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## D6.3

# Country specific CHRODIS Integrated Multimorbidity Care Model (IMCM) versions

WP6 Pilot Implementation of Integrated Care  
Model for Multimorbidity

Task 6.5 CHRODIS integrated care model  
adjustment for local healthcare setting

Final Version

Rokas Navickas, VULSK

Elena Jurevičienė, VULSK

Laimis Dambrauskas, VULSK

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## The CHRODIS PLUS Joint Action

**CHRODIS PLUS** is a three-year initiative (2017-2020) funded by the European Commission and participating organisations. Altogether, 42 beneficiaries representing 20 European countries collaborate on implementing pilot projects and generating practical lessons in the field of chronic diseases.



The very core of the Action includes 21 pilot implementations and 17 policy dialogues:

- The pilot projects focus on the following areas: health promotion & primary prevention, an Integrated Multimorbidity Care Model, fostering the quality of care for people with chronic diseases, ICT-based patient empowerment and employment & chronic diseases.
- The policy dialogues (15 at the national level, and 2 at the EU level) raise awareness and recognition in decision-makers with respect to improved actions for combatting chronic diseases.

**A heavy price for chronic diseases:** Estimates are that chronic diseases cost EU economies €115 billion or 0.8% of GDP annually. Approximately 70% to 80% of healthcare budgets across the EU are spent on treating chronic diseases.

**The EU and chronic diseases:** Reducing the burden of chronic diseases such as diabetes, cardiovascular disease, cancer and mental disorders is a priority for EU Member States and at the EU Policy level, since they affect 8 out of 10 people aged over 65 in Europe.

A wealth of knowledge exists within EU Member States on effective and efficient ways to prevent and manage cardiovascular disease, strokes and type-2 diabetes. There is also great potential for reducing the burden of chronic disease by using this knowledge in a more effective manner.

**The role of CHRODIS PLUS:** CHRODIS PLUS, during its 36 months of operation, will contribute to the reduction of this burden by promoting the implementation of policies and practices that have been demonstrated to be successful. The development and sharing of these tested policies and projects across EU countries is the core idea driving this action.

**The cornerstones of CHRODIS PLUS:** This Joint Action raises awareness of the notion that in a health-promoting Europe - free of preventable chronic diseases, premature death and avoidable disability - initiatives on chronic diseases should build on the following four cornerstones:

- health promotion and primary prevention as a way to reduce the burden of chronic diseases
- patient empowerment
- tackling functional decline and a reduction in the quality of life as the main consequences of chronic diseases
- making health systems sustainable and responsive to the ageing of our populations associated with the epidemiological transition

## Contributors and Acknowledgements

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<sup>1</sup> Università Cattolica del Sacro Cuore, Rome, 00168, Italy

<sup>2</sup> National Centre of Epidemiology, Institute of Health Carlos III, Madrid, 28029, Spain;

<sup>3</sup> EpiChron Research Group, Aragon Health Sciences Institute (IACS); IIS Aragón; REDISSEC. Miguel Servet University Hospital, 50009 Zaragoza, Spain;

<sup>4a</sup> General Directorate of Health Care, Health Department, Government of Aragon, 50009, Zaragoza, Spain

<sup>4b</sup> Teaching Unit of Preventive Medicine and Public Health, Miguel Servet University Hospital, 50009, Zaragoza, Spain;

<sup>5</sup> Regional Ministry of Health and Families of Andalusia, Seville, E-41020, Spain;

<sup>6</sup> Andalusian Public Foundation Progress and Health (FPS), Seville, E-41092, Spain;

<sup>7a</sup> Servicio Andaluz de Salud (SAS), San José de la Rinconada-Los Carteros Primary Care Center, Seville, E-41300, Spain;

<sup>7b</sup> Servicio Andaluz de Salud (SAS), Tiro de Pichón Primary Care Center, Málaga, E- 29006, Spain;

<sup>8</sup> Centro di Medicina dell’Invecchiamento, Fondazione Policlinico Universitario “A. Gemelli” IRCCS, Rome, 00168, Italy;

<sup>9</sup> Vilnius University Hospital Santaros Klinikos, Vilnius, LT-08661, Lithuania;

<sup>10</sup> Family medicine clinic, Hospital of Lithuanian University of Health Sciences “Kauno klinikos”, Kaunas, 50161, Lithuania;

<sup>11</sup> Department of Cardiovascular, Endocrine-metabolic Diseases and Aging, Istituto Superiore di Sanità, Rome, 0161, Italy;

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## Abbreviations

CD	Chronic Disease
CP	Collaborating partner
EU	European Union
IMCM	Integrated multimorbidity care model
JA	Joint Action
LIWG	Local Implementation Working Group
NCD	Non Communicable Diseases
SWOT	Strengths, Weaknesses, Opportunities, Threats
WP	Work Package
MS	Member states
D6.2	Deliverable 6.2 "Pilot implementation and outcomes evaluation"
PHC	Primary healthcare center
SAS	SERVICIO ANDALUZ DE SALUD
MM	Multimorbidity

## Executive summary

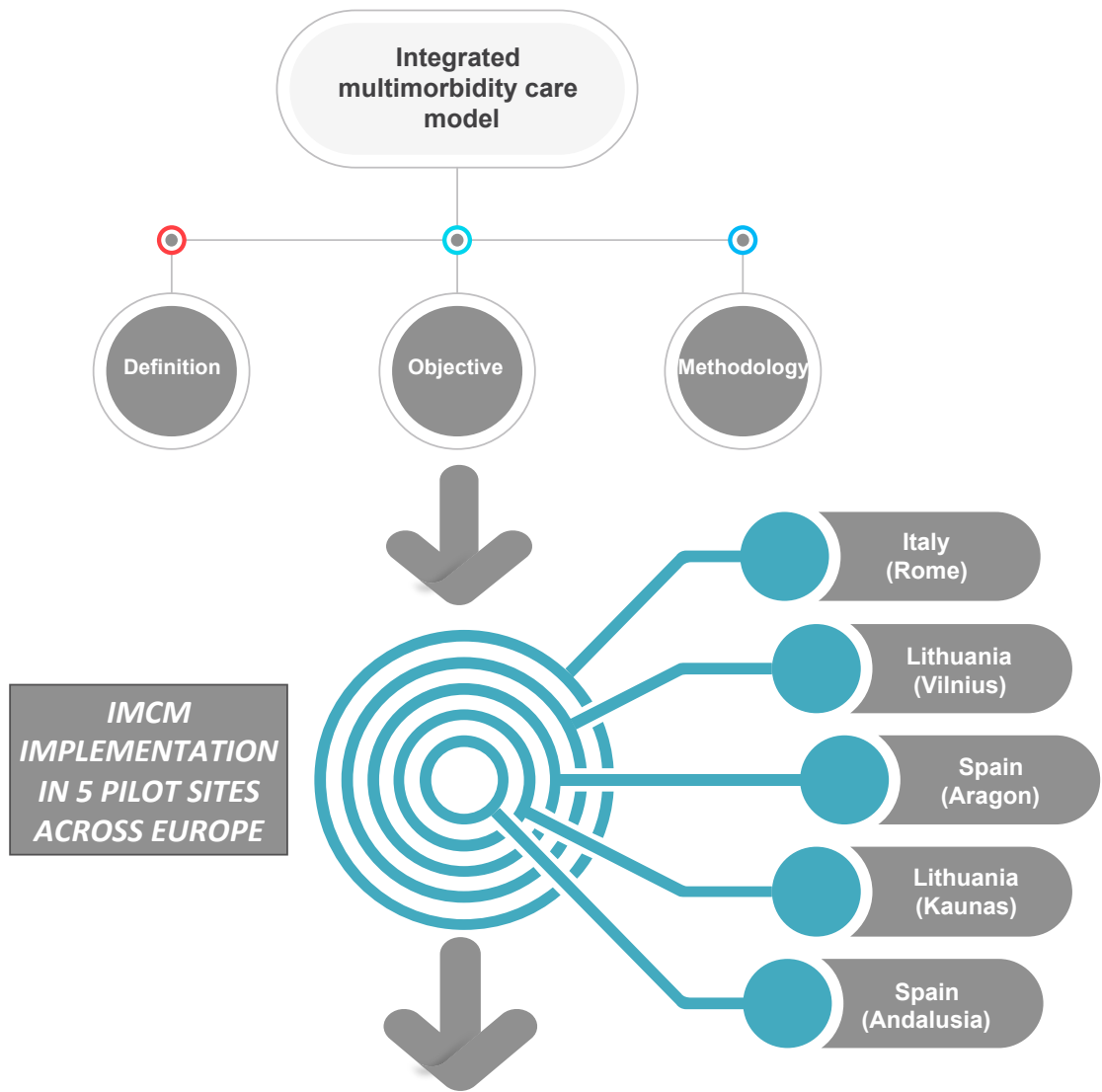
The economic burden of non-communicable diseases (NCDs) is on the rise and is projected to show steeper increases in the future, especially in less developed economies and among the poor in middle- and high-income countries [1]. NCDs also result in non-healthcare costs, for example productivity losses due to morbidity or mortality and costs of informal care [2-3]. The situation even get worse when we are looking at multimorbidity (MM) - the co-occurrence of multiple chronic diseases or conditions in a single individual. MM patients are complex, particularly because they are more likely to have problems with mobility, self-care, and daily functioning than patients with one chronic disease, as well as cognitive impairment and frailty [4]. This often results in a more challenging healthcare treatment, fragmented care, polypharmacy, which increase the risk of inappropriate prescribing, adverse drug reactions and poor medication adherence [5-7].

Innovative practices were identified based on the collection of policies, strategies and interventions that started in JA-CHRODIS and in its outputs such as the Integrated Multimorbidity Care Model (IMCM) may be a comprehensive response to the burden of NCDs for every Member State (MS). The IMCM was developed as part of Joint Action (JA)-CHRODIS (2014-2017) [8] and focuses on several limitations currently faced in the treatment of multimorbid patients. Within CHRODIS PLUS (2017-2020), this model was assessed in practice to prove its applicability. Proposed model was focusing on different aspects of multimorbid patient care, not only related to clinical factors, but also to organizational factors and includes components such as “comprehensive assessment”, “case manager”, “individualized care plan”, “multidisciplinary team” and others (<http://chrodis.eu/wp-content/uploads/2017/11/ja-chrodis-multimorbidity-care-model-wp6-rokas-navickas.pdf>). Throughout the lifetime of CHRODIS PLUS, IMCM pilot implementations took place in five pilot sites, which were required to implement at least one component. Based on local experience and knowledge, participating partners determined IMCM to the specific characteristics of their local health care setting and developed country specific model versions, fully adapted and specified for local implementation. Pilot sites directly reached total of 3449 patients in Europe and brought significant change in the quality of their care. The evidence from D6.2 shows that despite the differences between sites in terms of implemented components of the IMCM and target population in general the IMCM had positive effect across all healthcare systems in which it was tested.

This deliverable is meant to present country specific CHRODIS IMCM versions, from no less than 3 different healthcare settings maintaining the model structure, but taking into consideration local context, regulations, etc. Based on local experience and knowledge, LIWG members from participating sites adapted the IMCM to the specific characteristics of their local health care setting and developed country specific model versions. Local implementers proved the applicability of the IMCM in five European settings of both primary and specialized care levels, with different characteristics.

Based on these conclusions demands of primary healthcare services should be reviewed by each MS and modified considering country specific CHRODIS IMCM versions. In order to ensure quality and sustainability of primary health care it is recommended for each MS to review national health strategy sections for treatment of patients with MM and complement it relying on science-based methodological pilot implementations (such as case manager appointment, individual care plan, multi sectoral patient centered approach).

### Document orientation visual guide



### COUNTRY SPECIFIC IMCM VERSIONS





## Introduction

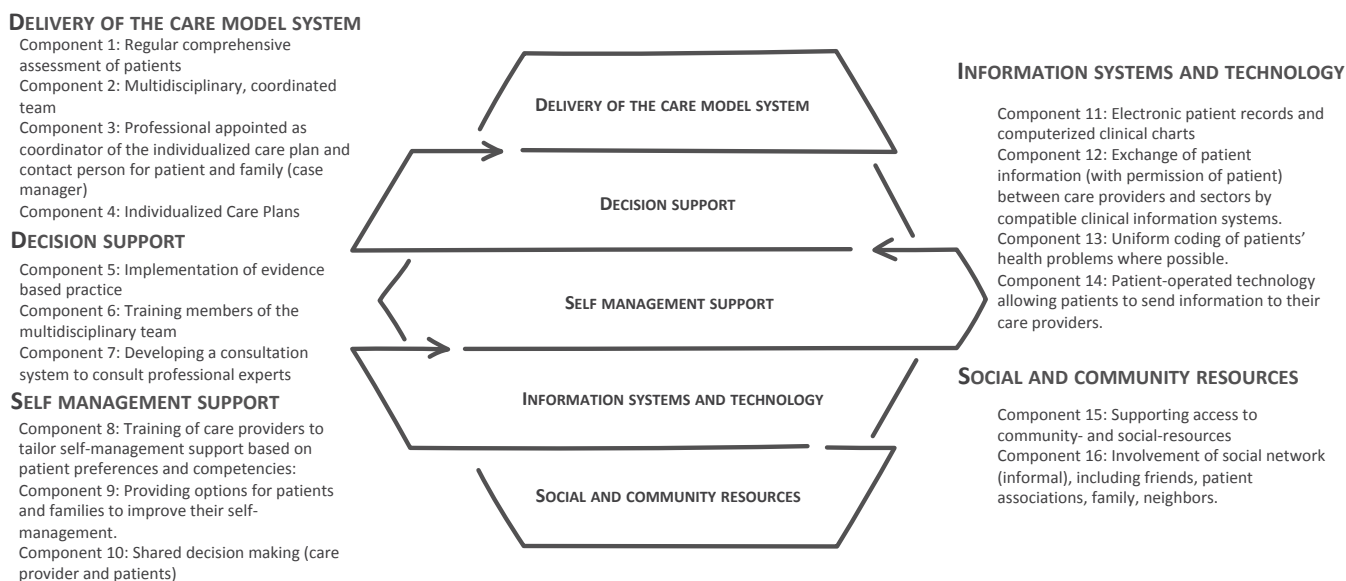
This section highlights:

1. the definition of Integrated multimorbidity care model
2. the objectives of this report;
3. the methodology steps taken by pilot sites

### ***The definition of Integrated multimorbidity care model***

The IMCM was developed as part of Joint Action (JA)-CHRODIS (2014-2017) [8] and focuses on several limitations currently faced in the treatment of multimorbid patients. Within CHRODIS PLUS (2017-2020), this model was assessed in practice to prove its applicability. Throughout the lifetime of CHRODIS PLUS, IMCM pilot implementations took place in five pilot sites, which were required to implement at least one component.

The IMCM identifies sixteen components across five domains (Figure 1) with clear aims, key characteristics, target populations and relevance for patients with MM.



**Figure 1. IMCM domains and components**

The full report and development description of IMCM that responds to unmet needs for improved care and coordination and better support to self-management of patients can be found here: <http://chrodis.eu/wp-content/uploads/2017/11/ja-chrodis-multimorbidity-care-model-wp6-rokas-navickas.pdf>

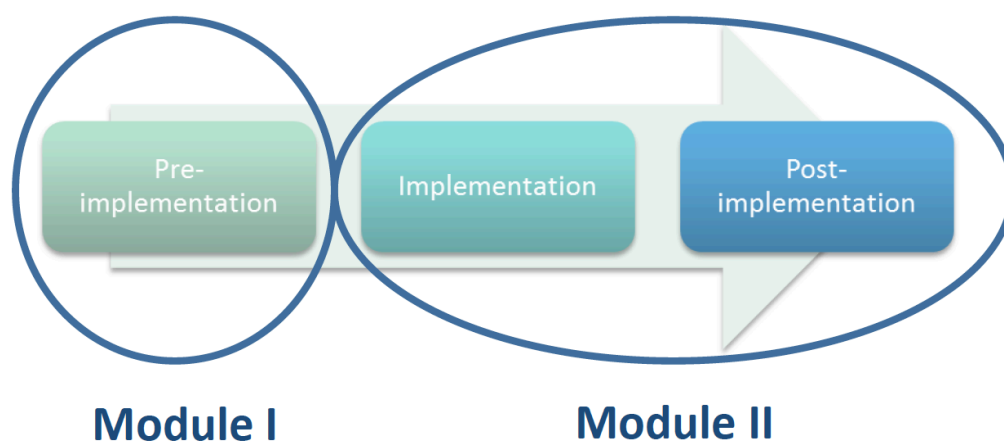
### ***The objectives of this report***

This deliverable is meant to present country specific CHRODIS IMCM versions, from no less than 3 different healthcare settings maintaining the model structure, but taking into consideration local context, regulations, etc..

Based on local experience and knowledge, LIWG members from participating sites adapted the IMCM to the specific characteristics of their local health care setting and developed country specific model versions. Local implementers proved the applicability of the IMCM in five European settings of both primary and specialized care levels, with different characteristics.

### ***The methodology steps taken by pilot sites***

In JA CHRODIS PLUS, a three-step implementation strategy has been defined that will be followed by all implementation sites. It has been designed to be appropriate from the scientific point of view, applicable considering data availability and feasible according to project's timeline and resources (Figure 2).



***Figure 2. Implementation strategy phases and modules***

The implementation strategy was divided into two main documents/modules (Figure 2):

-**Module I:** Focusing on pre-implementation techniques. A Pilot Action Plan describing the activities to be performed in each pilot site has been developed. Proposed activities included the implementation of at least one of the 16 components of the IMCM.

-**Module II:** Focusing on implementation and post-implementation techniques. The implementation phase strategy consists of executing the implementation, data collection and monitoring the implementation.

The objective of pre-implementation phase (Figure 3) was to identify, specify and analyze determinants that act as barriers and enablers that could influence implementation outcomes, and then to elaborate the Pilot Action Plans to be followed during the implementation and post-Implementation phases. This first phase consists of the following actions:

1. Definition of the scope of the intervention and selection of topics to implement
2. Situation analysis using the Strengths, Weaknesses, Opportunities, Threats (SWOT) analysis

3. Elaboration of the Pilot Action Plans

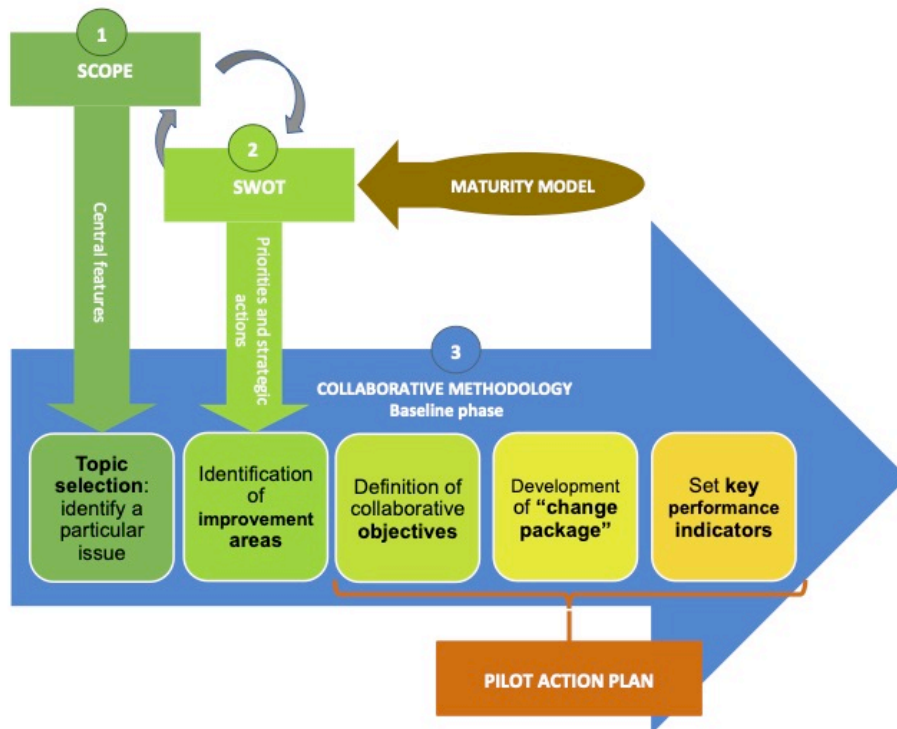


Figure 3.

Pre-implementation strategy phase’s scheme

The objective of the second phase was to specify and describe the steps in the process of transferring practices and tools into real practice. Pilot Action Plans elaborated during the pre-implementation phase was followed. This phase consisted of the following actions:

1. Execution of the implementation.
2. Data collection.
3. Monitoring of the implementation.

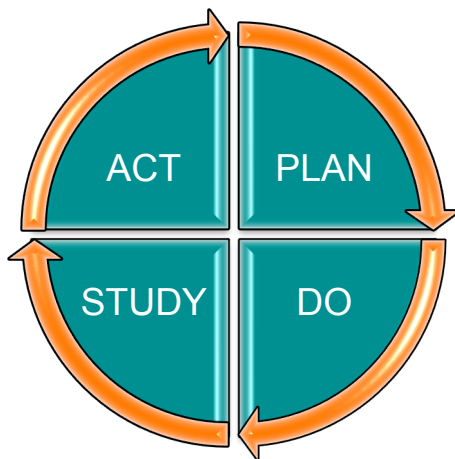


Figure 4. PDSA cycle

The implementation phase was based on a **PDSA** (Plan-Do-Study-Act) cycle (Figure 4). The steps of the PDSA cycle approach are the following:

**PLAN:** Plan the action, develop a framework (who, what, when, where).

**DO:** Carry out the plan and collect data.

**STUDY:** Analyze results, compare to predictions and summarize what was learned.

**ACT:** Refine the actions based on learning and determine modifications.

### Post-implementation techniques

The impact assessment during this phase included the analysis of key findings, their relevance to the rationale, and the specific aims of the intervention. The association between interventions and their outcomes was also analysed, discussed and presented to the local stakeholders.

## IMCM pilot implementation

This section highlights:

1. Pilot Action plan elaboration process
2. Characteristics of pilot sites that tested the model.
3. Implementation process

### ***Pilot Action plan elaboration process***

The Local Implementation Working Groups (LIWG) were established in each pilot site in order to elaborate country specific IMCM version taking into account their specific organizational structures, processes of work, local health care, social, and legal context. LIWG identified the appropriate local stakeholders to collaborate in the pilot implementations and were responsible of the Pilot Action Plan elaboration which was followed during the implementation and post-implementation phases. The Pilot Action Plan is the way the LIWG's vision was made concrete. It described a sequence of steps that needed to be taken, or activities that needed to be carried out.

The collaborative approach, and consequently the adapted version that was used in JA CHRODIS PLUS, is a simple, yet powerful tool for implementing changes. This methodology required multidisciplinary teams, as the LIWGs, to come together periodically to learn change ideas and quality methods, and to exchange experiences with making changes. Collaborative learning methods can stimulate implementation of changes, promote learning skills among participants and fasten the dissemination of good ideas.

During this step the LIWG were encouraged to answer three questions:

- What are we trying to accomplish?
- What changes can make that will result in improvement?
- How will we know that a change in an improvement?

In order to provide an answer to the questions above, LIWGs identified improvement areas, defined objectives, developed the “Change Package” and set key indicators, through the following steps:

#### **1. Identified the specific issues to work on**

The central features and IMCM components to work on have been already selected during the definition of the scope.

#### **2. Detected improvement areas (annex 1)**

Based on the situational analysis, LIWG identified concrete improvement areas. The priorities and strategic actions defined in the SWOT analysis helped defining precise and specific improvement areas to work on.

#### **3. Defined specific objectives**

According to the improvement areas detected, the LIWG specified achievable and realistic objectives.

#### 4. Developed the Change Package

Based on the improvement areas and the associated objectives, concrete activities were described and documented in the Change Package. The Change Package is the set of changes that lead to improvement and successful implementation of IMCM during the Implementation Phase. Each objective defined in the previous step required at least one activity.

#### 5. Set key performance indicators

Key performance indicators were defined by the LIWG ensuring that the expected impact of the interventions can be measured. The LIWG defined challenging, achievable and measurable target that encouraged and motivated team members to work on the implementation goal. It was important to use existing data to measure the progress towards the target. At least one key performance indicator was included for each objective in the final “Change package”

Pilot Action Plans are the result from the steps described above (objectives, activities, and indicators), which, in turn, are directly linked to scope definition/topic identification and situation analysis.

The Pilot Action Plan is the way the LIWG's vision was made concrete. It described a sequence of steps that needed to be taken, or activities that needed to be carried out. In JA CHRODIS PLUS, the action plan outlined the concrete activities that supported LIWG to implement changes and meet objectives in their site.

### ***Characteristics of pilot sites***

IMCM pilot implementations took place in five pilot sites, which were required to implement at least one component. Pilot sites directly reached total of 3449 patients in Europe and brought significant change in the quality of their care. Local implementers proved the applicability of the IMCM in five European settings of both primary and specialized care levels, with different characteristics (Table 1).

**Table 1. JA-CHRODIS IMCM implementation in 5 pilot sites across Europe**

Country (region)	Pilot setting	General objective	Number of patients included	Type of components focused on
Italy (Rome)	The pilot has been implemented in a day hospital geriatric outpatient clinic in Rome	Improve case coordination, and provide patients with a reference care provider	N=265	-Delivery of the care model system -Decision support -Information systems and technology -Self management support -Social and community resources
Lithuania (Vilnius)	The pilot has been implemented in the Family Medicine Center- primary care setting at	To improve quality of multimorbid patient care and test Chrodis IMCM applicability in the primary	N=195	-Delivery of the care model system -Decision support -Self management

	Vilnius University Hospital Santaros Klinikos	healthcare setting		support -Social and community resources
Spain (Aragon)	The pilot has been implemented in Primary Care Health Centres of Aragón (Spanish regional healthcare setting)	To pilot the implementation of the Chrodis IMCM in the public health system of Aragón (Spain) to improve care for patients over 65 years with multimorbidity	n=291	-Delivery of the care model system -Decision support -Information systems and technology -Self management support
Lithuania (Kaunas)	The pilot has been implemented hospital/primary care setting: Kauno Klinikos Family medicine department and Kaltinenai PHC (rural area).	To improve the quality of care provided to multimorbid patients in Lithuania by testing Chrodis IMCM	N=201	-Delivery of the care model system -Decision support -Information systems and technology -Self management support -Social and community resources
Spain (Andalusia)	The pilot has been implemented in primary healthcare centres of the Andalusian Health Service (SAS)	Better management of complex chronic patients (CCPs) to improve their health status by the systematic application of Personalized Care Plans (PAPs) in Andalusia	N=2788	Delivery of system design

### ***Brief description of implementation process***

#### ***Day hospital outpatient clinic in Rome (Italy)***

Patients with MM (defined as the co-occurrence of multiple chronic diseases) frequently experience fragmented care, which increases the risk of negative outcomes. Particularly elders with dementia and adults with intellectual disabilities are characterized by complex health needs, MM, and polypharmacy. In a usual care setting they often experience poor care coordination, and frequently don't have a reference care provider and necessary information and support to improve their self-management. Requiring specialized care, they experience unnecessary referrals, long waiting times at the office and care fragmentation. Furthermore, in a big urban context, they also are exposed to long trips to hospital care, missed appointments, etc. Based on the initial SWOT analysis, and after a consensus meeting "Fragmentation of care, poor care coordination, accessibility of care and patient's self-management education" have been identified as the main improvement areas to be carried out.

The main objectives of the care model are to: improve coordination and provide patients with a reference care provider as well as to increase the accessibility of care through a Techno care service and enhance self-management through patient-operated technology, improve professional knowledge on MM, reduce

inequalities in access to care and support services, improve accessibility of services, improve care coordination and integration of different units (within the organization), increase multidisciplinary collaboration, identifying target group patients, improve patient and informal caregiver involvement, and reduce hospital admissions and acute care visits. The intervention targeted six components of the IMCM proposed by JA-CHRODIS, from four of the five domains (Table 4.).

The pilot study was set up in a Day hospital outpatient clinic in Rome.

Local implementing working group (LIWG) included 3 Geriatricians, a Neurologist, a Psychologist, a Nursing Coordinator, a Secretary, a Case Manager, a Health Economist, the patient's GPs and the representatives of the patient associations.

Quantitative and qualitative analyses have been used to evaluate the impact of the interventions. Different key process indicators were calculated to indirectly verify the impact of the improvement actions undertaken. A survey was administered in the outpatient context at the beginning of the quality improvement intervention and 10 months after enrollment to measure the patients', families' and clinicians' appreciation and establish interventions effects on outcomes.

The study showed that implementation of the IMCM had a positive impact on both patients and health professional outcomes.

Outcome assessment evaluation based on key validated tools (PACIC + and ACIC 3.5 instruments) in the pre and post-implementation phase helped to demonstrate the clinical effectiveness of the care models as well as highlight any difficulties in adapting a common care model in different countries and clinical settings.

### ***Vilnius University Hospital Santaros Klinikos, Family Medicine Center (Lithuania)***

With increasing life expectancy, prevalence of MM is also rising and health care systems are faced with serious organizational and financial challenges. Multimorbid patients have complex health needs, but due to the current traditional disease-oriented approach, they face a highly fragmented form of care. The delivery of the primary care for MM patients in Lithuania is not coordinated and is based on disease-specific guidelines. Currently, there are no specific guidelines for the management of MM patients with no resources or no additional financing assigned to treat MM patients.

The general aim of the intervention was to test IMCM applicability in the primary healthcare setting with an aim to optimize treatment, maintenance and healthcare resources, as well as to improve the quality of MM patient care. Each IMCM component was discussed by the experts, focusing on a) possible adaptation to local setting, b) aims, c) key characteristics, d) target populations, and e) relevance for MM patients. Based on local experience and knowledge country specific IMCM fully adapted and specified for further local implementation was determined. Holistic assessment, a personalized action plan and a case manager were introduced as key-elements to provide the integrated care for MM patients. Individual personalized plans were designed after a holistic assessment of patients was carried out by multidisciplinary teams (GPs, nurses, case manager, social workers and others), and agreed with each patient or family member. The individual care plan was based on a holistic assessment of key aspects of patient health status (disease symptoms and history, functional ability, quality of life and psychosocial factors) and their preferences (i.e. desired patient outcomes). Options for patients to improve their self-management were personalized and consistent with their individualized care plans.

The target population was patients with MM treated at Vilnius University Hospital Santaros Klinikos, Family Medicine Center. These patients are heavy users of the healthcare resources, they are between 40 and 75 years of age and have more than one chronic condition. Total enrolled number of patients is 195.

Quantitative and qualitative analyses have been used to study the impact of the interventions. VULSK site identified indicators for the measurement of targeted IMCM components and calculated key process



indicators to indirectly verify the impact of the improvement actions undertaken. Several questionnaires were administered in the outpatient context at the beginning of the intervention and ~1 year after enrollment to measure the patients and clinicians appreciation and establish the interventions effects on outcomes.

The pilot study confirmed that the IMCM might have a positive impact on the quality of care both from health professionals and the patients' perspective, but it is important to highlight that in order to reach significant health outcomes improvements and overall reduction of healthcare services utilization, a longer period of the intervention should be analyzed.

### **Andalusian Public Health System (Spain)**

The Andalusian Public Health System (APHS) is responsible for the provision of healthcare and public health services to the entire Andalusian population (8.5 million inhabitants), where around 250000 complex chronic patients (CCPs) were identified in 2018. 4% of very complex patients consume up to 30% of primary care and hospitals resources. Since 2016, Personalized Action Plans<sup>1</sup> (PAPs) were introduced as key-elements to provide the needed holistic care. PAPs are written plans designed by multidisciplinary teams (family physicians, nurses, internists, case manager nurses, pharmacists, social workers, among others), and agreed with each patient or family/caregiver. PAPs are based on a comprehensive assessment of key aspects of patient status (including targeting symptoms, functional ability, quality of life, among others) and their preferences (i.e desired patient out-comes).

Based on the initial SWOT<sup>2</sup> analysis, and after a consensus meeting, "Lack of data on the influence of the systematized application of PAPs to complex chronic patients in their general health status" was identified as the main improvement area, to be carried out at primary healthcare (PHC) level. Thus, the aim of the Andalusian pilot was the assessment of the systematised application of PAPs to better manage CCPs, at primary healthcare centres of the APHS, as well as its quality assessment.

The target population selected are CCPs that meet the criteria established in the document *Integrated Care Process 'Healthcare for Multimorbidity Patients'*<sup>3</sup> (disease patterns, physical function, mental health, and socioeconomic status) and prioritized according to the rules established in internal guidelines<sup>4</sup>.

The initial sample size was 200 CCPs, but later expanded to assess all CCPs with a first PAP drawn up and delivered from December 2018 to February 2019, a total of 2788 patients.

Andalusian Local Implementation Working Group (LIWG) included 8 members representing all required functions and expertise. Their roles were: doctors (specialists in family and community medicine, internal medicine, preventive medicine and public health) nurses, directors of primary health care centres, pharmacist, sociologist, among others.

Component-4 (Individualized care plans) of the IMCM was selected to be implemented in primary healthcare centres in Andalusia.

The activities within this pilot has been the following: CCPs sample selection, drawing up and delivering the PAPs, patients' follow-up and data collection (at corporate electronic healthcare record, for each patient),

<sup>1</sup>Personalized Action Plans = individualised care plans

<sup>2</sup>Strengths, Weaknesses, Opportunities and Threats

<sup>3</sup>Proceso Asistencial Integrado 'Atención a pacientes pluripatológicos' [The Integrated Care Process 'Healthcare for Multimorbidity Patients].

<sup>4</sup>Plan de Acción Personalizado en pacientes pluripatológicos o con necesidades complejas de salud. Recomendaciones para su elaboración [Individualized care plans for patients with multimorbidity or with complex health needs. Recommendations for its drawing up].



retrieving the needed information from the Andalusian Health Service's corporate information system and other sources, and data analysis.

Patients have been followed up for 12 months. The assessment includes the following set of indicators: Geographic coverage, Awareness and training sessions, PACIC+ and ACIC questionnaires, Health outcomes, Costs estimation, Quality assessment. Additional quality assessment of a random sample of 350 anonymised PAPs has been included. Data sources for assessment are: corporate information system (electronic health record), training activities information.

Results refers to 2788 patients included and followed in the Andalusian pilot, from 32 Health Districts (of a total of 33) and 372 main PHC centres (of 410). During 2018, 48 awareness-raising sessions were held. In 2019, 2570 healthcare professionals were trained. PACIC+ reflects an improvement in the health status change perceived by patients (5.3 score). ACIC score decreases but remains in the same category (Reasonably good support for chronic illness care). Main health outcomes results show a reduction in the increment of unplanned potentially preventable inpatient episodes (from 37,1% 2018-2017 to 16,1% 2019-2018). An overall reduction in the expected rise of healthcare services utilization compared to the previous year (mainly PHC visits, emergencies at PHC, outpatient visits). Estimation of its economic impact reflects a 23,5% reduction of current healthcare utilisation cost compared to the expected trajectory. Overall quality assessment reflects areas of improvement in the elaboration of PAPs.

### ***Public Health System of Aragón (Spain)***

MM has become the norm rather than the exception in the aging population of Aragón (Spain), affecting 80% of people over 65 years of age. However, health professionals lack specific trainings to manage these complex patients. There is also an urgent need to reinforce mechanisms to ensure the integrations of healthcare levels (i.e., primary and specialized) and those with the community resources to reduce the potential negative health outcomes associated to MM. In this context, care models as the Chrodis IMCM have been designed to address the challenge of managing MM in daily practice.

LIWG aimed to pilot for one year (2019) the implementation of IMCM in the Public Health System of Aragón. The goals of their intervention were: to minimize fragmentation of care; to improve health services use, adequacy and patient self-perceived quality of care; to train healthcare professionals; to provide them with specific skills on MM, person-centred care and shared-decision making; and to strengthen the provision of community care.

Pilot implementation included 291 patients of over 65 years with MM, 21 primary care teams (i.e., general practitioner-nurse) from 13 primary care health centres, internists from 3 general hospitals, policy makers, healthcare managers and researchers.

LIWG from Aragon addressed the following components of the IMCM through the eMULTIPAP Training Programme, the Complex Chronic Patient Care Strategy, and the Community Care Strategy:

- Decision support: by training health professionals (i.e., eMULTIPAP Chrodis-Plus Edition Course), and through a virtual consultation system to facilitate communication among them.
- Self-management support: by training professionals in shared decision-making.
- Delivery of care: by assessing patients comprehensively, agreeing individualized care plans, defining case managers, and creating hospital chronic care units.
- Information systems and technology: by developing software to register and share patient information between primary and specialized care.
- Social and community resources: by mapping and disseminating the regional community resources (i.e., available online), assessing patient's social context, and establishing a referring procedure to the social worker.

For the assessment of the intervention, the following main outcome indicators were selected:

- Health services use: hospitalizations and visits to emergency room and to primary care
- MM management skills: pre-post test score
- Patient's self-perceived quality of care: ad-hoc question

And the following process indicators, among others:

- Percentage of patients with individualized care plan
- Percentage of patients with case manager
- Number of professionals trained
- Satisfaction with the training programme
- Online availability of community resources mapped

At the end of the implementation, all included patients had a designated case manager and an individualized care plan. Up to 96.7% of them had their social context assessed, and 3.3% of them were referred to the social worker. During the 1-year implementation, the average of hospitalizations, emergency visits and visits to primary care varied from 0.64 to 0.69, from 1.55 to 1.24, and from 49 to 42, respectively. Up to 87.5% of patients reported an improvement of self-perceived quality of care after the intervention. The online training was started by 100% of implementer professionals, and 89.1% (49/55) completed the course, who scored their satisfaction with 8.3/10 and the course's impact with 3.8/5. Professionals improved their MM management skills from 7.36 to 9.18/10 in the test.

### ***The Hospital of Lithuanian University of Health Sciences (LSMU) Kauno klinikos (Lithuania)***

According to JA CHRODIS results, at the age of 65 and over, the prevalence of MM in the Lithuanian population was 42% and at the age of 85 it was above 62%. There is an obvious need to present a new collaboration model in the country and to perform the best care for MM patients presenting holistic and patients oriented care with a new – case manager with a support of multidisciplinary team. The integrated health care and individualized health care should be the key principles aiming to increase the quality and accessibility to patients with MM. General purpose of the interventions was to test the IMCM for MM patients in Lithuania with the main aim to provide a better care for MM patients and improve its quality. Specific Objectives:

- To improve patient's continuous assessment, self management and care
- To improve professionals knowledge and capacity for MM patient's management at PHC level

The pilot was performed in Lithuanian University Hospital „Kauno Klinikos” (represented city and public PHC center) and in „Kaltinenai” PHC center (represented rural area, public PHC center). Pilot implementation targeted IMCM components across five domains: Delivery of Care, Decision Support, Self-Management Support, Information Systems and Technology, and Social and Community Resources). The target population was patients with MM aged 40 -75 years old. There were total 201 participants included in the pilot.

The assessment of the results was done at the end of the project, through quantitative and qualitative measurements. Training programs and the implementation protocols were newly performed for a case manager and for multidisciplinary teams in PHC level. The individualized health care plans (including patients' mental, physical and social evaluation, patients' needs) were developed for all the participants and a case manager performed a coordinator function with a support of multidisciplinary teams. Utilization of health resources were measured: hospitalizations, visits to emergency department, visits to GP, case manager and specialties; the attitude towards health care system was assessed by health care providers/administration using ACIC questionnaire and satisfaction of MM patient was assessed using PACIC+ before and after implementation.

The main improved areas/results:

1. IMCM model based on integrated and individualized health care was implemented in PHC.

2. The multidisciplinary teams were established with its' main coordinator – a case manager – independent nurse practitioner.
3. The decision support system was developed in PHC level: case managers and family physicians received a continues support by multidisciplinary team and experts.
4. The training for medical professionals, new guidelines and protocols were incorporated in PHC practice.
5. Patients and heath care providers evaluated the performed heath care quality better after model implementation (PACIC + and ACIC results).

## IMCM impact for local health systems

This section highlights:

1. Potential benefits of IMCM implementation
2. Impact of the project on people and healthcare systems
3. Stakeholders and Policy Makers Involvement

### ***Potential benefits of IMCM implementation***

All WP6 pilots aimed to assess IMCM applicability testing the components of the care model in real life practice. The pilot studies showed that implementation of IMCM had a positive impact on both patients and health professional and institution (healthcare system) outcomes:

- The introduction of a case manager led to a significant improvement in the patient perception of care coordination and compliance with the health care process.
- The accessibility of care and faster specialists visit
- ACIC score showed considerable improvement in self-management care after the implementation.
- Improved patient care and control of the chronic disease condition by introducing additional services (holistic assesment, individual care plan, case manager) in primary care.

Particular strengths of this project are its replicability and the limited resources needed to have an impact on patients and professionals involved in the process of care. Strong stakeholder commitment and collaboration to complete and analyse the implementation (even with the pandemic crisis on the end) was the key to a succesful IMCM implementation and one of the main strengths of the project.

Barriers, enablers and suggestions for future implementations identified during the implementation of the selected dimensions and components of the IMCM can be found in ANNEX II of this report.

### ***Impact of the IMCM on people and healthcare systems***

This was the first time the IMCM has been implemented in practice. Currently, there is no similar information in the scientific literature about IMCM interventions, making it a challenge to compare WP6 implementation results with other findings. Furthermore, this kind of intervention has been applied for the first time and the barriers encountered during the implementation and resistance to organizational changes from the population and healthcare professionals may have affected some of the results.

In our opinion, the IMCM across 5 pilot sites had a positive impact beside the results obtained in patients. It served to reinforce the collaboration of stakeholders from different areas and strategies of the departments of health. Key stakeholders were aware of the problem of MM in clinical practice, and of the current efforts that are being conducted at European and international level. Some ideas how to improve the ongoing care strategies in most of the countries that tested the IMCM were shared among managers, physicians, policy makers and researchers.

The establishments of the LIWG, with a reorganization of the professionals' team and the introduction of the figure of the case manager led to a significant improvement in the patient perception of and compliance with the health care process. By implementing a model that offers holistic assessment, a patient-centered approach, individualized care plans and case managers pilot sites guaranteed quality and continuity of care for multimorbid patients, which led to better efficacy of the health care process and reached significant improvements of PACIC+ scores.

Implementation in Aragon region showed that the self-perception of the patients about the quality of their care was considerably improved. This could be due to professionals better trained to manage MM and to the actions implemented to minimize the fragmentation of patient's care by designing case managers, creating hospital chronic care units, and facilitating the communication and sharing of information among professionals.

Finally the IMCM implementation may also optimize healthcare utilization use. As concluded by the pilot implementation in Andalusia main health outcomes results show a reduction in the increment of unplanned potentially preventable inpatient episodes (from 37,1% 2018-2017 to 16,1% 2019-2018). An overall reduction in the expected rise of healthcare services utilization compared to the previous year (mainly PHC centre visits, emergencies at PHC, outpatient visits). 2019 costs of healthcare calculated for the study group are 23,5% less than projected using 2018-2017 variation. Rates of services utilisation of the study group are above the ones for all chronic patients in 2017 and 2018. 2019 utilisation rates of the study group decrease in comparison to previous year.

It is important to highlight that all WP6 pilots confirmed that the IMCM implementation might have a positive impact on quality of care both from the health professionals and patients' perspective, but in order to reach significant health outcome improvements and overall reduction of the utilization of healthcare services, a longer period of intervention should be analysed.

### ***Stakeholders and Policy Makers Involvement***

Alignment with regional strategies and plans on chronic care, strong corporate information systems to support data retrieval and analysis, and political support may help future implementations, sustainability and replicability of the IMCM to the broader EU arena. Training of healthcare professionals is also a key element. Based on the findings from the pilot sites, Member States are encouraged to revise national health strategy sections for treatment of patients with MM and consider complementing it relying on science-based methodological IMCM pilot implementations (such as case manager appointment, individual care plan, multi sectoral patient centered approach).

The sustainability of the Andalusian pilot was guaranteed since it is imbedded in the long-term plans and strategies of the Regional Ministry of Health and Families of the region. Regarding the institutional involvement, this pilot has been strongly supported by political leaders and directors of the Plan for CCPs in Andalusia. Close implication by General Directorate for Healthcare and Health Outcomes of the Andalusian Health Service and General Directorate for Health and Social Care of the Regional Ministry has been a reality.

In Lithuania LIWGs joined forces in collaborated and initiated discussions with the Ministry of Health of the Republic of Lithuania which led to revision of the national health strategy on the treatment of patients with MM by adopting the evidence-based methodology used for the implementation of pilots according to the model (such as case manager appointment, individual care plan, multi sectoral patient centered approach). A public call to implement innovative and efficient healthcare models in Lithuania was opened based on WP6 IMCM. This will expand IMCM components implementation across the country allowing the activities to continue beyond the lifespan of CHRODIS PLUS.

## Country specific CHRODIS Integrated Multimorbidity Care Model (IMCM) versions

Based on local experience and knowledge, participating partners determined JA-CHRODIS IMCM to the specific characteristics of their local health care setting. The model's sustainability requires the continued collaboration of key stakeholders from health and community care, and the awareness that MM is an issue that exceeds purely economic and structural barriers. The potential replicability of described intervention will depend on the specific context, as other settings may potentially differ from WP6 countries that developed specific IMCM versions.

### ***Country specific IMCM versions, fully adapted and specified for local implementation***

Country:	Italy	
Setting:	Day hospital geriatric outpatient clinic	
Target group:	Multimorbid patients with dementia and adults with intellectual disability	
Specific objectives (SO):	<b>SO1:</b> Improve communication and coordination of care among members of the health care team and patients and assess patients with comprehensive tools <b>SO2:</b> To improve services accessibility, efficiency and reduce inequalities. <b>SO3:</b> Improve patient self-management	
IMCM components	Activities	Key performance indicators
• Regular comprehensive	<sup>SO1</sup> ⇒ Identification of case manager roles (goals and protocol) ⇒ Identification of the multidisciplinary team to	Process indicators: ○ Number of patient

<p>assessment of patients</p> <ul style="list-style-type: none"> <li>• Multidisciplinary, coordinated team</li> <li>• Professional appointed as coordinator of the individualized care plan (“case manager”)</li> <li>• Providing options for patients and families to improve their self-management</li> <li>• Shared decision making (care provider and patients)</li> <li>• Patient-operated technology allowing patients to send information to their care providers</li> </ul>		<p>be activated on request by the case manager according to subjects’ needs</p> <ul style="list-style-type: none"> <li>⇒ Case management training (for healthcare professionals)</li> <li>⇒ Assessment of patients with AD and DS with InterRAI-CA and InterRAI-ID tools respectively :</li> <li>○ Selection, acquisition and electronic implementation of the multidimensional tools to be used.</li> <li>○ Training of the case manager to administer the multidimensional assessment.</li> <li>○ Implementation of the comprehensive multidimensional assessment as part of the routine assessment.</li> </ul>	<p>with AD and DS that participate at the group meeting</p> <ul style="list-style-type: none"> <li>○ Number of patients kept in charge by the case manager</li> <li>○ Number of patients assessed with InterRAI tools</li> <li>○ Number of techno visits/year</li> <li>○ Number of patients attending the group meeting</li> </ul> <p>Outcome indicators (to be assessed before and after the intervention):</p> <ul style="list-style-type: none"> <li>○ Patient Assessment of Care for Chronic Conditions (PACIC+)</li> <li>○ Assessment of Chronic Illness Care (ACIC 3.5)</li> <li>○ Emergency Department admission of patient enrolled in the study</li> <li>○ Drop-outs (Missing appointments by patients)</li> <li>○ The patient satisfaction survey</li> </ul>
	SO2	<ul style="list-style-type: none"> <li>⇒ Creation a convenient and effective techno care workstation</li> <li>⇒ Definition of techno care procedure including eligibility criteria the acquisition of informed consent from patients</li> <li>⇒ Data set and agenda definition</li> <li>⇒ Definition of a customer satisfaction survey to have feedback and improve the service in the future.</li> </ul>	
	SO3	<ul style="list-style-type: none"> <li>⇒ Elaboration and distribution of informative material for the focus group sessions with patients and their family members.</li> <li>⇒ Preparation of training material to explain natural history of diseases, associated medical conditions and useful tips on symptoms management (especially focusing on behavioral disturbances).</li> <li>⇒ Organization of patients’ and caregivers’ experiences sharing sessions.</li> </ul>	
Country:	Spain		
Setting:	Primary Care Health Centre		
Target group:	Complex multimorbid patients with severe health problems and polypharmacy		
Specific objectives:	<p><b>SO1:</b> To improve the provision of health care to minimize fragmentation and improve health services use and patient’s self-perceived quality of care</p> <p><b>SO2:</b> To improve skills and knowledge of healthcare professionals on the management of complex chronic patients, polypharmacy, patient-centred care and</p>		

		shared-decision making <b>SO3: To strengthen the provision of community care</b>	
IMCM components		Activities	Key performance indicators
<ul style="list-style-type: none"> <li>• Regular comprehensive assessment of patients</li> <li>• Multidisciplinary, coordinated team</li> <li>• Professional appointed as coordinator of the individualized care plan (“case manager”)</li> <li>• Individualized Care Plans</li> <li>• Training members of the multidisciplinary team</li> <li>• Developing a consultation system to consult professional experts</li> <li>• Shared decision making (care provider and patients)</li> <li>• Exchange of patient information (with permission of patient) between care providers and sectors by compatible clinical information systems</li> <li>• Supporting access to community- and social-resources</li> </ul>	SO1	<ul style="list-style-type: none"> <li>⇒ Definition of the case manager roles</li> <li>⇒ Creation of multidisciplinary primary care team</li> <li>⇒ Creation of chronic care unit of reference at hospital</li> <li>⇒ Identification of personnel of reference at the chronic care unit</li> <li>⇒ Development of an individualized care plan based on comprehensive assessment by primary care team</li> <li>⇒ Proactive follow up of patients through regular Primary Care consultations</li> <li>⇒ Development of a virtual interconsultation system to consult professional experts outside the Primary Care team</li> <li>⇒ Development of a module to record and share patients’ information among healthcare levels</li> <li>⇒ Assessment of health services use</li> <li>⇒ Assessment of patients’ self-perception of healthcare improvement</li> <li>⇒ Individualized care plan quality assessment (QA).</li> </ul>	<p>Process indicators:</p> <ul style="list-style-type: none"> <li>○ Number of Primary Care teams included in the program</li> <li>○ Number of patients with individualized care plans based on comprehensive assessment</li> <li>○ Number of patients included in the program with case manager formally identified</li> <li>○ Number of patients referred to the social worker</li> <li>○ Number of patients with socio-family assessment done</li> <li>○ Healthcare professionals satisfaction with the training course</li> <li>○ Number of trained healthcare professionals</li> </ul> <p>Outcome indicators (to be assessed before and after the intervention):</p> <ul style="list-style-type: none"> <li>○ Number of admissions to the emergency room in 12 months</li> <li>○ Number of hospitalizations in 12 months</li> <li>○ Number of avoidable hospitalizations in 12 months</li> <li>○ Number of primary care visits in 12 months</li> <li>○ Patient’s self-perception of improvement in health care provision</li> <li>○ Increment of healthcare professionals knowledge as the difference of mark in a pre-post test</li> <li>○ Patient Assessment of Care for Chronic Conditions (PACIC+)</li> <li>○ Economic impact estimation</li> </ul>
	SO2	<ul style="list-style-type: none"> <li>⇒ Healthcare professional training (online 5-week training course - eMULTIPAP) and assessment of the results of the course.</li> </ul>	
	SO3	<ul style="list-style-type: none"> <li>⇒ Mapping of community resources in the region</li> <li>⇒ Recommendation of community resources to patients</li> </ul>	



	⇒ Socio-family assessment of patient ⇒ Referral to social worker if needed	
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Country:	Lithuania	
Setting:	Primary health care, Family Medicine Clinic	
Target group:	Patients aged between 40 and 75 years who have more than one chronic condition (heavy users of the healthcare resources).	
Specific objectives:	<b>SO1:</b> To improve professionals' knowledge and capacity in MM patients management and coordination through levels of care <b>SO2:</b> To improve patients' awareness and capacity for self-management <b>SO3:</b> To improve patients' access to services, including community and social resources	
IMCM components	Activities	Key performance indicators
<ul style="list-style-type: none"> <li>• Regular comprehensive assessment of patients</li> <li>• Multidisciplinary, coordinated team</li> <li>• Professional appointed as coordinator of the individualized care plan ("case manager")</li> <li>• Individualized Care Plans</li> <li>• Training members of the multidisciplinary team</li> <li>• Developing a consultation system to consult professional experts</li> <li>• Providing options for patients and families to improve their self-management</li> </ul>	<b>SO1</b> <ul style="list-style-type: none"> <li>⇒ Definition of multidisciplinary team and elaboration of the guidelines;</li> <li>⇒ Definition of case manager and protocol of action;</li> <li>⇒ Training care providers to tailor self-management support for patients;</li> <li>⇒ Comprehensive assessment of patients (medical, mental, functional capacities and social problems)</li> <li>⇒ Development of individual health care plan template;</li> <li>⇒ Development of consultations system for multidisciplinary team members.</li> <li>⇒ Evaluation and follow up of individual health care plans.</li> </ul>	Process indicators: <ul style="list-style-type: none"> <li>○ Number of patients with individualized care plans based on comprehensive assessment</li> <li>○ Number of patients included in the program with case manager formally identified</li> <li>○ Number of patients screened for social problems</li> <li>○ Number of trained healthcare professionals</li> </ul> Outcome indicators (to be assessed before and after the intervention): <ul style="list-style-type: none"> <li>○ Number of visits to PHC team/patient/year</li> <li>○ Number of admissions to the emergency room patient/year</li> <li>○ Number of hospitalizations patient/year</li> <li>○ Drug interaction rate/patient</li> <li>○ Number of patients reporting problems in self-care</li> <li>○ Patient Assessment of Care for Chronic Conditions (PACIC+)</li> <li>○ Assessment of Chronic Illness</li> </ul>
	<b>SO2</b> <ul style="list-style-type: none"> <li>⇒ Collection of information on patients' needs and expectations regarding their condition and barriers to care;</li> <li>⇒ Development and execution of education course for patients on self management;</li> <li>⇒ Establishment of approaches to</li> </ul>	



<ul style="list-style-type: none"> <li>• Shared decision making (care provider and patients)</li> <li>• Supporting access to community- and social-resources</li> </ul>		<p>strengthen patients' self-management and self- efficacy by involving patients in decision-making;</p> <p>⇒ Encouragement for patients to increase health literacy.</p>	Care (ACIC 3.5) (to be completed by healthcare professionals)
	503	<p>⇒ Asses MM patients social condition;</p> <p>⇒ Involve social worker in Multidisciplinary, coordinated team for multimorbid patients care;</p> <p>⇒ Support access to community and social resources.</p>	

## Conclusions & Recommendations

Patients with MM have complex health needs, but due to the current traditional disease-oriented approach, they face a highly fragmented form of care. Main objective of WP6 was to implement IMCM for the care of patients with MM across 5 different pilot sites in Europe and assess in practice its applicability.

Although the implementation period has been short (one year on average), the following main benefits can be highlighted for:

- Patients: The patients' self-perceived health care provision have been improved, and most patients reported an improvement in quality of care after the intervention.
- Health systems: Improved access and coordination of care and optimization of resources (an overall reduction of healthcare services utilization).

Direct involvement of healthcare professionals and close collaboration with relevant stakeholders and local institutions is a must when adjusting the IMCM for local implementation. Strong leadership and motivated frontline implementers was a key for stepping through the rigorous implementation strategy process. Regular meetings were held in order to maintain their commitment and motivate healthcare professionals to complete the implementation. Direct involvement of pilot center leaders ensured smooth coordination of IMCM activities.

Hopefully WP6 pilot implementation results and tools developed during IMCM implementations will support health care centers in Europe to adapt IMCM to their context and conduct further study in this field. Further studies may confirm that due to the complexity of multimorbid patients cases additional funding and new services for their care is needed in order to adapt to the emergent needs of the IMCM.

Based on the major Barriers and Enablers identified during the implementation of the IMCM the main conclusions and suggestions for future implementations which should be taken into account when preparing for IMCM implementation are:

- The IMCM implementation must be based on four pillars:

1. Model adaptation to local needs and specific characteristics of the intervention;
2. Identification of the right patients (correct target group);
3. Definition of the plan and outcomes assessment taking into consideration potential benefits for all: a) patient, b) healthcare usage, c) healthcare provider;
4. Identification/designation of the responsible to coordinate, timely deliver and follow-up the care plan (case manager).

It is expected that the results coming from a structured implementation of IMCM components will convince national/regional decision makers to review demands of healthcare services and can put a strong groundwork for further scaled up of the model.

- The sustainability is facilitated when IMCM elements (such as case manager appointment, individual care plan, multi sectoral patient centered approach) are regularly considered in the overall strategies and plans for care of patients with MM with healthcare systems. Adaptation of funding/resources can boost/ease the initial implementations/assessment of the model.
- The availability of evidence-based results (coming from a “pre Vs post”-implementation outcome assessment) help to demonstrate the clinical effectiveness and economic feasibility of the care model. Some organizational changes (e.g. healthcare professionals’ training, IT systems adaptation, carefully allocation of resources) may facilitate a successfully scaling up of this model.
- Demands of primary healthcare services should be reviewed by each implementing site and modified considering pilot implementation findings: primary care provided for multimorbid patients need to be strengthened.
- Decision and policy makers should be aware that MM is an issue that goes beyond an economic and/or structural burden. In addition, the support and commitment of key stakeholders of healthcare (e.g. directors of healthcare plans and strategies, general managers of the healthcare services providers), community care and patient representatives is also needed.

#### Recommendations

In order to ensure quality and sustainability of primary health care it is recommended for each MS to review national health strategy sections for treatment of patients with MM and complement it relying on science-based methodological WP6 pilot implementations (such as case manager appointment, individual care plan, multi sectoral patient centered approach).

Political debate moderated by the Ministry of health at a national level (in all MS) to support the IMCM adaption to local context, implementation and encourage the scaling up of the practices, aimed at reducing the burden of chronic diseases should be organized.

The long-term success of the IMCM intervention need to be further assessed and the economic evaluation of IMCM pilot implementation across different size and location stakeholders must be enforced by each MS nationally. Demands of primary healthcare services should be reviewed by each MS and modified considering pilot implementation findings.

## References

1. EC (2015) European Commission, The 2015 Ageing Report, Economic and budgetary projections for the 28 EU Member States (2013-2060)
2. Hofmarcher T et al. (2020) The cost of cancer in Europe 2018, European Journal of Cancer 129 (2020) 41e49
3. EHN (2017) European Heart Network, European cardiovascular disease statistics
4. Hopman P, Schellevis FG, Rijken M. Health-related needs of people with multiple chronic diseases: differences and underlying factors. Qual Life Res. 2016;25(3):651-60.
5. Smith SM, Soubhi H, Fortin M, Hudon C, O'Dowd T. Managing patients with multimorbidity: systematic review of interventions in primary care and community settings. BMJ. 2012;345:e5205.
6. Marengoni A, Angleman S, Melis R, Mangialasche F, Karp A, Garmen A, et al. Aging with multimorbidity: a systematic review of the literature. Ageing Res Rev. 2011;10(4):430-9.
7. Palmer K, Marengoni A, Forjaz MJ, Jureviciene E, Laatikainen T, Mammarella F, et al. Multimorbidity care model: Recommendations from the consensus meeting of the Joint Action on Chronic Diseases and Promoting Healthy Ageing across the Life Cycle (JA-CHRODIS). Health Policy. 2018;122(1):4-11.
8. <http://chrodis.eu/wp-content/uploads/2017/11/ja-chrodis-multimorbidity-care-model-wp6-rokas-navickas.pdf>

## ANNEX I. Improvement areas

Identified potential improvement areas (strategic actions) that were included in the Pilot action in order to implement one or more components of the IMCM.

### ITALY



#### Rome

- Accessibility of care
- Patients and family information and involvement in process of care
- Poor case coordination, the patient doesn't have a reference care provider
- Fragmentation of care; necessity of multidisciplinary approach



### LITHUANIA



#### Vilnius

- Multidisciplinary team establishment and management of multimorbidity
- Patient's needs and expectations analysis regarding their condition and barriers to care
- Training program for case-manager
- Information material for the patients about multimorbidity (patient self management)
- Communication among healthcare professionals. Decision support system for healthcare professionals/ consultation system to be advised by professional experts
- Individualized care plans
- Regular comprehensive assessment of patients
- Social sector and social worker active involvement in Multidisciplinary, coordinated team



## SPAIN



### Andalusia



- Lack of data on the influence of the systematized application of individualized and comprehensive care plans to complex chronic patients in their general health status.
- Need to improve the disease self-management by patient and their caregivers.
- Unresolved continuity of care between care levels (inter / intra level).
- Lack of coordination between healthcare and social services.

## LITHUANIA



### Kaunas

- Integrated and individualized health care plans for multimorbid patient
- Identification of a Case-manager (nurse) at Primary care level
- Multidisciplinary team establishment: communication among healthcare professionals/ decision support system for healthcare professionals/ consultation system to be advised by professional experts
- Training program for medical providers who involved in MM patients care



## SPAIN



### Aragón

- Training of healthcare professionals to adequately manage multimorbidity in clinical practice from a patient-centred focus by means of a standardized educational online tool specifically designed by and for health professionals.
- Fragmentation of care among healthcare professionals and levels suffered by multimorbid patients in the clinical practice.
- Integration and sharing of relevant clinical information of patients among health professionals from Primary and Hospital Care.
- Comprehensive assessment of multimorbid patients focusing on his/her needs and translate it into an individualized care plan and proactive follow-up.

## ANNEX II. Barriers, enablers and suggestions for future implementations

The table below reports barriers, enablers and suggestions for future implementations identified during the implementation of the selected dimensions and components of the IMCM.

Barriers	Enablers	Suggestions for future Implementations
<b>Rome, Italy</b>		
<ul style="list-style-type: none"> <li>• Founding to introduce a case manager in the hospital setting</li> </ul>	<ul style="list-style-type: none"> <li>• National institutions</li> </ul>	<ul style="list-style-type: none"> <li>• New policies on the chronic disease at the national level for the formalization of the case manager figure in the NHS context</li> </ul>
<ul style="list-style-type: none"> <li>• Lack of time and resources to prepare material and training course for the patient and their family members</li> </ul>	<ul style="list-style-type: none"> <li>• Hospital general management</li> </ul>	<ul style="list-style-type: none"> <li>• Collaboration with patients' associations</li> </ul>
<ul style="list-style-type: none"> <li>• Techno care service is too expensive in terms of human resources expenditure- by now it is not sustainable for hospitals</li> </ul>	<ul style="list-style-type: none"> <li>• National institutions/ Hospital general management</li> </ul>	<ul style="list-style-type: none"> <li>• Prevision of national reimbursements for techno care visits</li> </ul>
<b>Vilnius, Lithuania</b>		
<ul style="list-style-type: none"> <li>• Limited resources (time, personnel, funds), compared to population increasing needs. LIWG work schedule have to include all usual activities and daily tasks.</li> <li>• Personnel competence and experience in delivering care model system</li> </ul>	<ul style="list-style-type: none"> <li>• Anticipated additional personnel responsible for coordinating the patients and local coordinator of IMCM implementation activities.</li> <li>• Availability of training materials (training courses, templates and checklists) and presentation how to perform the pilot action plan</li> </ul>	<ul style="list-style-type: none"> <li>• Surveys and data analysis are more time consuming than usually expected. Anticipation of sufficient efforts to complete the comprehensive assessment and data analysis would ensure successful implementation of this dimension.</li> <li>• Risk management measures</li> </ul>



<ul style="list-style-type: none"> <li>• No defined patient stratification</li> <li>• Lack of legislation delivering the components into real life practice</li> </ul>	<p>before (and throughout) implementation.</p> <ul style="list-style-type: none"> <li>• E-tool for calculation of patient’s frailty index</li> </ul>	<p>for the implementation of the model and supervision of the implementation is suggested.</p> <ul style="list-style-type: none"> <li>• Identification of the right patients (correct target group)</li> </ul>
<ul style="list-style-type: none"> <li>• Changes in institution administration and change of staff in the pilot center</li> <li>• Specialized examination of the patient is required for initial consultation of a specialist (specialists do not agree to consult without examining patients)</li> <li>• Lack of legislation for GPs consultation with specialist and no defined tool for counseling which could ensure the security of patient data</li> <li>• Guidelines or structured training not always available</li> </ul>	<ul style="list-style-type: none"> <li>• Additional meetings with front line implementers and additional training for healthcare personnel</li> <li>• Clearly defined tasks and checklist template for LIWG personnel to follow the process of the protocol.</li> <li>• Strong leadership and coordination by experts in health economics, outcomes and management of non-communicable diseases.</li> <li>• Availability of internal hospital information system.</li> </ul>	<ul style="list-style-type: none"> <li>• Multidisciplinary teams (incl. primary care professionals) should be carefully identified and include motivated members with clearly defined roles, responsibilities.</li> <li>• Regular face to face workshop session with healthcare specialists and local facilitators.</li> <li>• Collaboration with specialists in formulating patient screening recommendations at the primary care level.</li> <li>• Revision of legislation and funding from National insurance fund</li> </ul>
<ul style="list-style-type: none"> <li>• Information systems not focusing on MM</li> <li>• Resistance to organizational changes from the population and professionals</li> <li>• Patient’s high expectations, scarce information material, limited self management</li> </ul>	<ul style="list-style-type: none"> <li>• Individual patient healthcare plan drafted by GP, case manager, multidisciplinary team with active involvement of patient and clearly defined tasks for him.</li> </ul>	<ul style="list-style-type: none"> <li>• Population awareness and ICT literacy, involvement (collaboration) of Patient’s Associations.</li> <li>• Involvement of patients’ representatives and community.</li> </ul>
<ul style="list-style-type: none"> <li>• Unresolved continuity of</li> </ul>	<ul style="list-style-type: none"> <li>• Social worker inclusion in</li> </ul>	<ul style="list-style-type: none"> <li>• Involvement of relevant</li> </ul>



care between care levels and sectors. Health and administrative data flows are not completely integrated	multidisciplinary team	sectors. <ul style="list-style-type: none"> <li>Inclusion of psychiatrists, social workers, nurses in the local implementation working groups and anticipation of required resources</li> </ul>
<b>Andalusia, Spain</b>		
<ul style="list-style-type: none"> <li>Deployment of the methodology at the same time throughout the territory: Andalusia extension is 87.597 km<sup>2</sup>, with 8.5 M inhabitants (average size of an EU MS)</li> </ul>	<ul style="list-style-type: none"> <li>Teams of experts developed training materials (on-line training courses and guidelines) to tackle CCPs as well as to perform PAPs.</li> </ul>	<ul style="list-style-type: none"> <li>Additional sessions with face-to-face workshops to train key health care professionals to be knowledge disseminators and training facilitators at local level.</li> </ul>
<ul style="list-style-type: none"> <li>Variability in PAP drafting by healthcare professionals (lack of systematization).</li> </ul>	<ul style="list-style-type: none"> <li>Availability of standard documents and guidelines and on-line training courses.</li> </ul>	<ul style="list-style-type: none"> <li>Additional sessions with face-to-face workshops to train key health care professionals.</li> </ul>
<ul style="list-style-type: none"> <li>Unclear IT PAP form, with many compulsory fields to be filled within the corporate eHR “Diraya” to register a PAP without direct explanations</li> </ul>	<ul style="list-style-type: none"> <li>Each field to be filled in the IT PAP form can display a help window including an explanation of the needed information.</li> </ul>	<ul style="list-style-type: none"> <li>Clear indications within the IT PAP form, including standardized options to be chosen when filling up the IT PAP form.</li> </ul>
<ul style="list-style-type: none"> <li>Healthcare professionals’ agendas have to include all activities and daily tasks.</li> </ul>	<ul style="list-style-type: none"> <li>Healthcare professionals’ agendas were adapted to include time for performing PAPs.</li> </ul>	<ul style="list-style-type: none"> <li>Advance on needed resources allocation at primary healthcare level.</li> <li>Re-dimension population register to each healthcare professional in PHC, specially CCPs.</li> </ul>
<b>Kaunas, Lithuania</b>		
<ul style="list-style-type: none"> <li>Aiming to reflect the assessment of the model the duration of the one</li> </ul>	<ul style="list-style-type: none"> <li>The model testing was based on routine health care practice.</li> </ul>	<ul style="list-style-type: none"> <li>The model should be adapted as much as possible for the country specific</li> </ul>

<p>year testing is too short. There was also lack of motivation of health care providers who participated in the project for their additional input.</p>		<p>system, adding additional investments on human resources and equipment. The big efforts should also be based on staff education and support.</p>
<ul style="list-style-type: none"> <li>• Doctor - doctor consultation system was partly developed: the specialists- family physician consultations were not performed due to legislation and e-health limitations.</li> </ul>	<ul style="list-style-type: none"> <li>• Family physicians and case managers received continues support on patients individualized health care planning. This was a core importance for physicians working in rural areas.</li> </ul>	<ul style="list-style-type: none"> <li>• Aiming to include some innovations, the legislations and practical possibilities should be carefully reconsidered.</li> </ul>
<ul style="list-style-type: none"> <li>• Patients' self-management support was provided by a case manager, which was time consuming and could have a negative impact on quality.</li> </ul>	<ul style="list-style-type: none"> <li>• The higher patients' involvement reflected positively on their chronic condition care.</li> </ul>	<ul style="list-style-type: none"> <li>• In future it is recommended to involve more PHC multidisciplinary members in patients self-management support.</li> </ul>
<ul style="list-style-type: none"> <li>• The current e-health systems are not adopted for MM patients care. The changes were impossible because they are very costly</li> </ul>	<ul style="list-style-type: none"> <li>• The individualized health care plan protocol may be a basis for e-health development in future.</li> </ul>	<ul style="list-style-type: none"> <li>• In future research there is a need additional support for programing and changing current e-health systems.</li> </ul>
<ul style="list-style-type: none"> <li>• The social problems were detected to all the patients; unfortunately the help to solve them was limited due to a lack of social workers and well-coordinated social system.</li> </ul>	<ul style="list-style-type: none"> <li>• The social screening reflected a huge existence of social problems in MM patients; it reflected the need of social worker in PHC teams.</li> </ul>	<ul style="list-style-type: none"> <li>• More research is needed for better integration of health and social sectors.</li> </ul>
<p><b>Aragon, Spain</b></p>		
<ul style="list-style-type: none"> <li>• Resistance of some professionals to change the way they provide care</li> </ul>	<ul style="list-style-type: none"> <li>• Training</li> <li>• Dissemination in health sectors</li> </ul>	<ul style="list-style-type: none"> <li>• Spend more time to train professionals for the implementation of the</li> </ul>

<p>for chronic patients</p> <ul style="list-style-type: none"> <li>• Computer tool to register clinical information</li> <li>• No enough human resources</li> <li>• Difficult coordination among members of the care team because of people transfers</li> </ul>	<ul style="list-style-type: none"> <li>• Leader and motivated professionals</li> <li>• Designate a person of reference in primary care teams to energize the team in this issue</li> <li>• Schedule of agendas to facilitate GP-nurse meetings</li> </ul>	<p>model</p>
<ul style="list-style-type: none"> <li>• Limits in the number of students</li> <li>• Change in the form of working to focus the virtual consultations to Internal Medicine and Geriatrics and not in the rest of specialties</li> </ul>	<ul style="list-style-type: none"> <li>• Project eMULTIPAP</li> <li>• Startup of the virtual consultation tool</li> <li>• Sessions conducted by primary care teams and Internal Medicine services</li> <li>• Creation of professionals ties among healthcare levels</li> </ul>	<ul style="list-style-type: none"> <li>• Scale up the training tool to the broader audience of professionals possible</li> </ul>
<ul style="list-style-type: none"> <li>• Lack of specific training</li> <li>• Feeling of lack of time to do it</li> <li>• Lack of a specific space in the EHRs to register the reflexive process about the patient</li> </ul>	<ul style="list-style-type: none"> <li>• Online training tool</li> </ul>	<ul style="list-style-type: none"> <li>• the online training format showed to be feasible and highly convenient, as the professionals can complete it anywhere/anytime</li> </ul>
<ul style="list-style-type: none"> <li>• Resistance of professionals to register patient information in a different protocol.</li> </ul>	<ul style="list-style-type: none"> <li>• Ad hoc design of the clinical registration tool</li> </ul>	<p>-</p>
<ul style="list-style-type: none"> <li>• Difficult access to social resources from the health system</li> </ul>	<ul style="list-style-type: none"> <li>• Implementation of the Community Care Strategy</li> <li>• Identification of assets in the Community</li> </ul>	<p>-</p>