DIGIT-PRE

Innovation Investments Instruments (I3)

DIGITal tools delivering PREvention, prediction and remote care through a resilient EU value network to reduce health system stressors in a post-COVID world
PROJECT N°I3 – 101081934

OPEN CALL for SMEs

developing digital health solutions

for prevention, prediction & remote care

Health Challenges

15/05/2023

◎ DIGIT-PRE

DIGIT-PRE is a project designed to generate digital health innovations through cross-border and cross-sector collaborations among Small and Medium-sized Enterprises (SMEs).

The aim of DIGIT-PRE is to positively impact people's health while reducing stress on the healthcare system. By providing personalized information and support, early risk assessment of individual health situations, the goal is to prevent and predict the progression of conditions and diseases, minimize, or delay hospitalization, and improve overall health and well-being. DIGIT-PRE generated solutions should be participatory and user-friendly for individuals.

In collaboration with stakeholders and health experts, DIGIT-PRE has identified five AREAS where digital solutions can play a significant role in achieving project goals. Further, we have defined specific CHALLENGES within these AREAS where SMEs can apply to develop and/or improve solutions (see list below).

There are three different ways for SMEs to apply to the open call:

1. By responding to the CHALLENGES and exemplified solutions defined within the project without any changes.

2. Re-frame the CHALLENGES and exemplified solutions by, for example, target one of them with a different approach.

3. Propose an idea that target *another* health CHALLENGE than the ones defined, as long as the challenge falls within one of the chosen AREAS and meet project requirements.

For either of these options proposals will be evaluated on to which extent they address and impact the DIGIT-PRE AREAS and CHALLENGES described below.

In summary, DIGIT-PRE aims to generate new health solutions through cross-over collaborations among SMEs, while also supporting their entry into the international market. The solutions must focus on health prevention, prediction, or remote care, and should not already be on the market. Furthermore, DIGIT-PRE generated solutions and tools should prioritize putting the user in control and empowering self-care whenever possible.

TABLE OF CONTENTS

1. AREA: MENTAL HEALTH

In recent years, there has been growing recognition of the heightened challenges associated with mental illness among children and adolescents, and the problems among adults are also increasing globally. Depression, anxiety, and eating disorders are among the leading causes of disability, along with stress-related problems. However, there is much that can be done to prevent mental illness and provide support to those in need. Digital solutions are critical tools in this area, and we have identified specific areas that require innovative and robust solutions to improve and enhance mental health.

First, early intervention and prevention strategies are crucial in addressing mental health issues generally. Digital solutions that provide screening, assessment, and interventions for mental health conditions in a proactive and preventive manner can help identify at-risk individuals early on and provide timely support and actions to prevent the onset or progression of mental health problems. Second, improving access to early mental self-health care is vital to promote wellbeing in individuals and decrease the risk of severe mental illness, as well as using health care resources to those with highest needs.

Digital solutions can play a crucial role in addressing these challenges. They provide convenient and confidential access to mental health support and resources, overcome barriers such as stigma and geographical distance, and offer personalized intervention based on individual needs and preferences. Digital solutions that enable remote or virtual mental health care, such as telehealth platforms or online counseling services, can bridge this gap and provide accessible and convenient mental health support to those in need. These innovative digital solutions should be evidence-based, user-friendly, and tailored

to the unique needs of the user. They should prioritize privacy and security, adhere to best practices in mental health care, and have the potential to significantly impact mental health outcomes and improve the well-being of individuals.

1.1 CHALLENGE: Early detection of signs and risk factors for mental illness among kids and adolescents

Empowering today's kids and adolescents to take care of and understand their mental health is important for preventing mental illness, but it is equally important to empower the adults around the child, such as parents, teachers, and others. Understanding and identifying risk factors enables early intervention to be offered, regardless of the environment in which the child is located. Getting help in time is important and has many positive effects.

The unmet need is a digital supporting tool priory for school health care for self-work to prevent mental illness.

1.2 CHALLENGE: Treatment support for eating disorders

Eating Disorders (EDs) are complex illnesses with significant physiological and psychiatric impacts, resulting in personal, interpersonal, social, and economic burdens. The unmet need is a digital tool that can provide support to diagnosed individuals during the treatment process, empower their self-care capacity, and encourage their progress. The goal is for the tool to enhance the treatment process, accelerate recovery, and improve the chances of successful recovery.

Research has highlighted that elements such as problem-solving, exposure, and relapse prevention strategies, which are integral to face-to-face empirically supported treatments, are often lacking in current digital solutions for EDs. Therefore, DIGIT-PRE stakeholders seek a tool that encompasses these evidence-based approaches to better support individuals with EDs throughout their recovery.

1.3. CHALLENGE: Palliative remote care

Palliative care is a patient-centered approach that aims to improve the quality of life for those with life-threatening illnesses. While traditionally offered in hospitals or specialized units, many patients now prefer receiving palliative care at home, where they can be close to loved ones and feel secure. The introduction of new medical solutions has the potential to revolutionize palliative home care and address the challenges faced by patients, families, and care providers.

DIGIT-PRE stakeholders seek innovative digital solutions that can support patients and/or relatives in palliative care. Patients can benefit from tools such as virtual reality therapy, which can provide emotional and spiritual support from the comfort of their home. Informal caregivers, family, and relatives, who provide palliative care to loved ones can be supported through digital tools that assist them in their caregiving role, as palliative home care can often cause significant physical and emotional stress for informal caregivers.

2. AREA: REHABILITATION

Rehabilitation is defined as "a set of interventions designed to optimize functioning and reduce disability in individuals with health conditions in interaction with their environment". The need for rehabilitation worldwide is predicted to increase due to changes in the health and characteristics of the population. For example, people are living longer.

Rehabilitation helps people to be as independent as possible in everyday activities and enables participation in education, work, recreation and having a meaningful life.

Addiction is manifested in any behavior that a person craves, finds temporary relief or pleasure in but suffers negative consequences because of, and yet has difficulty giving up.

We are seeking innovative solutions to improve and strengthen people's possibility to rehabilitation and work in everyday life, supported by healthcare using remote care solutions, to maintain as good a health as possible according to their circumstances.

2.1.   CHALLENGE: Adherence to self-care rehabilitation of Musculoskeletal Disorders

Musculoskeletal conditions refer to conditions that affect the performance of the locomotor system, which includes joints, bones, and muscles. Musculoskeletal conditions are the leading contributor to disability, and cause early retirement, reduced ability to participate in society, limited mobility, and reduced quality of life. In musculoskeletal rehabilitation, adherence to therapies is a primary determinant of treatment success. Despite that, it is a very common and widely identified phenomenon that patients tend to neglect rehabilitation.

The unmet need is an innovation that supports the rehabilitation and self-care in musculoskeletal conditions when a patient receives individual instructions from a medical expert or a physiotherapist. The solution must motivate and make the patient commit to therapy as well as monitor the execution, progress, and effectiveness of it.

2.2.   CHALLENGE: Addressing relapse in addiction

Addicts need a complex recovery process and relapse prevention. Addiction is a problem that affects not only the individual but also his/her family, colleagues, and society. Currently the solution to addiction management is psychotherapy with or without psychiatric support. A digital solution could be embraced by therapists and the patient/patient's relatives since it could provide the opportunity of earlier intervention.

DIGIT-PRE stakeholders seek a digital solution that supports addicts and relatives to identify and recognize early signs of addiction. Additionally, the tool could be used to support therapists and doctors to monitor the progress of the patient and signs of relapse.

3. AREA: NEUROLOGICAL CONDITIONS

Neurological conditions refer to a wide range of disorders that affect the nervous system, including the brain, spinal cord, and nerves. These conditions have a significant impact on public health due to their prevalence, the degree of disability they can cause, and the associated healthcare costs. Furthermore, neurological conditions significantly impact an individual's quality of life, affecting their physical, emotional, and social well-being.

It is important to provide appropriate support and resources to help individuals manage their condition and maintain their independence and participation in society. Public health efforts to address neurological conditions typically focus on prevention, early detection, and management. This includes promoting healthy lifestyle choices, such as exercise and a healthy diet, reducing exposure to environmental toxins that may contribute to neurological disorders, and improving access to healthcare services for those who need them.

Digital solutions have the potential to significantly improve the lives of people living with neurological conditions by providing access to information, resources, and support. By leveraging these technologies, early detection, individuals' possibility to better manage their condition and improve their overall health and well-being is improved.

3.1. CHALLENGE: Improving care on post-stroke patients

Stroke is a life-threatening medical condition that occurs when there is a blockage of blood supply to a part of the brain or when a blood vessel in the brain bursts. In 2017, there were 1.12 million stroke incidents in the EU, 460 thousand deaths, and 7.06 million disability-adjusted life years lost because of stroke. The need for improving care on post-stroke

patients is critical to improve the quality of life and overall health outcomes for stroke patients, reduce the burden of disability, and lower healthcare costs. From the perspective of the stroke patient, the problems are the physical and psychological challenges of recovering from stroke, including impaired mobility, communication difficulties, and depression. From a societal perspective, there is the economic burden of stroke on the healthcare system, including the cost of hospitalization, rehabilitation, and long-term care.

DIGIT-PRE stakeholders seek an integrated platform that will incorporate wearable sensors and other health monitoring tools to track vital signs, physical activity, and other relevant health data. The platform will likely also include a gamification component that motivates citizens to engage in healthy behaviors and adhere to their treatment plans but also features to help patients manage risk factors for stroke. With a focus on monitoring patients to detect early warning signs of stroke and prevent the occurrence of new episodes. The end users of the platform may include stroke patients, their families, and healthcare professionals such as doctors, nurses, and rehabilitation specialists.

3.2. CHALLENGE: Detection of mild cognitive impairment to prevent dementia

Dementia is an acquired disorder that is characterized by a decline in cognition involving one or more cognitive domains (learning and memory, language, executive function, complex attention, perceptual-motor, social cognition). The most common form of dementia in older adults is Alzheimer disease (AD), accounting for 60 to 80 percent of cases. Dementia is currently the seventh leading cause of death among all diseases and one of the major causes of disability and dependency among older people worldwide. Dementia has physical, psychological, social, and economic impacts, not only for people living with dementia, but also for their caregivers, families, and society at large.

Mild cognitive impairment (MCI) is heterogeneous in its clinical spectrum and has historically been challenging to define, identify, and monitor in clinical practice. MCI often remains undiagnosed, as recognizing cognitive impairment is challenging for clinicians at any stage of the disease. MCI is known to influence the (spontaneous) speech of the patient via three main aspects.

The unmet need is AI supported speech recognition algorithms: an easy-to-use device aiming to detect MCI and/or signs of dementia in a wide population, for primary care use in large scale screening is desirable.

3.3. CHALLENGE: Early detection of Development Language Disorder

Developmental Language Disorder (DLD) is a diagnosis given to a person who has difficulty talking and/or understanding language. Developmental language disorder is a relatively common disorder. Approximately 7% of age cohort globally have the diagnosis (regional variance may occur), and it might be associated with other disorders. The disorder may have a major impact on the individual's everyday life and social skills. Additionally, it causes a financial challenge for the public sector as the costs associated with care and support for a child can be very high, if the disorder is not diagnosed and taken care of until school age. With earlier detection and thus, diagnosis, the individual harm and treatment costs can be significantly lower.

DIGIT-PRE stakeholders are asking for a symptom supporting tool that helps detecting developmental language disorder to enable early diagnosis of the disorder. A solution could for example track a child's level of proficiency with their (native) language, and if concerns

arise the results could be shared with a caregiver. This would ideally speed up diagnosis and treatment, and help detecting cases that could otherwise go undetected.

4. AREA: HEALTHY LIFESTYLE

Having a healthy lifestyle is essential for a long and healthy life. Healthy habits can prevent the development of chronic diseases, improve physical and mental well-being, and enhance longevity and quality of life.

Furthermore, healthy lifestyle habits can also have economic and social benefits, such as positive impacts on relationships, improved productivity and performance at work or school, and reduced healthcare costs associated with preventable diseases. Many aspects of our lives, including sleeping habits, nutrition, exercise, routines, and environments, can impact our health and overall well-being.

We are seeking digital solutions that can support individuals in their everyday lives to improve their health through good and sustainable lifestyle habits. The ideal solutions should be evidence-based, scalable, and consider factors such as usability, accessibility, and affordability to ensure widespread adoption and sustainable change.

4.1. CHALLENGE: Improving teenagers' sleep quality with incentive approaches

Many young people today suffer from lack of sleep, which constitutes a major problem from several different aspects, not least in terms of mental and physical health and wellbeing.

DIGIT-PRE stakeholders seek a solution that is targeted to teenagers and should be used on their daily life and practices. A creative and fun way to create behavioral changes (gamification) is expected, where the teen gets empowered to manage their sleeping problems.

Integration of various health data (level of hormones, heart rate…) is also expected as many connected devices already provide general information, which the solution gather and provide a short summary. Additionally, the solution may be used by healthcare professionals to detect this lack of sleep and improve the compliance of the patient, especially if the patient case is severe and requires dedicated follow up.

4.2. CHALLENGE: Solutions for improved occupational wellbeing for office workers

A sedentary lifestyle and prolonged sitting have been associated with poor mental and physical health, as well as premature death. Studies have linked excessive sitting with medical conditions such as obesity and certain types of cancer. While addressing the challenge of physical activity encompasses various areas, our focus is on the working environment of offices.

Office workers typically spend two-thirds of their waking day sitting. Expert guidance recommends regular breaks from sitting and accumulating 2-4 hours of standing during an 8-hour workday. Interventions to reduce sitting are needed to achieve these targets, and thus, we are seeking solutions that can increase movement during the workday for people working in offices.

Offices are spaces where the need for employees to be less sedentary aligns with employer benefits of creating a professional environment that boosts productivity and retains talent.

With the increasing prevalence of working from home, solutions suitable for the home office environment are also needed. The unmet need is solutions within following areas to counteract a sedentary lifestyle for office workers:

- Utilizing different digital objects in the office can help enhance the vitality of the workplace.

- Introducing gamification activities in the office can help promote physical activity and social engagement among individuals.

- Spending time outdoors offers numerous benefits to one's well-being, such as the positive effects of nature, regular physical activity, exposure to natural sunlight, and breathing fresh air. Despite these advantages, most meetings naturally occur indoors. Solutions to bring the advantages of outdoors in the working environment are needed.

4.3. CHALLENGE: Exergaming for people aged 60+

Maintaining an active lifestyle as we age is crucial for our overall health and well-being. We have identified people over the age of 60 as an important target group that requires support in initiating or maintaining sustainable exercise habits.

DIGIT-PRE stakeholders seek an exergaming solution that allows individuals to exercise at their own level while experiencing pleasure and challenges in their workouts. Exergaming is increasingly recognized as a means of individual and group training, catering to the diverse capabilities of everyone.

The solution should enable the target group to engage in challenges that align with their ambitions and lifestyle, have a motivating effect, and facilitate social connections

between groups. It should also be user-friendly and provide a sustainable solution to improve and enhance the activation of the target group over time.

5. AREA: HEALTH AND AGEING

Ensuring the well-being and health of older adults is crucial for promoting independence, managing chronic diseases, and fostering social engagement and mental well-being.

As the aging population in Europe becomes more digitally capable, there is a pressing need for digital solutions that can support and enhance the health of older adults. DIGIT-PRE stakeholders seek innovative digital tools that can empower elderly individuals to improve and maintain their health in their daily lives. These solutions should be user-friendly, accessible, and tailored to the unique needs, capabilities, and preferences of older adults.

They may include technologies such as mobile applications, wearable devices, telehealth platforms, or other digital interventions that can promote healthy aging, encourage physical activity, monitor health parameters, provide health education and information, facilitate social connections, and support mental well-being in the elderly population. The ideal solutions should be evidence-based, scalable, and have the potential to positively impact the health outcomes and quality of life of older adults. They should also consider factors such as usability, accessibility, and affordability to ensure widespread adoption and meaningful engagement among elderly users.

5.1. CHALLENGE: Predicting emergency care to avoid hospitalizations

Unplanned hospitalizations, emergency visits and re-admissions of at-risk citizens are frequent and pose logistical challenges and high costs to the healthcare system. However, many of these hospitalizations could be avoided with optimal management of chronic diseases and geriatric syndromes by physicians. DIGIT-PRE stakeholders seek a solution that can calculate risks, predict, and prevent hospitalizations.

This solution could be a platform used by at-risk citizens who have already experienced an emergency hospitalization, as well as caregivers who can integrate individual data. Non-medical data, such as well-being questionnaires completed by the at-risk individual on a weekly basis, could be combined with medical data to create profiles of risk situations that can be avoided. The goal is to develop a system that can proactively identify individuals at risk of hospitalization and provide timely interventions to prevent hospitalizations, thereby reducing the burden on the healthcare system and improving patient outcomes.

The unmet need is a user-friendly solution, capable of integrating various types of data, and enable effective communication and coordination among healthcare providers, patients, and caregivers.

5.2. CHALLENGE: Preventing falls of older adults

In an aging society, the risk of fall accidents among the elderly is increasing. In Europe alone, 3.8 million elderly individuals visit emergency units every year due to fall-related injuries, with 1.4 million requiring hospitalization. Several known risk factors contribute to falls, including the person's physical and mental condition, medical problems, and unsafe environments. Falls have significant effects, particularly for elderly individuals with impaired healing abilities, and can cause pain, limitations in quality of life, and burdens on caregivers and the healthcare system.

Early diagnosis and appropriate, person-specific actions can reduce falling accidents. Therefore, we are seeking a solution that provides a comprehensive risk-detection and prevention program, including the following steps:

1. *Risk assessment*

2. *Fall prevention advice*

3. *Fall prevention support*

4. *Fall risk monitoring*

The goal of this solution is to improve patient safety, reduce healthcare costs, and enhance the overall well-being and quality of life for elderly individuals, while also supporting healthcare providers and caregivers in delivering effective care. By implementing a comprehensive and proactive approach to fall prevention, we can make a significant positive impact on the health and well-being of the elderly population.

5.3. CHALLENGE: Early detection of joint replacement infections

Early detection of joint replacement infections is crucial as it is one of the most severe complications that can occur after surgery. These infections can cause significant harm to the patient's health, requiring further treatment and increasing hospital costs.

The unmet need is a solution that can aid in the early detection of infections in prosthetic joints. This solution should be able to identify signs of infection as early as possible to enable prompt intervention and prevent further complications.