Topic idea submitted to IHI - Reference Number: TI_001164

Are you submitting the idea:
☐ **in your personal capacity?**
☒ **on behalf of an organisation?**

Please indicate the name of the group organisation: KnowL Solutions BV

Please select from the list below the type of stakeholders your organization represents: Small & medium enterprise (SME)

1 Title of your idea

Please provide a short title that accurately reflects the objective(s) of your idea:
Improved care pathways in Parkinson's disease through digital technologies

2 Scope

Explain the specific challenges/problems to be addressed by your idea and how these affect relevant stakeholders, taking into account what is already known and/or available in the field:
Parkinson's disease (PD) is a neurodegenerative disorder with motor and non-motor clinical manifestations that dictate the accrual of loss of autonomy and increasing complexity of care. The increase in life expectancy and expected doubling of PD prevalence in coming years further support the development of PD management strategies with high dissemination and greater usability potential.

In the last decades, there has been a growing interest in improving health-related outcomes using technology. In PD, technology-based solutions have been developed mainly with the aim of generating an accurate, objective, and reproducible measurement of motor function. Novel sensor-based and wearable technologies enable a shift of the evaluation of PD from the traditional clinical examination and clinical scales to one based on more objective health monitoring of daily function in an everyday-life naturalistic environment.

However, just as important as motor functions disorders are speech and voice difficulties. Based on statistics, of the more than seven million people with Parkinson's disease worldwide, between 75% and 90% will develop voice and speech problems over the course of their illness. Thus, it's of key importance to improve this care pathway by using the novel digital technology that gives a potential to generate a more continuous and remote health monitoring and the enhancement of patient care communication, what can be a bound to deliver a revolution in PD care.

Please indicate which IHI specific objective(s) (SO), as described in the IHI Strategic Research and Innovation Agenda (SRIA), your idea addresses:

["SO2: integrate fragmented health research and innovation efforts bringing together health industry sectors and other stakeholders, focusing on unmet public health needs, to enable the development of tools, data, platforms, technologies and processes for improved prediction, prevention, interception, diagnosis, treat- ment and management of diseases, meeting the needs of end-users"
"SO3: demonstrate the feasibility of people-centered, integrate health care solutions"
"SO4: exploit the full potential of digitalisation and date exchange in heath care"]

Please select the keywords that are most relevant to your idea:

["Non-communicable diseases"
"Neurodegenerative diseases"
"Prediction"
"Diagnosis"
"Disease management"
"Digital health"
"Health technology"]

In alignment with the IHI specific objective(s) selected above, specify the objectives of your idea:

Existing approaches for evaluating patients for PD are limited. Doctors typically evaluate patients once or twice a year in a supervised clinical setting. Such examinations tend to rely on patient-reported information, however there is a lack of understanding as well as of patient-centralized care.

The project objectives are threefold:

AUTOMATED SPEECH RECOGNITION; One of the hallmarks of PD is the presence of dysarthria, a motor speech disorder, characterized by a significant reduction in vocal loudness, monopitch, hoarse and breathy vocal quality. These deviant features of healthy speech have a significant impact on speech intelligibility, which refers to how an acoustic signal is decoded. Thus, we aim for novel AI and ML algorithms enabling in the same breath: I) accurate speech-to-text conversion by learning from exceptions and errors that are being experienced by PD patients; II) improved prevention model to evaluate speech disorders related to Parkinson's disease;

SEMANTIC INTEROPERABILITY OF EHR SYSTEMS; Our goal is to create a system architecture that allows the electronic sharing of patient information between different EHR systems and healthcare providers in a seamless and meaningful way;

CLINICAL DECISION SUPPORT SYSTEM; We aim for approach where we develop a system enabling shared decision making between the clinician, patient and the carer, flexibility that accounts for diagnostic and treatment variation among clinicians, and monitoring of information integration from multiple sources;

3 Expected impacts to be achieved by your idea

Briefly describe the expected impacts to be achieved by your idea, ensuring that they contribute to IHI general and relevant specific objectives, as described in the IHI SRIA:

Impacts *are wider long-term effects on society (including the environment), the economy and science, enabled by the outcomes of R&I investments. Impacts generally occur sometime after the end of the project, e.g. successful implementation of digital solutions supporting people-centred care.*

IHI general objectives: *1. contribute towards the creation of an EU-wide health research and innovation ecosystem that facilitates translation of scientific knowledge into innovations, notably by launching at least 30 large-scale, cross-sectoral projects, focussing on health innovations; 2. foster the development of safe, effective, people-centred and cost-effective innovations that respond to strategic unmet public health needs, by exhibiting, in at least 5 examples, the feasibility of integrating health care products or services, with demonstrated suitability for uptake by health care systems. The related projects should address the prevention, diagnosis, treatment and/or management of diseases affecting the EU population, including contribution to 'Europe's Beating Cancer Plan'; 3. drive cross-sectoral health innovation for a globally competitive European health industry and contribute to reaching the objectives of the new Industrial Strategy for Europe and the Pharmaceutical Strategy for Europe.*

By realizing the proposed project idea, we expect to reach long-term effects on society (PD patients, healthcare providers, informal carers) as well as on economy and business perspective.

The economic impact is substantial – the annual European cost is estimated at €13.9 billion. Parkinson's is a complicated disorder that most patients live with for many years and decades, becoming increasingly reliant on others to care for them in all aspects of life. The highly idiosyncratic presentation of the disease, its unpredictable progression, the plethora of possible symptoms render the disease particularly difficult to manage. Thus, combination of project's objectives listed in the previous question delivering a continuous stream of information via a digital solution has many obvious attractions, due to its pervasiveness, portability, context-sensitivity, immediacy and convenience. One of the most desired is cost saving (e.g. freeing up time spent by healthcare workers on administrative tasks, early prediction, more accurate treatment plans)

In terms of societal impact, the proposed solution will have an impact on both, patient as well as the healthcare provider; It will put a patient in a centre and give him control of health and well-being. Additionally, it will increase the ability for healthcare professionals to better understand the day-to-day patterns and needs of the people they care for, and with that understanding they will be able to provide better feedback, guidance and support for staying healthy. Moreover, by spending more time on treating patients rather than on data entry during examinations, the quality of care will significantly increase.

4 Why should your idea become an IHI call topic?

Explain why collaboration through a cross-sectoral and multidisciplinary public private partnership is needed in particular:

Why does it require collaboration among several industry sectors (*e.g.* pharma, vaccines, biotech, medical devices, in vitro diagnostics, radiotherapy, medical imaging health ICT)?

Why does it require collaboration between private (industry) and public partners (*e.g.* academia, healthcare practitioners, patients, regulators)?

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Why is the contribution of industry needed to achieve the expected impacts?

***Contribution of industry**: Large companies that are members of the IHI industry partners (i.e. COCIR, EFPIA, EuropaBio, MedTech Europe, Vaccines Europe) contribute to the programme, primarily through 'in-kind' contributions (e.g. their researchers' time, laboratories, data, compounds). At least 45% of each project's total costs have to be in-kind contribution.*

Digitalization can improve the sustainability and competitiveness of the process industry. However, all of the small and medium-sized enterprises (SMEs), especially those who are acting alone, don´t have the capabilities to use digital technologies efficiently. Key challenges in the utilization of digitalization opportunities are finding the applications which provide added benefits to the customer, and the development and introduction of new business models based on new ecosystems in a manner that is beneficial for all parties involved. To achieve our objectives, the project identifies the needs of industrial companies and the opportunities which industrial companies have, and consults SMEs about their business development. One of the central goals is to expand process industries' co-operation from country-specific to cross-border co-operation. SMEs benefit from the development of ecosystem business models, implementation of technical pilots, and through demonstration, ongoing RDI project applications and industry ecosystem co-operation. Additionally, we believe that our cross-sectoral project will benefit by involving the biopharmaceutical, biotechnology and medical technology sectors, including companies active in the digital area to respond to unmet public health needs.