i PROLEPSIS

HorizonEurope-funded project developing a novel personalised digital care ecosystem for people with PsA

iPROLEPSIS project newsletter | Issue No. 3

November 2023

Welcome! This is the third edition of the Newsletter series of the iPROLEPSIS project. In this newsletter issue, we delve into the updates and progress of the project activities, synergies and events.

Inside this issue

- **Received ethical approval for iPROLEPSIS-PDPID study in the Netherlands**
- **Ongoing user research and co-creation for the development of the mIPROLEPSIS app**
- **Defined the first version of the iPROLEPSIS ecosystem's architecture**
- **Completed review of the state-of-the-art literature and existing datasets in the field of PsA**
- **Formed alliance with the DHU project; upcoming and past project events**

iPROLEPSIS-PDPID study

In November 2023, the **protocol for PsA Digital Phenotyping and Inflammation Drivers Study (iPROLEPSIS-PDPID)** received **ethical approval** in the Netherlands. Approvals in the UK, PT and GR are in progress.

The primary **objective of the iPROLEPSIS-PDPID** is to **create smartphone and smartwatch-based, AI-driven digital biomarkers** for the remote assessment and monitoring of individuals with psoriatic arthritis.

iPROLEPSIS-PDPID will leverage cutting-edge technology and a set of products, such as a **mobile phone app** and a **smartwatch.**

The miPROLEPSIS phone app, which will be used in this study, is currently under development. **The app will be** installed on the patients' smartphones and **utilised as a data collector** before being used to develop and train algorithms.

>>> Research landscape

The research will be conducted in four countries:

NL   **UK**   **PT**   **GR**

Two types of action will take place in the development cohort: **measure** and **predict**.

>>> Measure

Develop digital biomarkers for smartphones to **assess inflammatory symptoms**, focusing on movement patterns, pain, fatigue, and morning stiffness—benchmarking against clinical evaluations.

>>> Predict

Predict shifts from uninflamed to inflamed states by **identifying triggers** in psoriatic arthritis patients: stress, mechanical stress, and changes in the gut microbiome.

User research and co-creation

iPROLEPSIS active engagement with users through ongoing **co-creation sessions helps to advance the development of the mIPROLEPSIS app**, scheduled for delivery before January 2024.

In October 2023, the project partner **Erasmus MC (EMC) conducted** a **co-creation session with patient partners** to **assess the User Interface (UI)** of the PDPID-app. The focus was on improving usability, ensuring users' understanding of expectations, and enhancing users' engagement to minimise missing data.

The project partner **FACULDADE DE MOTRICIDADE HUMANA (FMH-ULISBOA)**, is also **developing storyboards** for the personalised gaming suite. **Three co-creation sessions were conducted**: one with healthcare professionals and two with patient partners.

Project partners **The Centre for Research and Technology Hellas (CERTH)** and **FACULDADE DE MOTRICIDADE HUMANA (FMH-ULISBOA)**, in collaboration with **the clinical partners**, worked on **identifying movements for the video analysis** that will be included in the iPROLEPSIS-PDPID study. **Multiple hand gestures and full-body movements were identified** for further assessment.

»» Main points: mIPROLEPSIS

- **App's general looks and UI were approved** by the patient partners.
- Despite being a data-collection app for research purposes, **patients emphasise the significance of reviewing their own data entries**.
- Participants noted a **need for enhanced visual cues** regarding specific activities in the app.

»» Personalised gaming suite

- **Smart games** meant for disease management **need to be highly tailored to the capabilities of the patients**.
- Patients view gaming as a form of relaxation, emphasising the **importance of stress-free design.**
- Patient partners expressed **interest in the proposed gaming categories**.

miPROLEPSIS app start screen
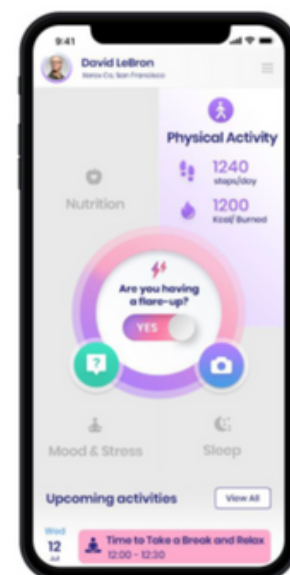
Architecture of the iPROLEPSIS ecosystem

In September 2023, **iPROLEPSIS technical partners defined the first version of iPROLEPSIS ecosystem's architecture**, including the initial technical specifications and product backlog.

The initial **conceptual architecture of the iPROLEPSIS ecosystem consists of:**
- The miPROLEPSIS patient mobile app (including the embedded subcomponent/feature biAURA);
- The iPROLEPSIS healthcare professionals (HCP) web app;
- The cloud-based Data Management System;
- The AI-driven Lifestyle Recommendation Engine;
- The xAI-driven Models Engine;
- The Serious Games Suite;
- Finally, the operation of the entire system is supported by the Orchestration and Monitoring component.

Digital health ecosystem is aimed **to support healthcare professionals to screen, monitor and treat psoriatic arthritis (PsA)**. It also aims to **empower people with/at risk of PsA by providing personalised insights and preventive interventions.**

A widely known **methodology developed** in 1995 **by Kruchten**, **was adopted** to organise the design and architecture of the iPROLEPSIS ecosystem.

>>> Tailored health solutions

miPROLEPSIS Patient App:

- **Primary Users:** Patients;
- **Function:** Tool for personalised disease monitoring;
- **Operations:** Captures data from sensors and wearable devices; Communicates feedback from the recommendation engine to the user;
- **Additional Applications/Features:** biAURA, keyboard; Further monitoring of patients' conditions, interventions, and engagement hooks.

miPROLEPSIS HCP (Health Care Professional) App:

- **Users:** Healthcare professionals (HCPs);
- **Health status tracking:** HCPs can tracks patients' health status; Review projections of PsA progression; Utilise recommendations for optimised personalised suggestions;
- **Data Presentation:** Aggregated patients' data and outcomes of the xAI Models Engine are displayed through intuitive and informative dashboards to HcPs;
- **Monitoring:** HCPs can monitor patients' adherence to medical, dietary, and physical activity plans; Issue warnings and notifications or adjust treatment regimens;
- **Facilitation:** Supports accurate interventions; Enables efficient and optimised management of PsA patients' needs; Facilitates communication with other HCPs and related stakeholders.

State-of-the-art analysis and datasets landscape

In October 2023, **iPROLEPSIS** partners completed an initial extensive **review, focusing on the state-of-the-art literature and existing datasets in the field of PsA**, with a special focus on flare dynamics.

The insights gained from the literature **provide background for various aspects of iPROLEPSIS research,** such as investigating PsA inflammation drivers and monitoring, developing the iPROLEPSIS digital health ecosystem for personalised preventive care, and conducting clinical studies.

Moreover, various **multi-source datasets** that can potentially yield valuable information for discovering PsA inflammation drivers and developing novel digital biomarkers and predictive models for disease monitoring and progression prognosis **were identified**.

The **identified datasets will be assessed for relevancy and usability, retrieved, harmonised and curated**. These datasets and predictive models will contribute to the research on PsA monitoring and inflammation drivers. In addition, the identified existing datasets will also guide the development of the Lifestyle AI-driven recommendation system and the Serious Games.

>>> Key highlights from findings

- **Common Symptoms:** Fatigue, pain, and stiffness emerge as commonly reported symptoms in PsA.

- **Flare Dynamics:** Flares may be triggered by mood, stress, sleep, bowel movements, and environmental factors. These flares, in turn, impact mood, stress, sleep, bowel movements, physical activity, and fine motor skills.

- **Monitoring Tools:** Clinical measurements, smartphone apps, wearables, and electrography techniques show promise in monitoring PsA symptoms and flare factors.

- **Genetic and Biological Factors:** Genetic elements, the gut microbiome, and skin mast cells may contribute to PsA development and responses to treatment.

- **Innovative Approaches:** Imaging-based techniques and data-driven models present alternative paths for clinical assessment.

Synergies and collaboration

In September 2023, **iPROLEPSIS formed alliance with the Digital Health Uptake (DHU)** project, marking a significant step forward in our commitment to advancing digital health solutions.

The Digital Health Uptake (DHU) project, funded through the Digital Europe Programme, is dedicated to aligning policies, strategies, instruments, and activities to promote the adoption of digital health solutions and services across Europe. The work of DHU is grouped under three key aspects: RADAR, KNOWLEDGE COMMUNITY and ACCELERATOR.

The **partnership between iPROLEPSIS and Digital Health Uptake (DHU)** will **span various channels, encompassing websites, newsletters,** and **social media** platforms. As our collaboration strengthens, we anticipate co-organizing events aligned with our shared mission.

Call for Radar entries

Looking to increase the reach and impact of your digital health solution or service? Join +100 practices that are already featured in the DHU Radar Repository. The DHU Radar is currently looking for entries for various types of practices, including:

1. **Policy and strategy** in relation to digital health solutions or services
2. **Digital solutions and services** (e.g., apps, portals, AI-based systems, etc.)
3. **Supporting tools and methodologies** for upscaling digital health solutions or services (e.g., management tools, impact assessment methodologies, etc.)

And more >>> Publish your practice here

DHU sessions at the Digital Health and Data Week

The Digital Health and Data Week is a three-day event in Ghent (Belgium), as the result of the collaboration between EHTEL, I~HD, and the UNICOM project consortium. The Digital Health Uptake (DHU) project, will be featured at the **EHTEL Symposium on 29 November** with a session on deploying digital health in the community and at the i~HD annual conference on 1st December with a session on successful practices for patient engagement and empowerment. Secure your spot now!

Events

iPROLEPSIS 3rd Plenary Meeting

iPROLEPSIS 3rd Plenary meeting is planned for **12-13 December 2023.** The event will take place in Rotterdam, Netherlands and will be **hosted by** project partners **Erasmus MC** abd **CICERO**.
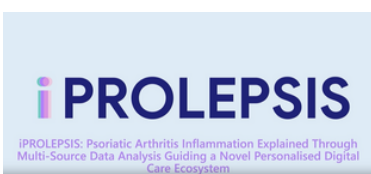
Past events

Medica 2023

Project partners **Amalia Ntemou (Netcompany-Intrasoft)** and **Georgios Apostolidis (Aristotle University of Thessaloniki (AUTH)) presented iPROLEPSIS project** at the **MEDICA** - Leading International Trade Fair in Germany, held on 11-14 November 2023 in Dusseldorf, Germany.

15th Portuguese Rheumatology Congress

On 27 October 2023, project partners **Cátia Gonçalves (Reuma.pt Study Coordinator)**, and **Ana M. Rodrigues, (Reuma.pt National Coordinator and Assistant Professor at NOVA Medical School) presented iPROLEPSIS** project, its objectives and clinical studies at the **15th Portuguese Rheumatology Congress**, held in Portugal.

Psoriatic Arthritis Awareness Day

iPROLEPSIS

iPROLEPSIS: Psoriatic Arthritis Inflammation Explained Through Multi-Source Data Analysis Guiding a Novel Personalised Digital Care Ecosystem

On 28 September 2023, **iPROLEPSIS joined to celebrate Psoriatic Arthritis Awareness Day**, dedicated to raising awareness of the painful inflammatory disease often linked with psoriasis. **Watch video.**