Heart Failure Patient Management and Interventions using Real World Data – The RETENTION case

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ABSTRACT

RETENTION is a European research project that aims at developing and delivering an innovative platform supporting enhanced clinical monitoring and management and personalized interventions of patients with chronic HF, reducing in this way their mortality and improving their quality of life and well-being. In order to achieve its goals, the RETENTION system combines continuous monitoring at home and integration of heterogeneous data-medical, clinical, physiological, behavioral, psychosocial, and real-world data - with clinical decision making and data-driven analytics. The RETENTION platform supports clinical decision making and evidenced based individualized interventions for HF patients by monitoring and collecting medical, clinical, physiological, behavioral, psychosocial and real-world data (RWD) and analyse this data using model-driven big data analytics, statistical, artificial intelligence and machine learning techniques. The platform will be validated through a Randomised Clinical Trial, involving 450 HF patients, recruited by 6 hospitals in 4 EU countries and each of them will be provided with devices such as a smartphone, weight scale, smartwatch, blood pressure monitor, oximeter, home temperature and humidity sensors and a local gateway. The main services of the RETENTION platform are i) the Patient Edge (PE), ii) the Clinical Site Backend (CSB) and iii) the Global Insights Cloud (GIC). The Patient Edge is used to collect and analyse the data provided by the real-world environment. The CSB is deployed at the clinical sites of the study and is responsible for the patient data ingestion received by the PE. The CSB enables the execution of local analytics based on verified intervention models, which will be trained on the GIC. Based on the results of these analytics, patient management interventions will be triggered and will be delivered to the PE instance of each patient. The integration of heterogeneous data, including RWD, and its subsequent processing is considered to be the main asset of RETENTION as it will allow the extraction of useful information hidden in data collected from patients' daily life. The RETENTION data model is developed to enable the storage and processing of this heterogenous data during the platform operation. The definition of the RETENTION data model is driven by the analysis of the international standards published by HL7 and is compliant with FHIR specifications that use widely adopted terminology systems.