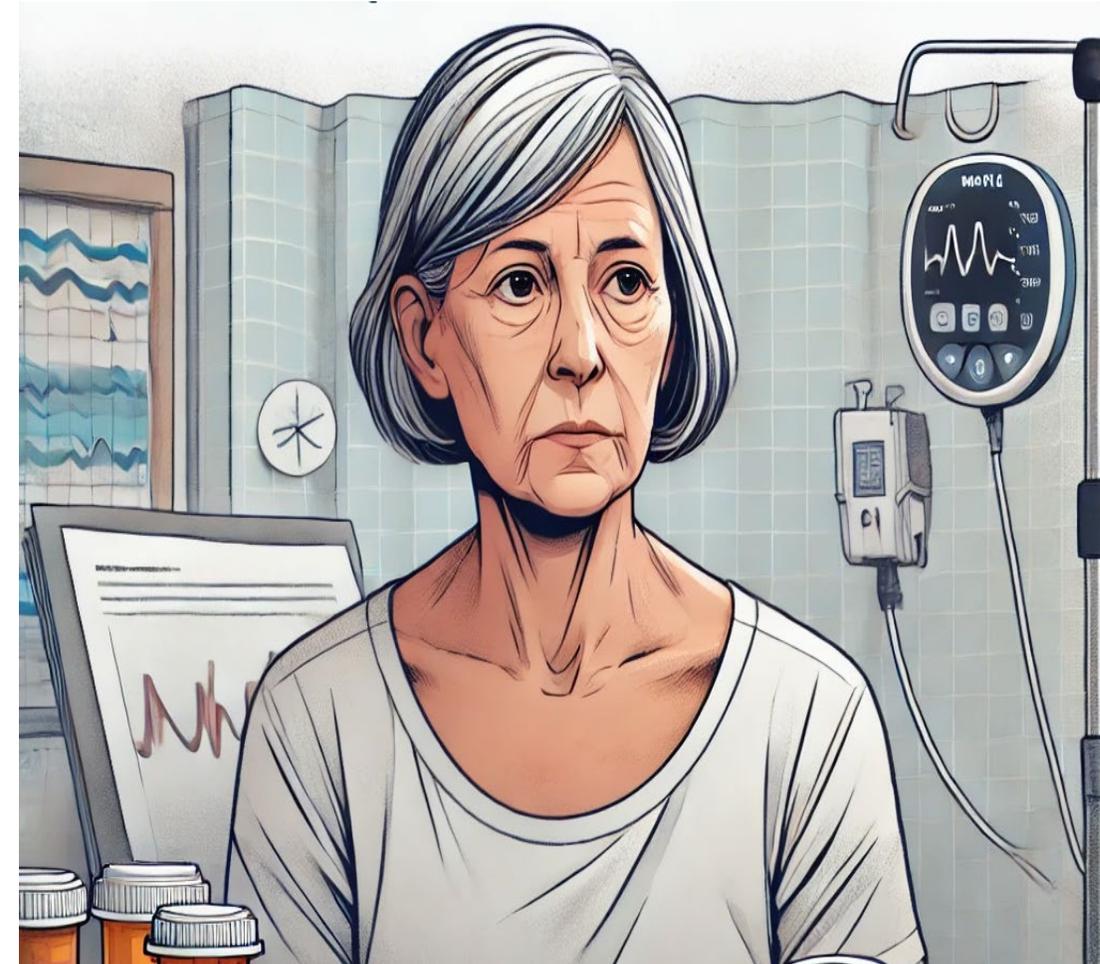
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**« From chips to healthcare services »**  
**Bridging Innovation & Care for real-world impact**

Olivier Horbowy - STMicroelectronics

# Patient Medical Report

**Name:** Dall-eDa - **Age:** 56 - **Sex:** Female



## Medical History

- **Type 2 Diabetes Mellitus:** Currently managed with medication and lifestyle adjustments.
- **Early-Stage Heart Failure:** Under cardiology supervision with ongoing treatment to stabilize heart function.
- **History of Severe Infections:** Includes a prior episode of **sepsis**, which required prolonged intensive care and months of recovery.

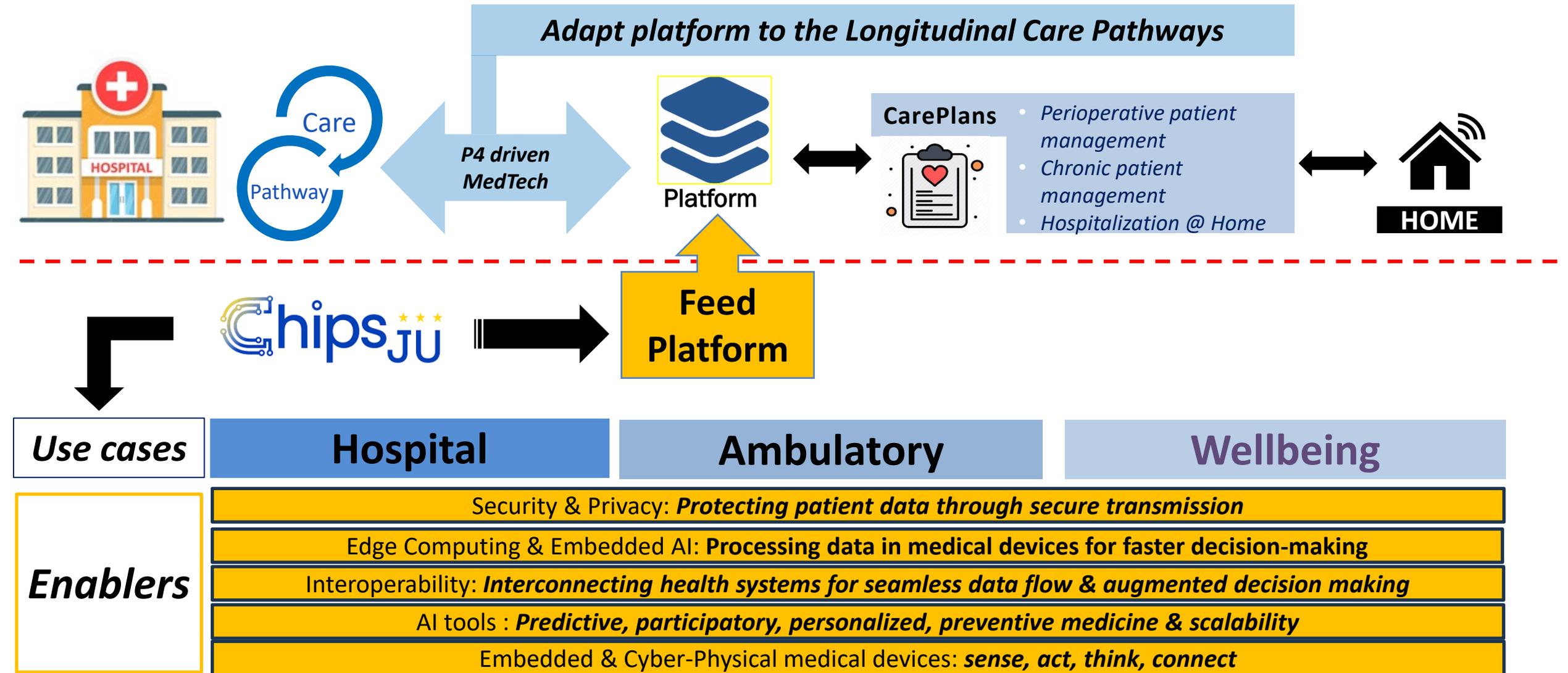
## Current Condition

- Multi-morbid patient requiring chronic disease management across specialties.
- High risk for recurrent infections and complications related to comorbidities.
- Fragmented care pathways, leading to inefficiencies and delayed interventions.

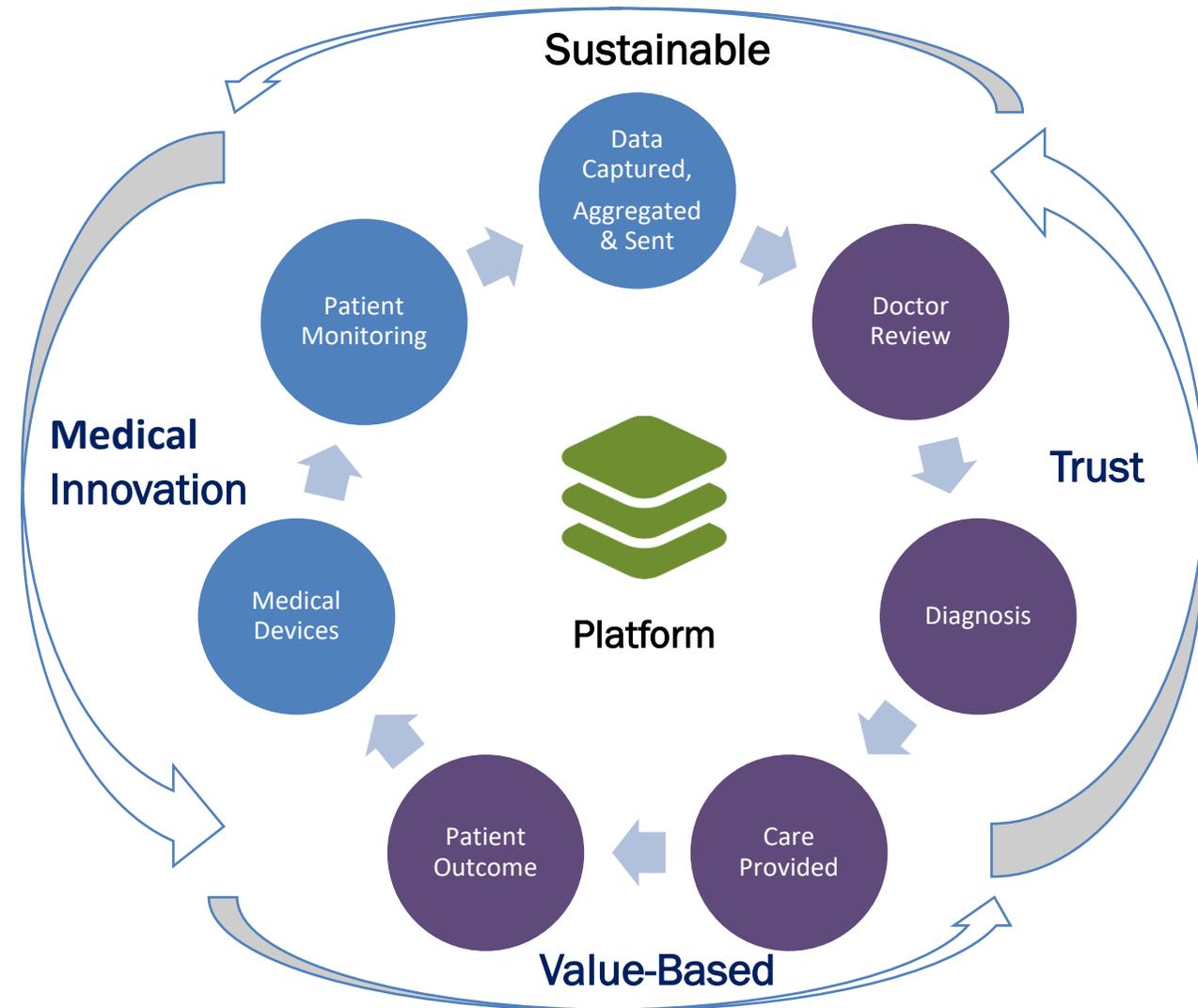
## Care Needs

- Continuous, real-time monitoring of critical health parameters (e.g., glucose levels, cardiac function, infection markers).
- Early detection and prevention of potential sepsis recurrence.

# « From chips to healthcare services »: Empowering innovation



# « From chips to healthcare services »: Empowering collaboration



**Sustainable:** environmental, economic & social sustainability while ensuring equitable & high-quality care

**Value-based:** improving patient outcomes relative to the cost of delivering those outcomes, emphasizing quality, efficiency & patient-centered care

**Trust:** confidence of patients, healthcare providers & stakeholders in the security, privacy, reliability and ethical use of digital health technologies & data

**Medical innovation:** development & integration of advanced technologies – from chips to medical devices to platforms – to enhance healthcare delivery, diagnostics, treatment & patient outcomes