



# GPS4IntegratedCare

Automatic generation of dynamic and personalized care workflows

Every patient is unique and every clinical case is different. Typical care workflows are, however, designed for a single care organization, for a specific disease and according to a standard patient profile. This generic approach does not always yield the best results, especially when dealing with complex medical patient profiles.

The GPS4IntegratedCare project developed a Smart Workflow Engine to suggest and execute workflows tailored to the needs of each individual patient. These workflows are coordinating the activities of different care providers in different care organizations taking into account the changing contexts of the patient.

The Smart Workflow Engine is designed to support the doctors to make decisions. Just like a GPS guides the driver on the road to his final destination (goal) avoiding obstacles, it suggests the personalized care pathway towards improvement of the health status of patient, taking into account the current clinical condition of the patient and adapting the care path where needed.

The GPS4IntegratedCare project solves problems associated with the management of complex medical patient profiles that require integrated care, such as comorbidities and/or poly medication, where workflows that belong to different care paths are aggregated. In these situations, the current static protocols often fall short in providing a patient-specific care trajectory.

The GPS4IC-solution is dynamic and adapts to the patient's ever-changing context thanks to:

- The automatic generation of a personalized workflow
- The automatic detection of conflicts between different workflows

- The automatic validation of ongoing workflows
- The integration of existing and newly generated knowledge in the relevant domain

## THE OUTCOMES

### 1. The GPS4IC-system offers personalized care workflows, tailored to the patient's needs

Typical care workflows are designed for a single care organization, for a specific disease, and according to a standard patient profile. This generic approach might result in a lack of communication and/or conflicting approaches to care in situations of comorbidity where a patient needs to follow more than one workflow. Moreover, the Smart Workflow Engine takes into account the specific condition of each individual patient in generating workflows. This means that, for example, when a patient is weakened, the workflow is adapted to a less aggressive treatment. That way, the GPS4IC system allows for matching the specific situation of each individual patient to the optimal workflow, while coordinating all needed care.

### 2. The Smart Workflow Engine promotes better coordination and patient empowerment

Current approaches for integrated care rely heavily on the knowledge and the network of the treating physician and the standard workflows of the care institution. This could result in an overload of information when dealing with complex patient cases. Therefore, the GPS4IC-system aims to support the physician in the decision-making process for different treatment options by creating comprehensive workflows. The system provides an interface to assist communicating workflows between different stakeholders and investigates the considerate communication method to better communicate with different stakeholders.

Moreover, the easy-to-use interface allows the physician to present clear alternative treatment options to the patients, enabling them to participate in the decision process. Patient empowerment is especially important for decisions dealing with the patient's quality of life. This way, a self-contained, communicative health services ecosystem is created in which all stakeholders are informed and aligned.

### 3. The smart workflows are semi-automatic and dynamic

With the main goals of improved efficiency and user satisfaction in mind, the GPS4IntegratedCare-project has developed a Smart Workflow Engine capable of generating personalized, scalable, semi-automated care workflows. An approach combining considerate computing and participatory design ensures a balance between automatic workflow generation and a sufficient level of user control.

GPS4IntegratedCare formalizes the required knowledge, along with the contextual data such as clinical condition of the patient, availability of resources, and preferences of the stakeholders to generate personalized and considerate workflows for integrated care. Additionally, the Smart Workflow Engine constantly updates itself with feedback of the generated workflows. This creates a dynamic system that learns and adapts to new situations, ensuring the best care pathway for each new patient.

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## FACTS

NAME	GPS4IntegratedCare
OBJECTIVE	Automatic generation of dynamic and personalized care workflows
TECHNOLOGIES USED	Semantic Web Language (JSON-LD, Turtle, N3), Reasoning Engine (EYE)
TYPE	imec.icon project
DURATION	01/04/2016 – 31/03/2018
PROJECT LEAD	Els Lion, Agfa HealthCare
RESEARCH LEAD	Jan Derboven, MintLab, an imec research group at KU Leuven
BUDGET	1,674,660 euro
PROJECT PARTNERS	Agfa HealthCare, Remedus
RESEARCH PARTNERS	MintLab, LIRIS, IDLab UGent
IMEC RESEARCH GROUPS	IDLab, an imec research group at UGent MintLab, an imec research group at KU Leuven

GPS4IntegratedCare project partners:

 AGFA  
HealthCare

 REMEDUS  
Technologies • Innovations • Growth



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