RENEW

Reshaping data-driven smart healthcare to optimize resources and personalize care for hypertensive patients through AI and digital twin models

KEYWORDS

digital platform for monitoring and educating hypertensive older adults, pilot studies with patients, informal caregivers and medical practitioners in Poland, Italy and Slovenia, digital twin, artificial intelligence, personalized healthcare, health econo

DURATION

36 months

ABSTRACT

The demand for convenient and accurate medical services is rapidly increasing worldwide, an increase that is particularly relevant to older adults, due to the growth of this segment in the general population. Moreover, both the risks for cardiovascular diseases (CVDs) and their prevalence increase dramatically with age, with CVDs accounting for approximately one-third of all deaths globally. Thus, as recognized worldwide, CVDs create a heavy economic burden and are a major contributor to the costs of medical care. Among cardiovascular diseases, hypertension is one of the strongest risk factors for all different CVDs including coronary disease, heart failure, arrhythmia, and cerebral stroke. Prevention and treatment recommendations should quantify the total cardiovascular risk by developing models that reflect variations between countries and age groups. Our project is targeting personalized data-driven smart healthcare to benefit hypertensive patients, at risk patients (e.g., women at menopause), and medical practitioners by exploiting previous results and expertise of the consortium for the design, implementation and assessment of models and solutions that can optimize the complementarity of inpatient and outpatient care. Specifically, we will contribute to optimizing personalized patient care through the development of a digital twin for hypertensive older adults and those at risk. This will help professionals provide more precise treatments that reduce unnecessary side effects and the high costs of one-size-fits-all approaches. It will support better treatment and care-related decisions, and realize more effective interventions while at the same time allowing prevention, early detection, and targeted treatments. This paradigm is not limited to medical practice improvement; it also offers a solution to the issues related to healthcare systems. It supports their strategic management in allocating limited public resources across outpatient and inpatient healthcare services to achieve maximum improvement in health outcomes. Our approach requires a variety of data such as patient data, medical data, economics and services data which will be collected through a digital platform comprising medical devices, wearable sensors for continuous monitoring, gamification elements and digital questionnaires. The platform will build and develop the achievements of the PerHeart ERA PerMed platform which was designed for heart-failure patients as a proof of concept for the efficiency of a smart data-driven approach to reduce rehospitalization rates in these patients. In RENEW we integrate specific elements for our target groups within a participatory design which will stimulate participant engagement and will ensure adherence and participant engagement during the piloting and validation stages. A total of 100 participants

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among which 60 patients with their caregivers and medical professionals will be involved for six months in Poland, Slovenia and Italy. This will allow the collection of data needed to develop artificial intelligent algorithms and a digital twin model that will continuously evolve over the course of the project and beyond. Our approach will enable efficient personalized feedback, optimizing the effective use of preventative medicines, devices, and other therapies, from both a health and economic perspective. To maximize the projects impact, we will target features that have a high potential of being reused in different settings and environments. RENEWs success is ensured through transnational cooperation, scientific multidisciplinary, and stakeholder variety. A consortium comprising industrial partners, academia, university hospitals and NGOs will ensure all needed ingredients. Their expertise was finely honed over the course of several health-related projects. Transnational collaboration facilitates integration of a wide end-user and stakeholder perspective and significantly enhance the projects impact.

PARTNERS

PI	Organisation	Country
STANCIU	CENTRUL IT PENTRU STIINTA SI TEHNOLOGIE	ROMANIA
Amabili	ISTITUTO NAZIONALE DI RIPOSO E CURA PER ANZIANA	Italy
Consoli	ECLEXYS SAGL	Switzerland
Kolakowski	Warsaw University of Technology	Poland
Piotrowicz	Jagiellonian University Medical College, University Hospital, Dept. of Internal Medicine and Geriatrics	Poland
Ricordel	Ecole Polytechnique de Nantes Université	France
Samar Bren	Informacijski raziskovalni inštitut za izobraževanje in svetovanje - Zavod IZRIIS	Slovenia
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