



**JADE  
CARE**

Joint action on implementation  
of digitally enabled integrated  
person-centred care

# D6.1 THE CATALAN DIGITALLY SUPPORTED INTEGRATED CARE SERVICES APPROACH ORIGINAL GOOD PRACTICE AND TRANSFER PROCESS

Core document

IDIBAPS, Institut d'Investigacions Biomèdiques August Pi i Sunyer

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## Table of abbreviations

B	Block
CF	Core Feature
CHSS	Catalan Health Surveillance System
CDSS	Clinical Decision Support System
DPO	Data protection Officer
EC	European Commission
EU	European Union
GDPR	General Data Protection Regulation
GMA	Adjusted Morbidity Groups
I(C)T	Information (and Communication) Technology
JA	Joint Action
LAP	Local Action Plan
LCF	Local Core Feature
LGP	Local Good Practice
NA	Next Adopter
NAWG	Next Adopter Working Group
OECD	Organization for Economic Co-operation and Development
oGP	Original Good Practice
PDSA	Plan Do Study Act
SIA	Strategic Intervention Areas
SMART	Specific Measurable Achievable Relevant Time-bound
SWOT	Strengths, Weaknesses, Opportunities, and Threats
WHO	World Health Organization

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are above the mean European GDP, whereas areas in brown are below mean European GDP.

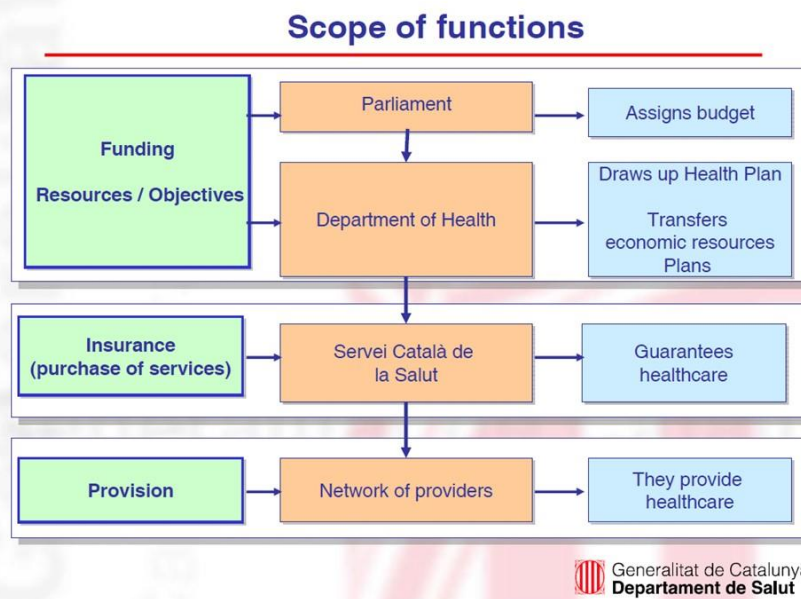


Figure 2: Main bodies and functions of the governance of the Health System. The “Servei Català de la Salut” is the single-public payer (purchaser of services), corresponding to the brand name CatSalut, mentioned in the text.

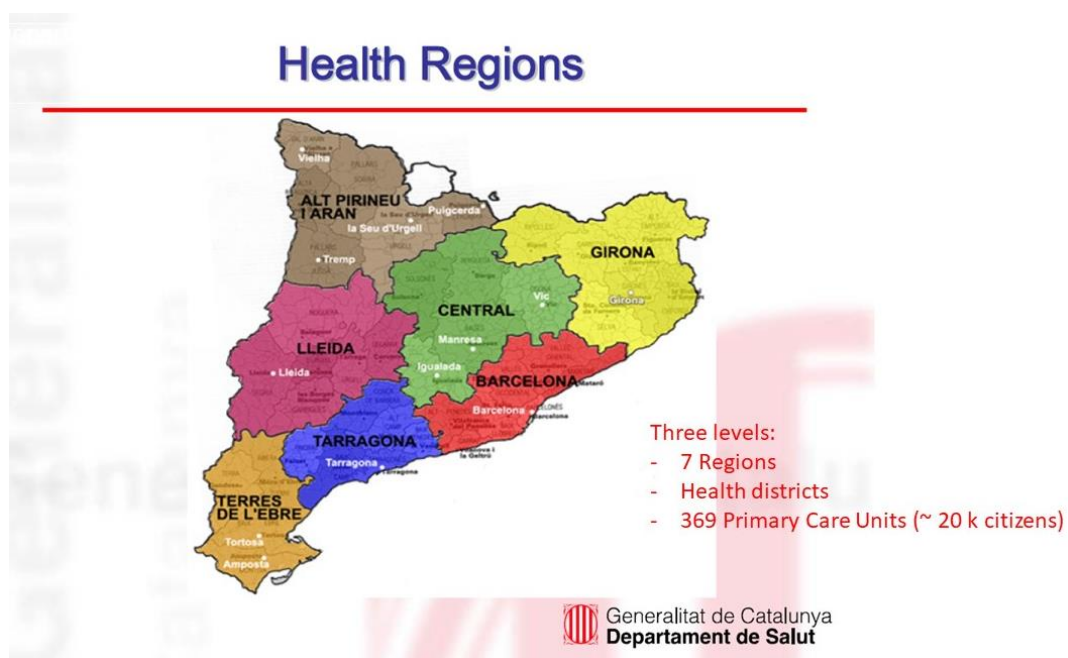


Figure 3: Three-level territorial organization of the Catalan Health System.



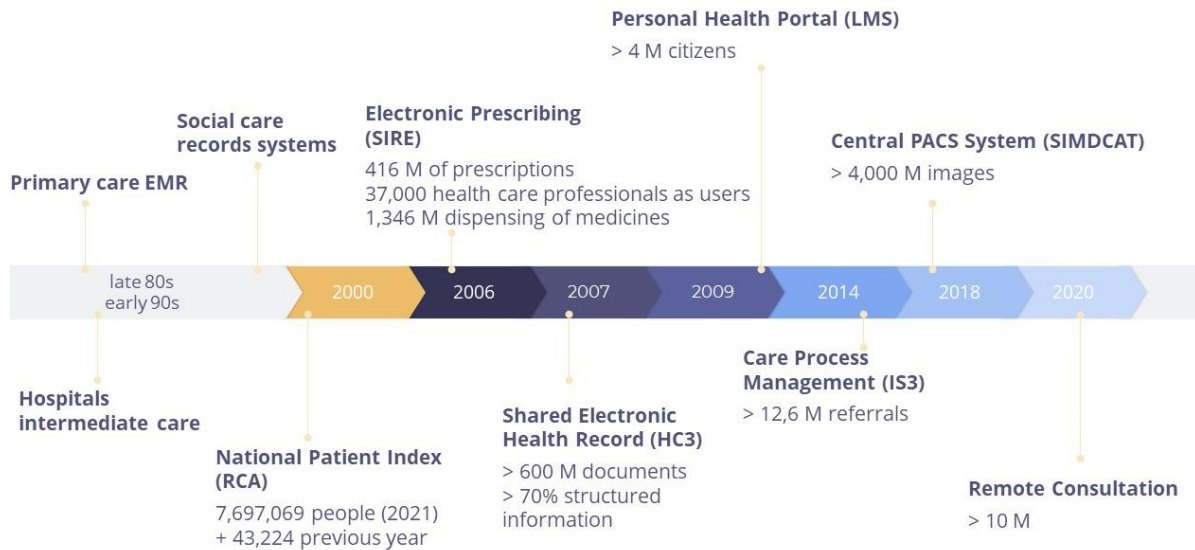


Figure 4: Historical developments of digital support to health & social care services. PACS stands for Picture Archiving and Communication System.



Figure 5: Infographics indicating the components of the Digital Health Network supporting healthcare services in the Catalan original Good Practice (oGP): i) Personal Health Folder, ii) National Patient Index (RCA), iii) Primary Care Electronic Medical Record, iv) Shared Electronic Health Record (HC3), v) Care Process Management (IS3), vi) Electronic Prescribing, vii) Terminology Server, viii) Central PACs Systems, and ix) Medical Messaging App.

Three relevant documents must be highlighted to better understand the evolution of the Catalan Health System over the last decade. Such documents are: i) Health Plan 2011-2015<sup>3</sup> and ii) Health Plan 2016-

<sup>3</sup> DEPARTMENT OF HEALTH. *Government of Catalonia Health Plan for 2011-2015.*; 2012. [https://scientiasalut.gencat.cat/bitstream/handle/11351/5519/pla\\_salut\\_catalunya\\_2011\\_2015\\_ang.pdf?sequence=3&isAllowed=y](https://scientiasalut.gencat.cat/bitstream/handle/11351/5519/pla_salut_catalunya_2011_2015_ang.pdf?sequence=3&isAllowed=y)

2020<sup>4</sup>. All three reports reflect both goals and achievements toward digital health transformation, as well as the adoption of integrated care services encompassing both vertical (specialized vs primary care) and horizontal (community-based and social care services) integration. Likewise, key ongoing regional developments are reported in the following documents: i) 2022 application for the EIP-AHA reference site, ii) 2021 Information Systems Master Plan<sup>5</sup>, and iii) Health Plan 2021-2025<sup>6</sup>. The current report on the activity of the Catalan oGP should be visualized under the scope of the regional work plans indicated above. Last, but not least, the 2020 WHO report on *Thirty-year Retrospective of Catalan Health Planning: Driver of Health System Transformation*<sup>7</sup> shows the important role of the Catalan Health Plans in triggering key sustainable changes at the regional level.

While accepting that Health Planning has played a backbone role in triggering the system transformation toward digitally supported integrated care services during the period 2011-2020, it should be acknowledged that three factors occurring during the first decade of the century were significant facilitators of subsequent changes following bottom-up and top-down approaches:

- i. Pilot initiatives generated by some health service providers triggered early successful experiences of ICT-supported service integration (2005-2010);
- ii. The Creation of Director Plans and promotion of participatory events/initiatives fostered the engagement of health professionals and patients in the change (2002-2010).
- iii. Promotion of regional networking following a Quadruple Helix Model (science, policy, industry, and society). Also, the endorsement of initiatives led by champions facilitated the creation of a health innovation ecosystem.

The competitive funding from the EU also played a significant positive role. Over the period 2016-2019, within the frame of the RIS3CAT program<sup>8</sup>, the NEXTCARE project (*Personalized Care for Chronic Patients under a Digital Health Framework*) promoted the **Open Innovation Hub on ICT-Supported Health Services** constituted on 15th October 2019 to promote synergies among relevant stakeholders of the Catalan Health System to foster transformative changes aligned with the Health Plan 2016-2020.

#### 1.1.1.1 The network

The Catalan ecosystem supporting JADECARE consists of several entities that could be allocated in three concentric circles, as described below and depicted in **Figure 6**:

The central team of the original good practice (oGP) is formed by the alliance of three groups of professionals: i) INCASyM (<https://www.incasym.com/>), Implementation of Integrated Care Services with a Digital Health & Systems Medicine Approach, which is a research& innovation platform at IDIBAPS-Hospital Clinic de Barcelona (HCB); ii) Digital Health Strategy from CatSalut; and, iii) Chronic Care Program, Integrated Health and Social Care Plan at the Department of Health. Generalitat de Catalunya. The alliance covers all key aspects of the oGP and provides direct interactions with Next Adopters through IDIBAPS-HCB, WP6's leading institution.

It is of note that the oGP's activities will be supported by a second circle of collaborators formed by different teams of health professionals leading innovative initiatives in the health district of Barcelona-Esquerri (AISBE), as well as from two agencies: AQuAS (Agencia de Qualitat i Avaluació Sanitàries de

<sup>4</sup> DEPARTMENT OF HEALTH. *Government of Catalonia Health Plan for 2016–2020*;2016. [https://salutweb.gencat.cat/web/.content/ departament/pla-de-salut/Pla-de-salut-2016-2020/documents/health-plan-catalonia\\_2016\\_2020.pdf](https://salutweb.gencat.cat/web/.content/ departament/pla-de-salut/Pla-de-salut-2016-2020/documents/health-plan-catalonia_2016_2020.pdf)

<sup>5</sup> The Catalan Information Systems Master Plan. <https://catsalut.gencat.cat/web/.content/minisite/catsalut/actualitat/2021/documents/2021-05-14-The-Catalan-Information-System-Master-Plan.pdf>

<sup>6</sup> DEPARTMENT OF HEALTH. *Government of Catalonia Health Plan for 2021-2025*;2022 [https://salutweb.gencat.cat/ca/el\\_departament/pla-salut/](https://salutweb.gencat.cat/ca/el_departament/pla-salut/)

<sup>7</sup> Thirty years retrospective of Catalan Health Planning. WHO 2020 <https://apps.who.int/iris/bitstream/handle/10665/357862/WHO-EURO-2020-5551-45316-64858-eng.pdf?sequence=1&isAllowed=y>

<sup>8</sup> NEXTCARE project (COMRD15), NextHealth Community Research and Innovation Strategy for Smart Specialization of Catalonia (RIS3CAT), 2016-2019.

Catalunya, <https://aguas.gencat.cat/ca/inici>) and FTSS (Fundació TIC Salut i Social, <https://ticsalutsocial.cat/>).

The third circle of oGP's collaborators is formed by the entities endorsing the *Open Innovation Hub on ICT-Supported Health Services*: Hospital Sant Joan de Deu (HSJD, <https://www.sjdhospitalbarcelona.org/ca>), Institut Guttman (<https://www.guttmann.com/>), Biocat (<https://www.biocat.cat/ca>), Eurecat (<https://eurecat.org/>), IDIBAPS-HCB (<https://www.clinicbarcelona.org/ca; https://www.clinicbarcelona.org/ca/idibaps>) and other stakeholders of the Catalan ecosystem of innovation including all those mentioned in the Reference Site led by FTSS.

Leading Executive Organization (LEO)	Institut d'Investigacions Biomèdiquest August Pi i Sunyer (IDIBAPS)
Co-Leading Executive Organization (co-LEO)	National Healthcare Service Center (AEEK, Hungary)



Figure 6: Core members of the Catalan Open Innovation Hub on ICT supported Health Services

### 1.1.1.2 Scope of the practice

#### 1.1.1.2.1 Problem/challenge description

- Well-identified limitations associated with fragmented healthcare/**Large scale adoption of practicalities of the chronic care model.**
- Reactive care/**Emphasis on efficient preventive strategies**
- Poor effectiveness and inefficiencies of conventional healthcare delivery/**Implementation of value-based healthcare.**
- Overcoming boundaries of traditional healthcare / **Foster bridging between health and social care systems.**
- Limited-slow adoption of digital tools/**Effective strategies to achieve digital maturity in the health sector.**
- One-size fits all/**Foster strategies leading to personalized medicine & convergence between integrated care and systems medicine approaches.**

#### 1.1.1.2.2 The General purpose of implementation

Achieve maturity of digitally enabled integrated care across the entire region, following the objectives described in the 2016-2020 Health Plan for Catalonia.

### 1.1.1.2.3 Target population

General population of Catalonia: 7.7 million inhabitants. Implementation of integrated care services with digital support aiming for convergence with a systems medicine (precision medicine) approach.

As everywhere, the recent COVID pandemic has caused major disruptions in healthcare delivery but had a positive impact on digital health transformation. The current post-pandemic period may offer opportunities to rebuild care pathways based on the lessons learnt during the past three years.

### 1.1.1.3 Information on main blocks and core features

The oGP initially identified eighteen core features (CF), clustered in five main blocks (B), for potential transference to Next Adopters. The rationale behind such a classification is as follows:

These five Blocks are: i) B1-Health risk assessment, ii) B2- Promotion of healthy lifestyles, iii) B3 - Implementation of Integrated Care Services, iv) B4 – Innovative assessment and regulatory aspects, and iii) B5-Digital support to integrated care services.

Block 1, health risk assessment, addresses tools for population-based health risk assessment, as well as strategies for clinical risk prediction.

Block 2, the promotion of healthy lifestyles, encompasses specific programs oriented toward disease prevention and enhanced management of multimorbidity. The block focuses on the promotion of healthy lifestyles, and optimization of patients' adherence and self-efficacy. It includes cognitive behavioural therapies (CBT), as a backbone component, in order to foster lifestyle changes and promote adherence to the patients' work plan.

Block 3 refers to specific implementation experiences of vertical (specialized vs community-based care) and horizontal (community-based health and social care services) integration to be shared with Next Adopters.

Block 4, Innovative assessment and regulatory issues, refers to methodologies for generating evidence of effectiveness as well as strategies for complying with ethical and regulatory frames.

Block 5- Digital support to integrated care services addresses strategies for digital health transformation.

It must be highlighted that the classification described above does not imply a unique adoption strategy. During the pre-implementation phase, the Next Adopters had the opportunity to select any given Block(s), or CF(s) for implementation at the service provider, at the health district or at regional/nation levels. Moreover, most of the CFs could be considered as building blocks of dynamic processes. As such, they allowed a broad spectrum of adoption strategies for any given CF, from: i) “plug-and-play” ii) site customization of the CFs; or, iii) joining the next-adopter in the evolutionary process of the CF.

We proposed that the granularities of the next-adopter work plans should be decided in phases 2 (situation analysis and definition of strategic actions) and 3 (define specific interventions and actions to be transferred) of the implementation process (2021). As described in the current document, the organization of the offers to the WP6-NAs evolved after assessment of the situation analysis and even, in some cases, during the implementation period, after the first PDSA cycle.

The main characteristics of the initial five blocks and eighteen core features are described below:

#### 1.1.1.3.1 B1-Health Risk Assessment: population-based and enhanced clinical decision making.

A core strategic asset in the Catalan scenario is the regional population-based health risk assessment tool, named GMA (Adjusted Morbidity Groups), developed and adopted in Catalonia<sup>9,10,11</sup> which is fully operational for health policy purposes and for clinicians in the workstation of primary care. It is updated

<sup>9</sup> Dueñas-Espín I, Vela E, Pauws S, Bescos C, Cano I, Cleries M, et al. Proposals for enhanced health risk assessment and stratification in an integrated care scenario. *BMJ Open*. 2016 Apr;6:e010301.

<sup>10</sup> Monterde D, Vela E, Clèries M, grupo colaborativo GMA. Los grupos de morbilidad ajustados: nuevo agrupador de morbilidad poblacional de utilidad en el ámbito de la atención primaria. *Atención Primaria*. 2016;48: 674–82.

<sup>11</sup> Vela E, Tényi Á, Cano I, Monterde D, Cleries M, García-Altes A, et al. Population-based analysis of patients with COPD in Catalonia: A cohort study with implications for clinical management. *BMJ Open*. 2018;8:e017283.

periodically (every six months or annually) and used to elaborate the health risk strata pyramid of the general population of Catalonia with a threefold purpose: i) Support decisions on healthcare services and policies; ii) Identify subsets of patients with the high risk of undesirable events (case finding strategies) that may require preventive interventions; and, iii) Contribute to enhanced clinical decision support through multisource predictive modelling.

The GMA tool predicts individual citizen risk based on multi-morbidity information gathered from the Catalan Health Surveillance System (CHSS). It is a publicly-owned open algorithm (CatSalut and Spanish Ministry of Health), not based on expert's opinions, which explains its high flexibility and transferability. The latter has been demonstrated by its adoption by thirteen out of the seventeen regional healthcare systems in Spain, covering >90% of the Spanish population, approximately 38 million citizens.

The GMA algorithm shows higher performance and applicability for the prediction of healthcare resources utilization in primary care than other well-known indices<sup>12</sup>. The input for the GMA algorithm is a text file containing information about the health problems (diagnoses) of the insured. The required fields are: i) identification of the insured; ii) diagnostic classification used; iii) code of the health problem; iv) date of diagnosis; v) birthdate; and, vi) sex of the insured. The output fields that the GMA algorithm generates are: i) Identity of the insured; ii) Adjusted Morbidity Group Code; iii) Number of chronic diseases present; iv) Number of organic systems affected by chronic disease; v) Total relative weight of the insured (complexity); and, vi) Clinical label summary of the set of relevant diseases identified in the insured.

As described, the use of the GMA grouper provides allocation of each citizen into the regional risk stratification pyramid. The four main strata usually identified are: i) GMA-1 corresponds to 50% of the population, with a lower complexity level; ii) GMA-2 or low-risk stratum: it corresponds to 30% of the population, which has higher complexity than the previous risk stratum; iii) GMA-3 or moderate risk stratum: it corresponds to 15% of the population, which has greater complexity than the previous risk stratum; and, iv) GMA-4 or high-risk stratum: it corresponds to 5% of the population, which has the highest complexity level. However, GMA scoring can be used as a continuous variable for inclusion into multisource predictive modelling as a covariate.

B1- CF1: Assessment of transferability, and identification of steps for adoption, according to intellectual property rules, of the Catalan population-based risk stratification tool into the ecosystem of the next adopter.

The experience acquired with the process of transferability of the GMA within Spain will facilitate to define of appropriate strategies customized to the characteristics of the Next Adopters. As indicated above, a “plug-and-play” strategy of adoption can consist of using and testing the Catalan algorithm in the next-adopter site. Alternatively, the process of transference could include the elaboration of an on-site algorithm based on the oGP premises.

B1- CF2 - Health data management strategies (Catalan Health Surveillance System, CHSS)

The steps followed to buildup the CHSS, its characteristics, as well as the different data management strategies followed in Catalonia will be transferred to the Next Adopters. The potential of data exploitation within the strategies defined in the current, 2016-2020 and future, 2021-2025, Catalan Health Plans will be shared with the next adopters.

The CHSS includes updated registries of the region of Catalonia (ES) (7.7M inhabitants) from Primary Care, Hospital-related events (hospitalizations, emergency room consultations and specialized outpatient visits), Pharmacy, Mental Health, Socio-sanitary services and other items (home-based respiratory therapies, dialysis, outpatient rehabilitation and non-urgent healthcare transportation) since 2011. It allows analyses of the use of healthcare resources, pharmacy consumption, the prevalence of key disorders and population-based health risk assessment. It is of note that although integration of CHSS registry data with electronic medical records is not yet in place, it constitutes the main strategic goal since January 2017 (see Block 5).

As mentioned, the COVID-19 pandemic has triggered a significant evolution in terms of data management which, overall, represents a big step toward overcoming still-existing health information silos and providing tools for agile management of the pandemic through efficient networking strategies & using computational modelling<sup>13</sup>.

**B1- CF3:** Development of enhanced risk prediction modelling for health policy purposes and/or clinical risk prediction (**Figure 7**).

We successfully tested the use of multisource computational modelling for clinical risk prediction<sup>14</sup> building on the specificities of the GMA, incorporating additional clinical variables and functional/social determinants to increase support of clinical decision-making at entry of the patient in the Emergency Room and at discharge.

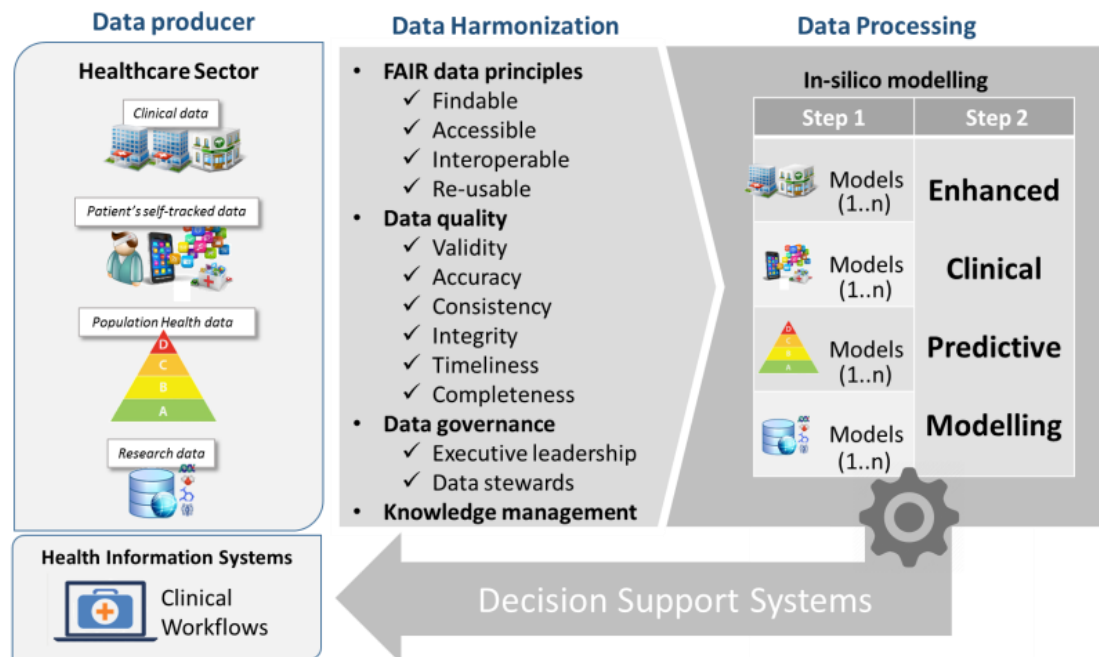


Figure 7: The 4 types of data sources considered for computational modelling, and for the elaboration of enhanced clinical predictive modelling as well as the development of clinical decision support systems (CDSS). Multi-disciplinary data sources will feed real-time decision support systems to guide health professionals in the clinical decision-making process (CDSS) and to facilitate self-management of proactive patients (PDSS), focusing on well-defined clinical processes for which decision-making can be facilitated by such decision support systems. Details on recommendations for data harmonization are reported in<sup>15</sup>, as well as explored by several ongoing EU programs.

Practicalities of enhanced multisource clinical predictive modelling, as illustrated in the figure below, including: i) clinical information, ii) GMA scoring, iii) patient’s self-tracking data, and, iv) disease-related biological mechanisms, to guide decision-making in the clinical arena have shown high potential. The task developed so far raised interest towards three strategic areas, namely: i) compliance with data harmonization principles; ii) dynamic modelling for clinical decision support systems (CDSS) through continuous model training and quality assurance; and iii) preparedness of digital infrastructure to support dynamic modelling generation, evaluation, and clinical applicability (see Block 5).

<sup>13</sup> Pérez Sust P, Solans O, Fajardo JC, et al Turning the Crisis Into an Opportunity: Digital Health Strategies Deployed During the COVID-19 Outbreak. JMIR Public Health Surveill. 2020 May 4;6(2):e19106. doi: 10.2196/19106. PMID: 32339998; PMCID: PMC7199803.

<sup>14</sup> Calvo M, González R, Seijas N, Vela E, Hernández C, Batiste G, Miralles F, Roca J, Cano I, Jané R. Health Outcomes from Home Hospitalization: Multisource Predictive Modeling. J Med Internet Res 2020;22(10):e21367. DOI: [10.2196/21367](https://doi.org/10.2196/21367)

<sup>15</sup> Aarestrup, FM et al. Towards a European health research and innovation cloud (HRIC). *Genome Medicine* 2020;12:18-32.

### 1.1.1.3.2 B2-Promotion of healthy lifestyles.

The design and implementation of proper policies to foster healthy lifestyles to prevent multimorbidity constitutes a major goal. Likewise, patient empowerment to increase self-efficacy and tertiary prevention of episodes of exacerbation is a key unmet need to improve health-related quality of life, increase survival and reduce avoidable use of healthcare resources. These are central aspects to be taken into account in the deployment of integrated care. However, programs' accessibility and poor adherence are major limitations for cost-effective interventions addressing such goals.

The approach adopted in Catalonia is to learn from the implementation of preventive perioperative interventions, specifically from the deployment of prehabilitation in high-risk candidates to major surgical procedures. The strategy has been fostered by two major factors. Firstly, the high burden of perioperative complications, including deaths, on healthcare systems<sup>16</sup>. Secondly, the time-limited period (average 4 weeks) of the intervention facilitates the analysis of the factors modulating adherence and effectiveness of the implementation. The results have indicated a high potential for healthcare value generation and transferability to other clinical scenarios. A three-step approach is proposed to next adopters. It includes: i) transferability of the current prehabilitation program (B2-CF1); ii) perioperative care with a population-health approach including community-based programs; and, iii) implementation of enhanced modalities of rehabilitation for chronic patients and citizens at risk for common multimorbid conditions.

#### B2- CF1- Transferability of the prehabilitation program

Prehabilitation is a preventive intervention targeting high-risk candidates for major surgical procedures carried out preoperatively, average 4-week duration, aiming at reducing complications and enhancing postoperative recovery. It combines: (i) exercise training and promotion of physical activity; (ii) nutritional balance; and; iii) psychological support.

The intervention is currently deployed as a mainstream service<sup>17,18</sup> and cross-country transferability at the EU level is being tested through an ongoing EIT-Health project (PAPRIKA, 2019-2021).

Since mid-2017, the Prehabilitation Unit at IDIBAPS-HCB provides logistic support to prehabilitation as a mainstream service within the frame of ERAS (Enhanced Recovery After Surgery) recommendations. During the first two years of PAPRIKA, prehabilitation at HCB has achieved maturity in five surgical programs involving major surgical procedures: digestive, cardiac, thoracic, gynaecology and urologic. Moreover, sustainable adoption of the service in all these areas has been consolidated. A recent analysis of the Prehabilitation Unit, currently submitted for publication to *Annals of Surgery* (*Multimodal prehabilitation as a mainstream service: a prospective controlled cohort study and implementation analysis*) provides a detailed description of the characteristics of the intervention, inclusion and exclusion criteria, service delivery, consolidated outcomes indicating high potential for healthcare value generation, as well as information on the implementation process including key performance indicators for quality assurance of the service after adoption. Moreover, the analysis confirms the high degree of generalization of the intervention to other use cases, as reported in B2-CF3.

#### B2- CF2- Perioperative care with a population-health approach

Several multidisciplinary co-design sessions were performed to explore alternatives aiming at overcoming the existing constraints and to explore the potential for regionalization of the service delivery using a LEAN approach (*a set of operating methods helping to create maximum value for patients by reducing waste and waits*). During 2019, we did substantial progress in the conception, as well as in the PAPRIKA technological developments, of digital support to the service (TLR=7). The overall aim is to maximize health value generation at the providers' level and at the healthcare system level. Moreover, the project

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<sup>16</sup> Dmitri Nepogodiev D, J Martin, B Biccard, A Makupe and Al Bhangu. Global burden of postoperative deaths. *The Lancet*. 2019; 393 (10170): 401

<sup>17</sup> Barberan-Garcia A, Ubré M, Roca J, Lacy AM, Burgos F, Risco R, et al. Personalised Prehabilitation in High-risk Patients Undergoing Elective Major Abdominal Surgery: A Randomized Blinded Controlled Trial. *Ann Surg*. 2018;267:50–6.

<sup>18</sup> Barberan-Garcia A, Ubré M, Pascual-Argente N et al. Post-discharge impact and cost-consequence analysis of prehabilitation in high-risk patients undergoing major abdominal surgery: secondary results from a randomised controlled trial. *Br J Anaesth*. 2019;123(4):450-456.

provided a better understanding of the implementation process which should facilitate the uptake of the service at the regional level in Catalonia and transferability to other sites.

Five core recommendations for action emerging from the project were worked out during the current semester, from October 2020 to March 2021, to achieve full maturity and regional scale-up during 2021: i) Increase service efficiency & value; ii) Build capacity & refine service delivery; iii) Enhance risk assessment & program personalization; iv) Improve digital support; and v) Transfer the service to the community.

### B2- CF3- Rehabilitation of chronic patients and prevention of multimorbidity

Lessons learnt in the deployment of prehabilitation services are extremely useful for designing and testing cost-effective rehabilitation programs for chronic patients, including oncology candidates, aiming at achieving high levels of accessibility and program adherence. Moreover, this type of program offers a unique opportunity to be scaled-up for citizens at risk for multimorbid conditions to efficiently prevent common chronic disorders such as cardiovascular, respiratory and type 2 diabetes mellitus, as planned in<sup>19</sup>

#### 1.1.1.3.3 B3- Vertical and Horizontal integration experiences adopted in Catalonia.

Innovative practices are continuously emerging in the region for testing. Those that have shown to be successful in terms of healthcare value generation and acceptability by patients and health professionals are promoted for large- scale deployment.

The current block (B3) includes four initially selected examples successfully assessed in the EU project ACT@Scale<sup>20</sup>. Each of the experiences encompasses several key dimensions: (i) change management and reorganization of the existing care delivery; (ii) embedding digital technologies and tools in care services, re-organization of patient pathways; (iii) changes in health workforce roles and skills with digital technologies and data; (iv) building the capacity of individuals and communities to participate in the care process; (v) citizen empowerment; (vi) use of patient-reported data; (vii) new payment methods; and, (viii) performance assessment of new care models.

A brief description of the four selected experiences indicated below can be found in<sup>17</sup>:

- B3-CF1- Programme for chronic and frail patients (Badalona Serveis Assistencials, BSA)<sup>21</sup>.
- B3-CF2- Support for complex case management including home hospitalization, transitional care and vertical&horizontal integration supported by digital tools (Health District Barcelona-Esquerra, AISBE)<sup>22,23</sup>
- B3-CF3- Healthcare support programmes for nursing homes (MUTUAM, Barcelona).
- B3-CF4- Integrated Care for admission avoidance of subacute and frail patients (PS Pere Virgili, Barcelona).

The analysis of implementation strategies following the CFIR approach and identification of KPIs for long-term follow-up of the service beyond the initial deployment phase is available for most of the interventions<sup>24</sup>.

<sup>19</sup> Barberan-García A et al Protocol for regional implementation of collaborative self-management services to promote physical activity. BMC Health Services Research (2018) 18:560. <https://doi.org/10.1186/s12913-018-3363-8>

<sup>20</sup> ACT@Scale (2016-19) – Advancing Care Coordination and Telehealth at Scale [Internet]. Available from: <https://www.act-at-scale.eu/>

<sup>21</sup> Píera-Jiménez J et al. BeyondSilos, a Telehealth-Enhanced Integrated Care Model in the Domiciliary Setting for Older Patients: Observational Prospective Cohort Study for Effectiveness and Cost-Effectiveness Assessments JMIR Med Inform 2020;8(10):e20938.

<sup>22</sup> Hernández C et al. Implementation of Home Hospitalization and Early Discharge as an Integrated Care Service: A Ten Years Pragmatic Assessment. Int J Integr Care. 2018 May 16;18(2):12. doi: 10.5334/ijic.3431. PMID: 30127696; PMCID: PMC6095082

<sup>23</sup> Cano, I., Dueñas-Espín, I., Hernandez, C. et al. Protocol for regional implementation of community-based collaborative management of complex chronic patients. *npj Prim Care Resp Med* 27, 44 (2017). <https://doi.org/10.1038/s41533-017-0043-9>

<sup>24</sup> Baltaxe E, Cano I, Herranz C, et al. Evaluation of integrated care services in Catalonia: population-based and service-based real-life deployment protocols. BMC Health Serv Res. 2019;19(1):370



#### 1.1.1.3.4 B4- Innovative assessment and regulatory aspects

This block includes three different items: i) healthcare planning and health delivery assessment (**Figure 8**); ii) regulatory issues regarding patients’ self-tracking data; and, iii) regulatory aspects regarding data privacy and sharing.

- B4- CF1- Catalan Health Plans and Practicalities of healthcare delivery assessment

As extensively reported earlier in the current document, the Catalan oGP has had a well-blended background for the design and deployment of five-year period Regional Health Plans over the last thirty years<sup>2,3,4</sup>. The last two Health Plans 2011-2015 and 2016-2016 focused on large-scale deployment of integrated with an emphasis on the digital transformation of the health system. The region is currently applying for the 2021-2025 Health Program.

Moreover, Catalonia is producing both recommendations and innovative information on the practicalities of healthcare delivery assessment based on the evaluation framework reported in<sup>21</sup>. It takes into account: (i) Health outcomes assessment with a Quadruple aim approach; (ii) Evaluation of service implementation (CFIR); (iii) Assessment of maturity (Sirocco); and; (iv) identification of service-specific key performance indicators for long-term follow-up after service adoption.

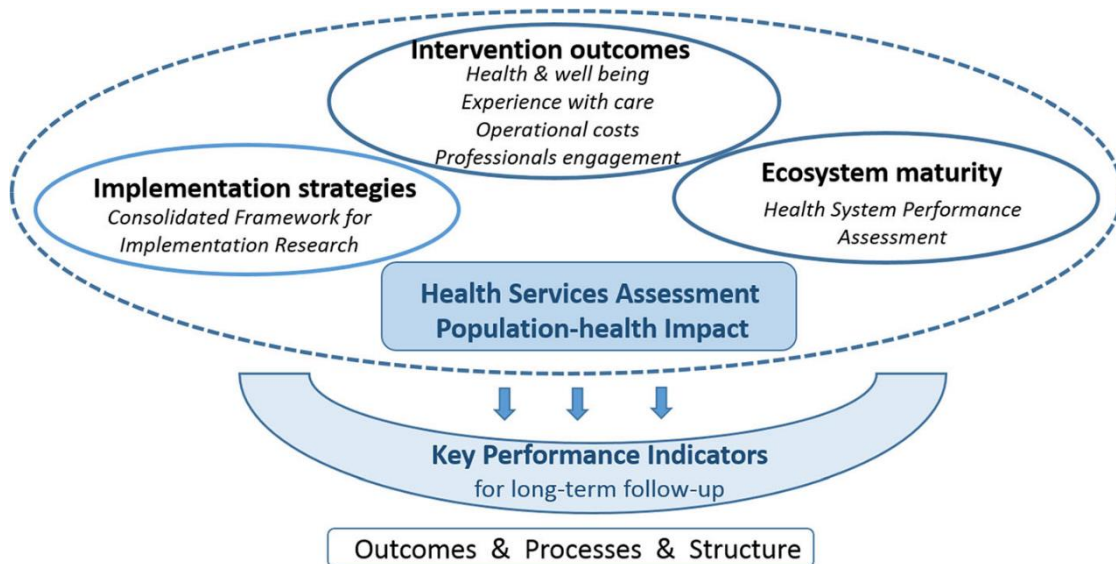


Figure 8: The framework for the assesment of integrated care services reported in<sup>25</sup>. Main components are: i) assessment of value generation of the interventions with a Quadruple Aim approach; ii) assessment of the impact at the health system level in selected cases, and iii) identification of KPI for continuous quality assurance after service adoption. Deployment of innovative interventions with proven efficacy requires assessment of ecosystem maturity and evaluation of the implementation process to reduce the efficacy-effectiveness gap, as well as to assess key determinants of transferability.

- B4- CF2- Regulatory aspects associated with patient’ self-tracking data

Fundació TIC Salut i Social (FTSS) has generated recommendations/standards for patients’ self-tracking data using Apps and taking into account interoperability with the regional personal health folder, La Meva Salut<sup>25</sup>

B4- CF3 - Regulatory aspects of health data management for research purposes and quality assurance purposes.

<sup>25</sup> Modol JR. Navigating Towards Self-Care: The Catalan Public Patient Portal. In: Aanestad M, Grisot M, Hanseth O, Vassilakopoulou P, editors. Information Infrastructures within European Health Care: Working with the Installed Base. Cham: Springer International Publishing; 2017. p. 173–92.

Health data management across institutions for research purposes in Catalonia is regulated under the umbrella of the PADRIS program, run by AQuAS<sup>26</sup>. Regulatory aspects of health data management for quality assurance and service innovation purposes are currently being addressed by FTSS, which plays the role of regional authority on health data privacy. Protocols for use of cloud-based digital support by healthcare providers, as well as to perform Big Data Analytics, have been implemented and can be shared.

### 1.1.1.3.5 B5- Digital support of integrated care services

Digital support of health services in Catalonia involves regional interoperability among an extensive network of healthcare providers with highly heterogeneous health information systems, as depicted in **Figure 9**. It is of note that a well-developed health information exchange system is in place. This is the role of the shared regional health record (HC3) which consists of a series of health information exchange platforms linking publicly-paid heterogeneous healthcare providers at the regional level. Within this scenario, in addition to HC3 (B5-CF1), two key tools are fully blended and implemented across the entire region: i) B5-CF2, Primary Care electronic medical record (eCAP) and the Electronic Prescription; and ii) B5-CF3, the Personal Health Folder (La Meva Salut, LMS) also interoperable with HC3. All these basic tools are governed by the eHealth (eSalut) Office within the ICT Strategy Directorate. The steps followed for the development of these three items, their current status and future evolution will be shared by the practice.

The region is currently deploying an ambitious ICT plan<sup>27</sup> for the full digital transformation of the health system with an emphasis on cloud-computing and CDSS based on artificial intelligence (AI). Some of these aspects are covered by B5-CF4. Within this umbrella will be sharing experiences testing digital tools to support: i) col-laborative work among stakeholders across health and social care tiers, as well as the implementation of adaptive case management and digital tools for patients' self-tracking information. Finally, B5-CF5 addresses the ongoing ICT deployment strategic plans for the period:

**B5-CF1** - Regional information exchange platform.

**B5- CF2**- Primary Care Electronic Medical Record and Electronic Prescription.

**B5- CF3**- Personal Health Folder (LaMeva Salut)<sup>22</sup>.

**B5- CF4**- ICT tools supporting adaptive case management & collaborative work.

**B5- CF5**- Cloud-based strategies.

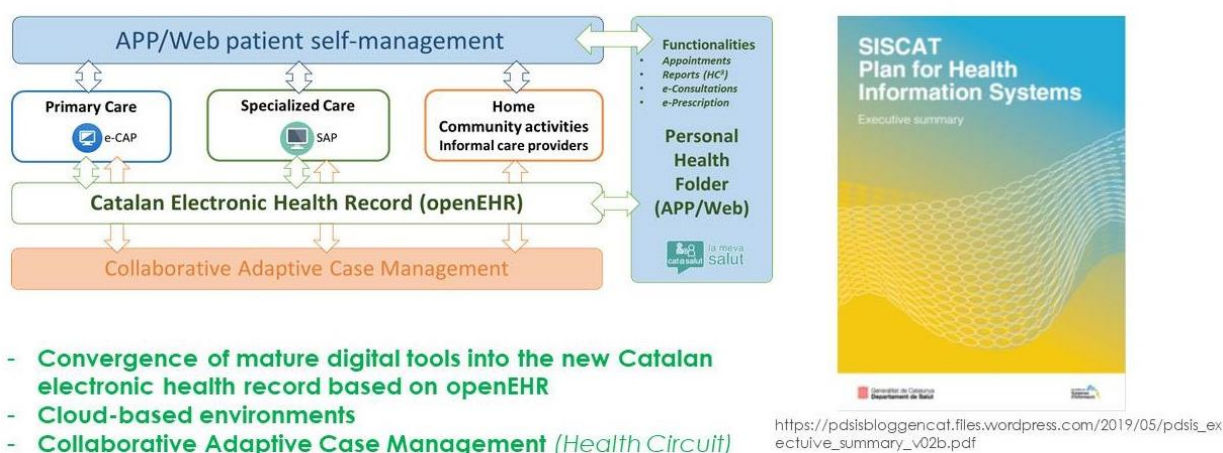


Figure 9: Core elements of the ICT support to health and social services in Catalonia

<sup>26</sup>Public Data Analysis for Health Research and Innovation Program (PADRIS) <http://aquas.gencat.cat/en/ambits/analitica-dades/padris/>

<sup>27</sup> SISCAT Plan for Health Information Systems. [https://pdsisbloggencat.files.wordpress.com/2019/05/pdsis\\_executive\\_summary\\_v02b.pdf](https://pdsisbloggencat.files.wordpress.com/2019/05/pdsis_executive_summary_v02b.pdf)

### 1.1.1.4 Key dimensions for success and sustainability

The SWOT analysis of the Catalan oGP shows the main traits depicted in **Table 1**:

<p style="text-align: center;"><b>Strengths</b></p> <ul style="list-style-type: none"> <li>• Political consensus on the model (<i>Health Plans</i>)</li> <li>• Positive top-down and bottom-up interactions during the transition period</li> <li>• Regional strengths in healthcare biomedical research and health-related industries</li> </ul>	<p style="text-align: center;"><b>Opportunities</b></p> <ul style="list-style-type: none"> <li>• Networking &amp; entrepreneurship tradition</li> <li>• Current COVID-19 crisis</li> </ul>
<p style="text-align: center;"><b>Weaknesses</b></p> <ul style="list-style-type: none"> <li>• Financial weakness</li> <li>• Health professionals crisis &amp; resistances</li> <li>• Organizational &amp; Governance deficits identified during the COVID-19 crisis</li> </ul>	<p style="text-align: center;"><b>Threats</b></p> <ul style="list-style-type: none"> <li>• Financial weakness</li> <li>• Governance revisited</li> <li>• Current COVID-19 crisis</li> </ul>

*Table 1: Results of the SWOT analysis of the Catalan oGP*

The three main factors determining the strength of the Catalan oGP are:

- i) The robust political consensus on core traits of the health model across the Catalan society, irrespective of the diversity of political orientations, explains the long tradition of coherent regional Health Plans, as acknowledged in the recent WHO report briefly described in the current document. Despite the heterogeneities of publicly paid health service providers, the role of the single-public payer, CatSalut, enforcing execution of Health Plans has played a central role.
- ii) Rich and positive top-down and bottom-up interactions have also favoured the evolution of the health system to face the 21<sup>st</sup> Century challenges of the health sector.
- iii) Last but not least, the Catalan ecosystem generates highly competitive scientific health/biological research and has strong business schools and competitive industrial activities in the pharmacy sector. The interactions among these elements are driving innovation and, consequently, fostering the evolution of the health system to cover the needs beyond the actual health requirements of the citizens.

In this scenario, a long tradition of regional networking across diverse institutions covering different sectors: education, research and industry generate opportunities for health innovation. Moreover, the current COVID-19 pandemic should be also seen as a unique opportunity to reshape some aspects of the system that are highly relevant for JADECARE regarding digital support and practicalities of the GDPR application. Also, in terms of strengthening collaborations among relevant institutions across sectors. Examples of the phenomenon are the roles played by groups like BIOCOSM (Computational Biology and Complex Systems at UPC), Barcelona Supercomputer Center (BSC) and others in terms of scientific achievements (systems approach), as well as in terms of policy and daily monitoring of the pandemic.

We can also identify three main factors weakening the Catalan oGP. One of the most prominent is the financial deficit. Despite Catalonia having full responsibility in all aspects of health organization, financial resources are controlled by the Spanish government. The Catalan health system is suffering from a chronic deficit of investments and financial support for a daily activity that cannot be supported only by preventing inefficiencies. This is a factor that has been acknowledged by prominent experts both at local and international levels.

Closely linked with the financial limitations is the burnout experienced by health professionals which can be attributed to limited investments, poor salaries and often temporality of the contracts. Such an environment favours resistance to change that could be easily overcome because of the entrepreneurship tradition of health professionals. When they are involved in changes that involve the generation of efficiencies and better health outcomes they become highly engaged, as shown in several initiatives over the last years. Their active contributions in the Director Plans and in the Health Plans clearly show high potential for engagement in transformative changes. A third factor weakening the Catalan oGP is the governance deficits at different levels of the health system. It has clearly emerged during the COVID-19 pandemic. The contrast between strengths in terms of policy (Health Plans) and well-identified weaknesses in terms of governance may seem paradoxical. But, in our understanding, it indicates potential to overcome such a limitation.

In summary, financial limitations and governance deficits are the two most prominent threats to be urgently solved. During 2020, an ad-hoc multidisciplinary group of key opinion leaders elaborated a well-defined plan to address these two challenges. We acknowledge, however, that appropriate management of the COVID-19 crisis during the last two quarters of 2020 and across 2021 will be a key aspect to preventing a new collapse of the health system, as in March-April 2020, and to successfully overcome the challenges identified during the current 2020.

**Table 2** lists the major factors of success and sustainability of the Catalan oGP. The process followed for the identification of those factors was closely related to the SWOT analysis described above.

### Other aspects that made the success and made it sustainable

- ✓ Political consensus on the health model with a positive perception of the population
- ✓ Long tradition of successful Catalan Health Plans
- ✓ Entrepreneurship & networking tradition leading to a consolidated ecosystem
- ✓ Despite some resistances, health professionals are champions of the change
- ✓ Current predominant analysis of the COVID-19 crisis as an opportunity

*Table 2: Major factors of success and sustainability of the Catalan oGP*

Four additional pillars are supporting the statements on the success and sustainability of the Catalan oGP:

- The Catalan oGP, as described in the current document, is not an initiative or a project. It is a sustained change of the entire regional health system (7.7 M citizens) over a long period, as illustrated by the evolution of the Health Plans over the last thirty years and, since 2011, regarding the transition to digitally enabled integrated care.
- Health indices assessed in terms of: i) patients' outcomes; ii) results of specific services; and, iii) population level are clearly positive both in absolute terms, as well as relative to the regional health expenditure.
- Perceptions of the Catalan health system by citizens are clearly positive. The Catalan Health Survey (ESCA) collects information on the population residing in Catalonia, without age limit, on the state of health, behaviours related to health and the use of health services. The ESCA provides, on yearly basis, relevant information for the establishment and evaluation of the health policies set out in the Catalan Health Plan.
- Perceptions of the Catalan health system by health professionals are positive despite well-identified problems described in the SWOT analysis.

### 1.1.2 Maturity Requirements for the Catalan original good practice implementation

The self-assessment process about the readiness for integrated care in Catalonia was done using the Scirocco tool<sup>28</sup>. The professionals listed below assessed the current situation of deployment of integrated care in Catalonia by rating the 12 dimensions on a scale from 0 to 5 where answer 5 represents the most advanced maturity level in each section. The evaluation displayed in **Figure 10A** represents the status of Catalonia in terms of maturity for adoption, not the minimum requirements for adoption by Next Adopters. It should be taken by NAs to analyse the feasibility of adopting the selected oGP's core features in their local setting.

In a subsequent exercise, the professionals got into consensus on the scores and minimum maturity requirements for NAs. Their individual scoring is displayed in **Figure 10B**. The authors of the self-assessment process within JADECARE were:

- Josep Roca, MD.PhD at IDIBAPS, coordinator
- Carme Hernandez, RN, PhD, Coordinator of the Home Hospitalization Program at HCB
- Carme Herranz, RN, Nurse coordinator of Research at CAPSBE
- Isaac Cano, PhD, Engineer specialist in Artificial Intelligence at IDIBAPS
- Antonieta Also, MD Primary Care Physician at CAPSBE
- Euridice Alvaro, Lawyer, Manager at IDIBAPS

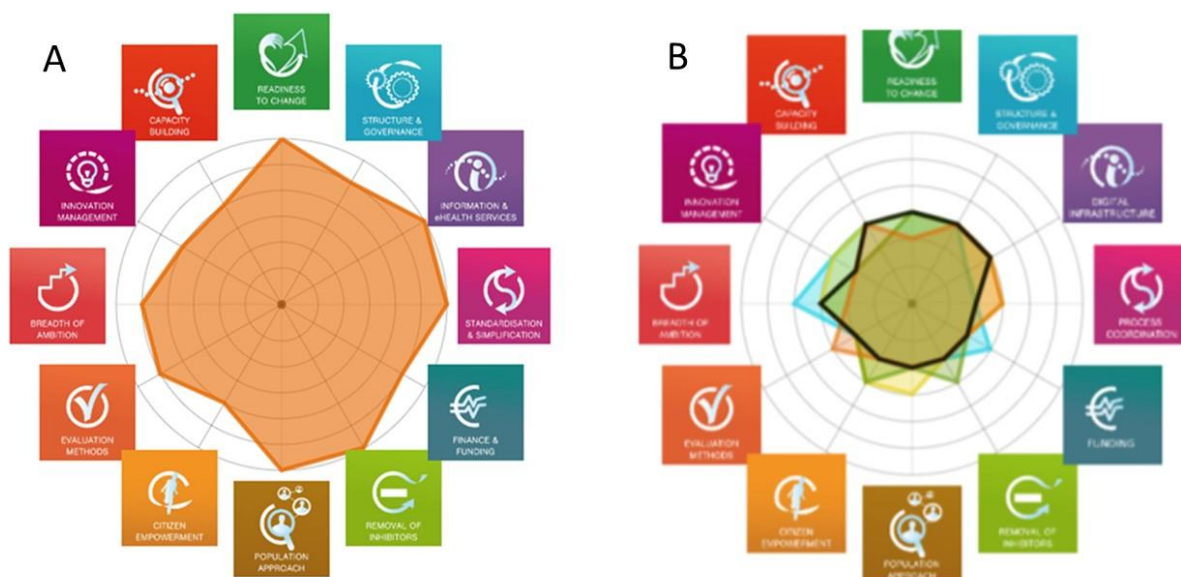


Figure 10: Panel A describes the maturity assessment of the oGP using the Scirocco model, whereas Panel B depicts the minimum maturity requirements for NAs.

The evaluation displayed in **Figure 10** was carried out on December 2019 within the frame of the PAPRIKA project (see B2 – CF1 for further explanations). The Scirocco assessment was carried out again within JADECARE producing very similar results. Consequently, we can reasonably assume that the figure is representative of the entire Catalan region. It is of note that these results represent the status of Catalonia in terms of maturity, not the minimum requirements for adoption of the oGP by Next Adopters.

<sup>28</sup> The SCIROCCO self-assessment tool is an online instrument to assess a region's readiness for integrated care. In the Maturity Model, the many activities that need to be managed to deliver integrated care have been grouped into 12 dimensions, each of which addresses part of the overall effort. By considering each dimension, assessing the current situation, and allocating a measure of maturity within that domain, it is possible for a country or region to have a radar diagram which reveals areas develop of strength and gaps in capability. The 12 questions are answered on a scale from 1 to 5 whereby answer 5 represents the most advanced maturity level in each section.

**Table 3** indicates the consensus scoring on minimum maturity for each of the twelve dimensions of the Scirocco tool achieved by the group of professionals indicated above.

Dimension	Score	Maturity Requirements
D1: Readiness to Change	2	Dialogue and consensus-building are underway; the plan is being developed
D2: Structure & Governance	2	Formation of task forces, alliances, and other informal ways of collaborating
D3: Digital infrastructure	2	eHealth deployed in some areas, but limited to specific organizations or patients (There is a mandate and plan(s) to deploy regional/national digital infrastructure, including a set of agreed technical standards, across the health and social care system), but it is not yet implemented
D4: Funding	1	The stakeholders produce some guidelines and recognise the need for the standardisation of coordinated care processes, but there are no formal plans to develop them
D5: Process Coordination	1	Fragmented innovation funding, mostly for pilots and testing
D6: Removal of inhibitors	1	Awareness of inhibitors but no systematic approach to their management is in place
D7: Population Approach	1	Population-wide risk stratification considered but not started
D8: Citizen Empowerment	1	Citizen empowerment is recognised as an important part of integrated care provision but effective policies to support citizen empowerment are still in development
D9: Evaluation Methods	1	Evaluation of integrated care services is planned to take place and be established as part of a systematic approach
D10: Breadth of Ambition	2	Integration within the same level of care is achieved
D11: Innovation Management	1	Innovation is encouraged but there is no overall plan
D12: Capacity Building	2	Cooperation on capacity building for integrated care is growing across the region

*Table 3: Consensus scoring on minimum maturity for each of the twelve dimensions of the Scirocco tool achieved by the group of professionals representing the oGP*

Such minimum maturity requirements indicated in the table were useful as a reference for the process of adoption undertaken by the NAs. Moreover, a list of minimum maturity requirements for each of the eighteen CF offered to the NAs was also elaborated, but not displayed in the current document (see detailed information in the project's SharePoint – WP6: pre-implementation area).

## 2 Transfer and adoption process and results

The current section has been divided into two parts: i) Evolution of the offer of the Catalan oGP during the pre-implementation phase; and ii) Highlights of the transfer and adoption process by NAs (**Figure 11**). The first subheading aims to facilitate a better understanding of the dynamic (and bidirectional) interactions between the oGP and the WP6-NAs during the pre-implementation phase. Also reflecting the speeds of the different NA to reach maturity throughout the project. The description of the oGP evolution during the project is supported by the publication initiatives reported in detail in the ANNEX.

The second subheading is devoted to the description of the processes of transfer and adoption followed by each of the WP6-NA. Such descriptions will be a summary of the detailed documentation provided in the ANNEX with emphasis on three aspects: i) results currently achieved, ii) expected sustainable outcomes beyond the project, and iii) recommendations and potential for future collaborations with the Catalan oGP. We have purposely adopted such format to facilitate the task of the reader. But, also, because throughout the project we have detected some NA's tensions between the necessary, and highly productive, rigidity of the steps guiding the adoption process and real-life evolution of the events in the different NA sites.

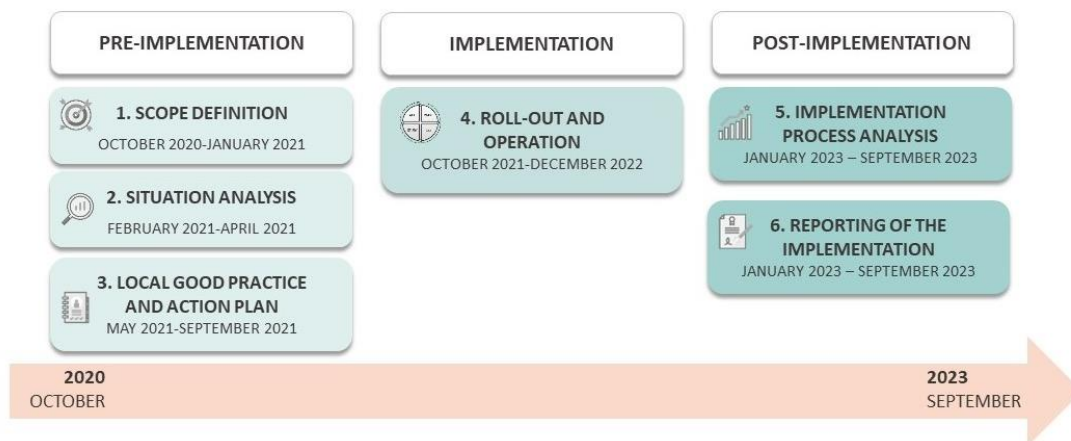


Figure 11: Structure and timeline of the project

## 2.1 Evolution of the offer of the Catalan oGP

The initial offer of five blocks (B) and eighteen core features (CFs), as reported in the presentation of the Catalan oGP, was based on a careful selection of mature elements susceptible to be transferred to the NA. However, this structure proven to be only valid for NAs that were able to identify a precise target in early phases of the project. However, for most of the candidates it soon became evident that a new and simpler structure would facilitate the dialogue and the plans for transfer & adoption. To this end, the three Study Visits held on April – May 2021 were already structured in three main blocks: i) Risk Assessment (initial Block 1), ii) Implementation (merging Blocks 2-4), and iii) Digital transformation (initial Block 5). This structure has proven to be efficient and will be maintained until the end of the project. Moreover, we progressively decided to open the dialog with the NAs beyond the mature CFs, sharing ongoing developments at oGP level. Such approach showed to be productive to i) generate complicities with the NA, ii) promote bidirectional learning between oGP and NA, and iii) open areas of potential collaborations beyond the project.

Moreover, the interplay among different elements such as: i) evolution of the oGP during the project lifetime, ii) interactions with the WP6-NA, and iii) collaboration with the OECD team has generated material susceptible to publication in peer review journals that have been already accepted (six articles) or submitted (three manuscripts) for publication. Three additional articles are planned to be submitted before July 2023. Moreover, three PhD thesis will be defended within the project’s lifetime. The abstracts and accessibility to the original material is provided in the ANNEX to the current document. The list of publications and ongoing PhD thesis is indicated in **Table 4**. A summary of the topics tackled in the publications, clustered by the three current blocks, is as follows:

- B.1 - Risk Assessment
  - B1.1. Determinants of adoption of population-based risk assessment & potential of the tools
  - B1.2. Multilevel predictive modelling in the clinical setting: CDSS and PDSS
  - B1.3. Future developments of the GMA: Exploring disease trajectories
- B.2 - Adoption of integrated care services
  - B2.1. Filling the efficacy-effectiveness gap
  - B2.2. Co-creation strategies
  - B2.3. Quality assurance after adoption: Key performance indicators & Dashboards
- B3. – Digital transformation (on top of the current mature Digital Health Network)

- B3.1. Open EHR strategies
- B3.2. Adaptive Care Case management in a collaborative work setting.



**Table 4** List of publications and PhD thesis

	<b>Title</b>	<b>Author</b>	<b>Journal</b>	<b>Block</b>	<b>DOI/Status</b>
<b>Article 1</b>	Role of co-creation for large-scale sustainable adoption of digitally supported integrated care: prehabilitation as use case	Erik Baltaxe	IJIC	B2.2.	<a href="https://doi.org/10.5334/ijic.6503">https://doi.org/10.5334/ijic.6503</a>
<b>Article 2</b>	Actionable factors fostering health value generation and scalability of prehabilitation: A Prospective Cohort Study	Raquel Risco	Annals of Surgery	B2.1	10.1097/SLA.0000000000005662 (accepted, 15 August 2022)
<b>Article 3</b>	Prospective cohort study for assessment of integrated care with a triple aim approach: hospital at home as use case	Carme Herranz	BMC Health Services Research	B2.3	<a href="https://doi.org/10.1186/s12913-022-08496-z">https://doi.org/10.1186/s12913-022-08496-z</a>
<b>Article 4</b>	Assessment of Hospital Avoidance in Catalonia: Cost Consequence Analysis	Carme Hernandez	BMC Cost Effectiveness and Resource Allocation	B2.3	<a href="https://doi.org/10.1101/2023.01.05.23284217">https://doi.org/10.1101/2023.01.05.23284217</a>  (submitted)
<b>Article 5</b>	Assessment of medical device software supporting healthcare services for chronic patients: experience from a tertiary hospital	Erik Baltaxe	JMIR	B3.2	<a href="https://doi.org/10.2196/40976">10.2196/40976</a>
<b>Article 6</b>	Computational modelling for prevention of unplanned hospital admissions	Ruben Gonzalez-Colom	JMIR	B1.2	<a href="https://doi.org/10.2196/40846">10.2196/40846</a>
<b>Article 7</b>	Five years of Hospital at Home adoption in Catalonia: impact and challenges	Ruben Gonzalez-Colom	JAGS	B2.3	<a href="https://doi.org/10.1101/2023.01.25.23284997">https://doi.org/10.1101/2023.01.25.23284997</a> (submitted)
<b>Article 8</b>	Health Circuit: a practice-proven ACM approach for innovative healthcare services	Carme Herranz	JMIR	B3.2	<a href="https://doi.org/10.1101/2023.03.22.23287569">https://doi.org/10.1101/2023.03.22.23287569</a> (submitted)
<b>Article 9</b>	Toward adoption of health risk assessment strategies: population-based and clinical settings	Ruben Gonzalez-Colom	IJIC	B1.1	(preparation)
<b>Article 10</b>	Implementation of Adaptive Case Management of Chronic Patients <i>Proposals for prevention of hospital admissions in high-risk patients</i>	Carme Herranz	IJIC	B2.2	(preparation)
<b>PhD Thesis 1</b>	Evaluation and Digital Transformation of Integrated Care Service	Erik Baltaxe	Univ. Barcelona	B2.1/B3.2	(Spring 2023)
<b>PhD Thesis 2</b>	Integration of Health and Social Services for Prevention of Hospitalizations	Carme Herranz	Univ. Barcelona	B2.2/B3.2	(Fall 2023)
<b>PhD Thesis 3</b>	Multisource predicting modelling: Towards personalized and value-based healthcare delivery strategies	Ruben Gonzalez-Colom	Univ. Barcelona	B1.1/B1.2 /B1.3	(Fall 2023)

Table 4: List of publications and PhD thesis

Key lessons learnt during the process of preparation of the publications indicated above are summarized in the final section of the current document and will be proposed for debate in the Key Learnings Meeting to be held in Barcelona on Friday 12th May 2023. **Table 4** depicts the following information: i) topics and authorship, ii) status of the publications, iii) relationships with the three blocks described above, and iv) links to accepted and submitted documents. The abstracts, as well as accessibility to the full pdf documents (click on top of the pdf), can be found in the ANNEX.

## 2.2 Transfer and adoption process

The section provides a summary description of the process of transfer for each of the WP6-NA. Since the NA showed substantial heterogeneities regarding several aspects, namely: i) speed in the identification of the target CF, ii) composition of NAWG and leadership, iii) maturity of the sites, etc..., we decided to predominantly work through bilateral interactions with each of the NA. During the project, commonalities among NA were progressively identified becoming quite evident during the thematic workshops. The oGP team is fully convinced that the post-implementation phase, in particular, the Key Learning Meeting planned for 12th May in Barcelona, can be addressed with the active participation of all partners with a hybrid format. However, bilateral meetings will still be needed to address very specific technical questions concerning a particular NA.

This core document reports on the results currently achieved, expected outcomes at the end of JADECARE and recommendations/potential for future collaborations. Detailed documentation of the entire transfer and adoption process followed by each NA is provided in the ANNEX. The SQUIRE 2.0 document reports on the NA's trajectory and achievements during the project's lifetime.

### The WP6 Next Adopters

The Catalan oGP has been transferred to four NAs of three European countries/regions (**Figure 12**). Three of them transfer core features only of the Catalan oGP, while one of them (Estonia) adopted a mix-and-match approach, meaning that they transfer features of other good practices of JADECARE. Moreover, one additional NA (UHO), mix and match approach, followed the Catalan oGP during the pre-implementation period but did not implement any specific WP6-CF during the implementation phase. However, this NA re-initiated the contact with the Catalan oGP during the second PDSA cycle to explore potential cooperation regarding initiatives on the digital transition, as briefly described in the current document.

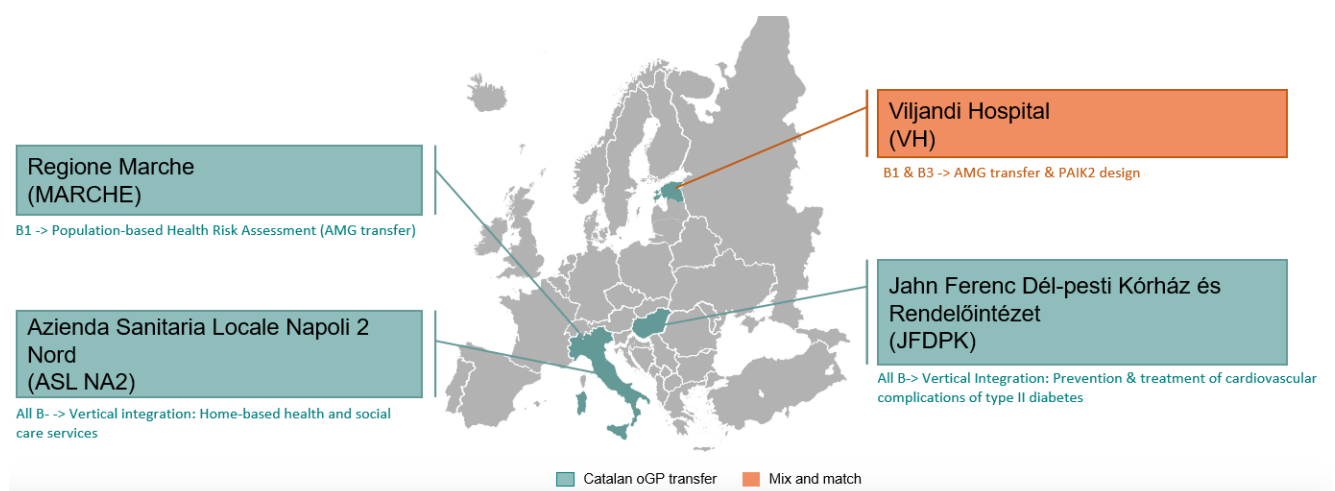


Figure 12: WP6-Next adopters (NAs). Estonia, in orange, adopted a mix and match approach with WP7

## 2.2.1 Marche Region, I (MARCHE)

### Context and trigger

The local problems that led Marche Region to study and implement the selected Local Good Practice (LGP) are: the high burden of non-communicable diseases (NCDs) and the need to manage more efficiently patients affected by them; the presence of remote areas, some of them strongly affected by the earthquake, where a high prevalence of older people lives; the need to identify subsets of patients with high risk of undesirable events; the necessity of supporting decision-making activity on healthcare services and policies; the need of analysing the use of healthcare resources. These necessities are linked to the obligations to be fulfilled, consistent with national regulations (the National Plan for Chronicity, the Italian Recovery and Resilience Plan and related regional laws), according to which population stratification is a prerequisite for healthcare planning.

### The local good practice

#### *A stratification tool for the effective management of chronic diseases in the Marche region*

The LGP of Marche region aimed at applying a population stratification tool to improve the efficiency of the Regional Health System and the quality of life of citizens by providing services that meet their needs. The intervention focuses on the management of chronic diseases.

The intervention consisted of setting up and testing a stratification tool for planning and decision-making purposes including 2 components.

Component 1, namely Local Core feature 1 (LCF1), is represented by the Catalan AMG population stratification algorithm, suitably adapted to the regional context and available health data. This tool will focus on chronic diseases and will make it possible to assess the population of the Marche Region placed in the higher sections of the Kaiser pyramid, aimed at supporting healthcare services programming.

Component 2, namely Local Core feature 2 (LCF2), envisages displaying on Marche region dashboard the aggregated data from the stratification (and other indicators related to chronic diseases) as well as the available services. This tool will facilitate in-depth analysis of stratification data and available services for policy- and decision-making processes.

### Transfer process

The regional authorities promoted efficient leadership with a well-defined mission from the very early phase of the project. The objective was the transfer of the GMA tool for population-based risk prediction for health policy purposes.

### Results currently achieved.

The different phases of the project have been successfully executed and the different challenges were properly faced. Major milestones were: i) pilot evaluation of quality of the data locally generated, ii) regional dataset preparation merging information from different existing data sources, iii) data cleaning and automatization of the generation of the regional dataset, iv) elaboration and analysis of the risk assessment pyramid at regional level, v) preparation of the logistics for local sustainability of the setting; and vi) initial steps for the preparation of the regional dashboard to facilitate regional health governance.

### Expected outcomes at the project's end.

The region is expected to have a sustainable system for population-based health risk assessment at the end of the project that should be further refined beyond the project.

### Key challenges

Local challenges: i) to set up a dashboard integrating stratification data and indicators on consumption of resources, to be used as a working tool for decision-makers; ii) to explore the implementation of predictive

tools for assessing hospitalizations (i.e. QUERALT<sup>29,30</sup>), and iii) to define local strategies for generation of predictive modelling wherein tools like GMA and QUERALT should be relevant model inputs.

Italian challenges: Open a debate on the current country-wide application of GDPR that limits the use of population-based information (i.e., predictive tools like GMA and QUERALT) at individual level for clinical purposes.

European level: Two main challenges have been identified: i) Elaborate strategies for data model fusion needed to elaborate and apply of population-based predictive modelling using tools like GMA and QUERALT; and ii) Analysis of existing site constraints associated to applications of GDPR.

#### Potential for future collaboration

High potential for collaboration in different areas associated with Block 1 has been identified, such as: i) update of the software to further refine current CF transfers, ii) generating multicentre collaborations to expand the use of population-based risk assessment, iii) multicentre approaches to multisource risk prediction for clinical support, the potential for such approach is supported by previous and current publications generated by the oGP, etc...

### 2.2.2 Viljandi Hospital, EE (VH)

#### Context and trigger

Digital infrastructure to support integrated care was piloted in Estonia but there was not yet region-wide coverage. Some standardized coordinated care processes were underway; guidelines were used, and some initiatives and pathways were formally described. On national level the coordination of social care service and health care service needs was introduced.

Triggers for local good practice were as follows: no frameworks of integrated care provision in the country, value-based contracting practically missing in Estonia, and the different payment schemes for hospital and ambulatory care have an impact on incentivizing the transformation from case-based care to population health-oriented care model. Moreover, the lack of risk stratification and case-finding tools to facilitate high-risk patient identification for care-management service were reasons to encourage active participation in the JADECARE project.

#### The local good practice

*An initiative to generate a predictive model to strengthen population health management and provide better-tailored services for multimorbidity risk group patients in Estonia.*

Evaluation of integrated care services was planned and established as part of a systematic approach. Target population was the elderly with concomitant chronic diseases and social health determinants at a high risk of hospitalization. Key components of service are vertical and horizontal integration, care management, and patient-centred care process.

Original good practice chosen for the implementation was two-folded: (1) Catalan risk stratification and case finding consisting of identifying high-risk patients for care management initiatives in the Viljandi county and to predict the needs of care for the region; (2) OptiMedis accountable care organization (ACO) focusing on local care organization and steering organization to better align providers around persons for person centred care delivery, choosing and implementing other integrated care pathways in the region and to monitor the performance of care delivery.

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<sup>29</sup> MONTERDE D ET AL. Performance of Comprehensive Risk Adjustment for the Prediction of In-Hospital Events Using Administrative Healthcare Data: The Queralt Indices. *Risk Manag Healthc Policy*. 2020;13:271. doi:10.2147/RMHP.S228415.

<sup>30</sup> MONTERDE D ET AL. Performance of Three Measures of Comorbidity in Predicting Critical COVID-19: A Retrospective Analysis of 4607 Hospitalized Patients. Published online 2021. doi:10.2147/RMHP.S326132

## Transfer process

The Viljandi Hospital has a strong management team with high potential for deployment of integrated care services in its county and two neighbour counties. They had a previous pilot experience on integrated care management of chronic patients (PAIK-1). The focus in JADECARE was on the prevention of hospitalizations with a mix-and-match approach (WP6 and WP7). The aim was to trigger implementation of new reimbursement modalities based on demonstration of value-based integrated care. Specifically, they were interested in the transfer of the GMA for stratification purposes (WP6) both for the local initiative, as well as for country-wide scalability. Moreover, the team was aiming to combine novel predictive modelling strategies with implementation of the business approach proposed by WP7. During the process of transfer it was clear that strong commitments of the central government and of the Estonian Health Insurance Fund were mandatory to ensure full success of the initiative.

During the Thematic Workshop held in Viljandi Hospital on mid-June 2022, the local team decided on a realistic building blocks approach to the operation by focusing on the elaboration of the PAIK-2 initiative consisting in a large pilot study on prevention of hospitalizations and re-admissions after discharge (enhanced transitional care) aiming at demonstrating value generation of the novel integrated care service in three Estonian counties. To this end, a visit to Barcelona was planned for the end of November 2022.

### Results currently achieved.

The Viljandi team consolidated two main objectives. Firstly, they demonstrated quality of their local data to produce a GMA-based risk stratification pyramid useful for the integrated care service planned. Secondly, they elaborated an ambitious protocol for a period of three years, beginning in 2023, to explore value generation of PAIK-2. The initiative has been already approved by the Estonian Health Fund.

### Expected outcomes at the project's end.

The three Estonian counties involved in the initiative will have up-and-running PAIK-2 for a three-year period. The expected positive results of the experience should contribute to a sustainable adoption of the intervention as mainstream service. Moreover, the work to be initiated during 2023 (PAIK-2) may pave the way for scalability of the initial plan to scale the use of population-based risk prediction tools (GMA and QUERALT) country-wide.

### Key challenges

Local challenges: i) to successfully execute the PAIK-2 project using GMA and QUERALT as risk assessment tools, and ii) to generate sound proposals for innovative reimbursement modalities.

Estonian challenges: i) country-wide scalability of risk prediction approaches based on GMA and QUERALT, and ii) open a debate on the scalability of integrated care services involving innovative reimbursement modalities in Estonia.

### Potential for future collaboration

High potential for collaborations in two areas: i) transfer of population-based risk prediction tools (GMA and\* QUERALT), and in ii) implementation of integrated care services with focus and prevention of hospitalization and hospital at home

### 2.2.3 Jahn Ferenc South-Pest Hospital and Clinic, HU (JFDPK)

#### Context and trigger

Type II diabetes is one of the most common non-communicable diseases in Hungary. The neglected or the inadequate care and services could lead to major complications for example minor toe amputations or more extended, major lower limb amputations. (Toe or other smaller amputations usually precedes limb amputation) Unfortunately, Hungary is leading in the number of major amputations worldwide (41.1 major amputations per 100,000 people); a big part of these amputations can be prevented by proper and continuous diabetes care. To improve quality and efficacy of care, a complex and integrated care system is desirable. Most patients enter the health care system with delay. The care of patients has been provided so far, but complex and integrated management of isolated treatment teams was needed to increase efficiency.

#### The local good practice

*Complex care and rehabilitation of multimorbid patients with type 2 diabetes who undergo minor amputation to prevent lower extremity loss.*

The Hungarian local good practice formulates and tests an integrated complex diabetes care approach to prevent major amputations. The care process includes acute care, rehabilitation, long-term aftercare and tertiary prevention services. This complex and integrated care plan will be supported by digital solutions and tools in the field of risk assessment, patient pathway planning, health literacy assessment, and patient education.

The Local action plan aimed at providing complex integrated care and aftercare for patients who undergo lower limb minor amputation to prevent further complications, encompassing the following interventions:

1. Development of a risk assessment algorithm and prediction model for type II diabetes complications and a further risk stratification method for health policy purposes including prevention.
2. Develop and implement a multidisciplinary complex acute care for multimorbid type 2 diabetes patients with a risk of minor amputation
3. Implement a complex rehabilitation program for multimorbid type 2 diabetes patients with minor amputation
4. Create a long-term aftercare plan for multimorbid type 2 diabetes patients to minimize the quality of life loss and complications

#### Transfer process

The Hungarian NAWG identified a clear interest in enhanced treatment of cardiovascular complications of type II diabetes mellitus, specifically aiming at preventing/minimizing the need for amputations. During 2021 and through the first PDSA cycle, the hospital team did a deep analysis of the in-house problem and designed potential hospital-centred action plans. The analysis was presented and debated in the Thematic Workshop held in Budapest on early July 2022. The event represented a major change in the orientation of the work plan and in the organization of the NAWG under a new dynamic leadership. Key agreements during and immediately after the meeting were:

- 1.- Need to focus mainly on community-based prevention of the target problem. It was acknowledged that hospital-based processes could improve, but an integrated program involving primary care teams was a key requirement.
- 2.- Need to reformulate the composition of the NAWG expanding the role of community-based services and strengthening the collaboration with governmental programs likely through public-private collaborations.
- 3.- Activate a future visit to Barcelona to get a better understanding of the organization and trajectory of the Diabetes Unit at Hospital Clinic de Barcelona and the regional program on type II diabetes run by the Department of Health.

The consensus was that the NA group will expand and consolidate the NAWG during Fall 2022 and the visit to Barcelona will be postponed to Spring 2023. It is currently scheduled for the 24<sup>th</sup> and 25<sup>th</sup> April.

#### Results currently achieved.

Three key objectives have been achieved: i) deep knowledge of the problem at the local level and properly oriented work plan, from a hospital-centric approach to a community-based focus. Healthcare value generation and a high potential for site transferability of the community-based programs, already implemented by the oGP (as well as in other sites), have been demonstrated, ii) reshaping of the NAWG following the recommendations of the Thematic Workshop, and last, but not least, iii) consolidation of dynamic leadership. These three conditions are essential for successful termination of the project with good perspectives of sustainability of the solutions to be implemented during 2023.

#### Expected outcomes at the project's end.

Elaboration of a well-designed pilot experience to be formulated and successfully launched during the project's lifetime. Previous multicentric experiences allow to predict the success of a preventive approach involving collaboration of community-based and specialized teams. Reengineering hospital-based processes must also be considered in the program.

#### Key challenges

Local challenges: Elaborate the specificities of the work plan and launch a pilot program during 2023.

#### Potential for future collaboration

The availability of the Catalan oGP to provide further continuous support to the Hungarian initiative can be committed.

### 2.2.4 ASL Napoli 2 Nord, I (ASL NA2)

#### Context and trigger

The regional health organizations offer fragmented responses to the social and health needs of users with chronic conditions. In this way, they are unable to take charge of the person in the long term, prevent and contain the disability, guarantee the continuity of care and integration of social and health interventions. As a consequence of this: a) these users have a greater risk of negative outcomes in terms of increased morbidity, increased frequency and duration of hospitalization, increased risk of disability and non-self-sufficiency, worse quality of life and increased mortality. b) the demand for health and social services by people with chronic pathologies, mainly the elderly, is increasing and the amount of health and social resources to be allocated to this segment of the population is growing.

Strengthening vertical (between hospital and territory) and horizontal (between health services and territorial social services) integration is necessary to guarantee the integrated care of users who express complex social and healthcare needs. Considering this, in ASL Napoli 2 Nord, the development and implementation of paths and tools shared by all the services and professionals involved and/or mutually autonomous organizations that operate jointly through levels of coordination, has become essential to make entry into the system accessible and governed, reduce fragmentation and the discontinuity within the system and between the various organizations (social and health).

#### The local good practice

*The management of protected hospital-territory discharges of fragile people, supported by digital tools.*

The local good practice aimed to strengthen the integration of care between the hospital and the territory and the construction of integrated care pathways to guarantee the effective taking over of the "global" needs of people with chronic conditions, with reference to protected discharges, supporting this process with ICT.

The NAWG considered the following strategic areas of intervention:

1. Deployment of a clinical program to foster vertical integration between hospital-based services and home care, as well as horizontal integration between health and social care services.

## 2. Elaboration and testing of a local technological platform to support the services.

### Transfer process

The team has been reporting regularly following the milestones indicated by the project management. The NA aimed to adopt the Catalan experience on interoperability between health and social services.

### Results currently achieved.

The team reports successful deployment of the clinical protocols with some delays in the implementation of the technological platform. The latter is currently being tested.

### Expected outcomes at the project's end.

The prospects reported in the SQUIRE 2.0 seem positive but granular information on evaluation of the results of the clinical protocol and on the technological performance precludes elaboration of a solid judgment on expected outcomes at the end of the project. The active participation of the team in the Key Learning Workshop to be held in Barcelona on 12<sup>th</sup> May is crucial to achieving a twofold objective: i) proper assessment of the sustainability & scalability of the work plan, and ii) generate synergies within WP6 and across the entire consortium.

### 2.2.5 Olomouc Hospital (CR)

#### Transfer process

The team at Olomouc Hospital had a mix-and-match approach to identifying the potential transfer of CF from WP5, WP6 and WP8. The results of situation analysis advised the CR team to focus on CF offered by WP5 and WP8. However, they have maintained regular contact with WP6 during the project lifetime. These interactions resulted in the visit of seven ICT professionals involved in digital health transformation at CR level. They reported a highly productive stay in Barcelona from 6 to 10<sup>th</sup> February 2023. During the week they visited the leading organizations in technological innovations in healthcare and identified contacts for future bilateral collaborations. Moreover, a MoU was drafted aiming at promoting future collaborations between Olomouc Hospital and IDIBAPS-Hospital Clínic de Barcelona.

## 2.3 OECD collaboration

Since January 2021, WP6 has been collaborating with the *OECD Action to Support JADECARE*. This initiative had two main purposes: i) Develop a guidebook for policymakers, and ii) Generate case studies of best practice interventions targeting non-communicable diseases. The focus was on the economic analysis of best practice interventions using sophisticated modelling techniques to assess value generation and transferability.

The work plan with WP6 focused on three interventions adopted in the Catalan oGP: i) Hospital at Home, ii) Prehabilitation of candidates for major surgical procedures, and iii) Integration of health and social care.

Each of these interventions was assessed in terms of i) Effectiveness, ii) Efficiency, iii) Equity, iv) Evidence-base, and v) Extend of coverage. Moreover, Enhancement options and Transferability of the intervention were also evaluated. Each case study ended with formulation of conclusions on health value generation and perspectives of the intervention.

In the current section, we are providing a summary the final reports generated by the OECD team. In the Key Learning Meeting, an evaluation of the potential of such collaboration will be done.

### 2.3.1 Hospital at Home (H@H)

In 2006, Catalonia, a region in Spain, introduced its first Hospital at Home (H@H) programme. H@H offers patients acute, home-based care that would otherwise be delivered in a hospital setting. This service is



designed to improve patient experiences and population health, while reducing the per capita cost of healthcare.

The report concludes that the H@H programme is designed to provide care to patients in their own home as opposed to a hospital setting. By doing so, it aims to improve experiences and outcomes, while reducing costs. Findings from this analysis indicate H@H aligns with many best practice criteria and has the potential to be transferred to other OECD and EU27 countries.

### 2.3.2 Prehabilitation

Prehab is a 4-6 week pre-operative intervention for high-risk patients undergoing major elective surgery. It aims to enhance clinical outcomes and patients' functional capacity in order to reduce post-operative morbidity and accelerate recovery through improving aerobic capacity, nutritional balance, and psychological well-being.

It has been implemented and studied since 2013 at the Hospital Clínic of Barcelona (HCB), in the Spanish region of Catalonia, in different variations and for patients undergoing different types of surgery. It is currently being scaled-up in Catalonia and was also transferred to Germany, France, the Netherlands and Poland.

Prehab has high transferability potential, not least because of its modular design and scope for personalisation, which makes it suitable for various settings and a wide range of patient populations. A natural next step would be to make it a mainstream pre-surgical component of the Enhanced Recovery After Surgery of (ERAS) recommendations. The intervention could also become a corner stone of integrated care to manage patients with multi-morbidity. The key components of tri-modal prehabilitation indeed have potential for generalisation to other domains of health care beyond surgery, such as enhanced rehabilitation strategies for chronic patients, prevention of multi-morbidity, oncology patients or prevention of premature births. Further efforts need to focus on optimisation of deployment of the service, with continuous and built-in evaluations of adoption in real-world settings, as recommended by the OECD Guidebook.

### 2.3.3 BSA, an integrated care organization

In 2000, the Badalona City Council developed an integrated care organisation bringing together health and social care sectors – Badalona Serveis Assistencials, BSA. In addition to organisational integration (i.e. combining health and social care), BSA creates other form of integration such as professional integration with the use of multidisciplinary teams and normative integration by developing a shared organisational and professional culture.

Conclusion and next steps:

**1. BSA is an integrated care organisation owned by the Badalona City Council.** Unlike many integrated care organisations, BSA brings together both health and social care services to better meet the needs of the population. BSA supports various levels of integration including organisational, functional, clinical and professional.

**2. Individual programs within BSA have demonstrated both effectiveness and efficiency.** An evaluation measuring the overall effectiveness and efficiency of BSA is not available. However, certain individual programs that make up BSA show they reduce healthcare utilisation, improve patient outcomes and are cost-effective.

**3. The needs of disadvantaged groups are addressed on an ad hoc basis.** Individual programs delivered as part of BSA address the population as a whole. Nevertheless, specific programs are developed on an ad hoc basis in response to unmet needs from disadvantaged groups. For example, BSA administrators introduced several strategies to combat high rates of untreated diabetes in the Pakistani community.

**4. BSA aligns with international best practice, nevertheless, there are opportunities for it to further improve.** For example, ongoing training to ensure health and social care professionals have the skills, confidence and motivation to work as a multidisciplinary team will ultimately improve service delivery.

Further, future research projects should focus on evaluating BSA as a whole as opposed to focusing on individual programs.

**5. Countries interested in transferring BSA must first consider the context in which their health and social care systems operate.** The ability for countries to integrated health and social care services will depend on how both sectors are currently organised. Key transfer facilitates include, but are not limited to, a sophisticated health information system, a motivated workforce and strong political commitment.

## 3 Main conclusions and Key learnings

### 3.1 Next Adopters' key conclusions

#### 3.1.1 Marche Region, I (MARCHE)

Marche implemented a comprehensive population-based risk assessment (HRA) strategy at regional level that will be used for informing health policy decisions, allocating resources, benchmarking, implementing preventive strategies and selecting appropriate healthcare services. The two key components of the HRA strategy deployed within the project have been: i) construction of the regional population risk pyramid to be periodically updated, and ii) implementation of a tailored dashboard for supporting decision making. The achievement of these two objectives required to successfully face several technical challenges, such as: 1) dynamic regional dataset preparation merging information from different existing data sources, 2) data cleaning and automatization for the generation of the regional dataset, 3) elaboration and analysis of the risk assessment pyramid at regional level demonstrating association between AMG scoring and local use of resources, 4) preparation of the logistics for local sustainability of the setting; and 5) design of the initial version of the dashboard to facilitate regional health governance.

The process of implementation has been reported in the manuscript: "Toward adoption of health risk assessment in population-based and clinical scenarios" by Gonzalez-Colom R et al, prepared jointly between the Marche (I), Viljandi Hospital (EE) and the Catalan oGP (ES). The material is currently under review at the IJIC. It is of note that the manuscript also provides a checklist of key steps recommended for site adoption of HRA strategies, independently of the morbidity grouper (AMG, CRG, ACG, etc..) adopted, that can be generalizable at EU level.

Moreover, the Marche's team has developed a detailed sustainability action plan encompassing the following objectives: 1) to complete the integration of the tool into the regional information technologies (IT) infrastructure, adding further healthcare databases and defining supportive actions to improve the quality and completeness of healthcare data; 2) to implement the dashboard in computational, technical, and graphical terms, adding maps aimed to visualize healthcare services adjusted to social-health care planning regulations and integrating it in the regional IT infrastructure; 3) to promote the use of the HRA tools by regional and clinical managers, and share the Catalan oGP experience for the discussions on the secondary use of health data. The last point is a critical aspect to properly articulate population-based and clinically oriented HRA strategies, as well as for use of clinical information for knowledge generation.

#### 3.1.2 Viljandi Hospital, EE (VH)

The team at Viljandi Hospital worked at two different levels: local and state perspective, following a mix and match approach. The general aim was to deploy value-based integrated care services, but they focused on prevention of unplanned hospitalizations as use case. Two core components of the local action plan were: i) implementation of health risk assessment (HRA) strategies for screening purposes and personalization of the service, and ii) change of reimbursement modalities aiming at evolving toward an accountable care organization.

Main achievements at local level were: i) development of risk stratification model and case finding algorithms based on the AMG tool, ii) ensure appropriateness of the approach for its use by the Estonian Health Insurance Fund, iii) development of a roadmap for implementation of a regional accountable care organization framework, and iv) approval by the local Ethics committee of a pragmatic randomized controlled trial (n= 856 patients) for prevention of unplanned hospital admissions (PAIK 2022-2025), co-funded by the Estonian Health Insurance Fund. To this end, Viljanen hospital involved two other counties,

Valga hospital and Kuressaare hospital, in the implementation of “Care-management of multimorbid patients with high-risk of hospitalization using a patient-centered integrated care model, digitally enabled medicine and telehealth tools: a two-arm randomized pragmatic trial in three counties of Estonia.”. The process of implementation of the AMG in Estonia, as described for Marche, has been reported in “*Toward adoption of health risk assessment in population-based and clinical scenarios*”, Gonzalez-Colom R et al. The material is currently under review at the IJIC.

The deployment process at Viljandi Hospital has been closely followed by qualified representatives of the Estonian government, as well as by the Estonian Health Insurance Fund. However, several factors such as: COVID pandemics, lack of available resources, resistances from tertiary hospitals, etc..., precluded scalability of the local process at state level within the project. It is expected that the Viljanen’s experience will generate productive bottom-up interactions leading the generalization of the approach at state level.

### 3.1.3 Jahn Ferenc South-Pest Hospital and Clinic, HU (JFDPK)

The main general objective of the site was prevention and enhanced treatment of cardiovascular complications of type II diabetes mellitus with special focus on “diabetes foot”. Specific aims of the local action plan were: i) development of policy recommendations involving quality assurance of medical care, effective patient pathways with a holistic preventive approach, and revision of payment procedures, ii) development of a patient pathway management tool for digitally supported integrated care, and iii) nationwide implementation of the tools, protocols, pathways and approaches developed within JADECARE, including Diabetes Outpatient Clinics and Multidisciplinary Diabetes Foot Clinics in the hospitals.

The activities at JFDPK clearly had a two-phase structure. Until the Thematic Workshop held in Budapest, on 4th July 2022, the implementation focused on the analysis and execution of the working plan at hospital level. The team generated a profound knowledge on factors determining the status of the site, as well as barriers and facilitators for the implementation of the local action plan. During the Thematic Workshop, the analysis of the results obtained at hospital level were complemented with ongoing initiatives for the reform of primary care at state level, as well as with the identification of synergies of potential public-private collaborations. Main conclusions of the meeting were the need for: i) strengthening interactions with primary care, ii) building-up collaborations with the private sector, and iii) opening the scope of the program expanding the multi-disciplinarity and preventive aspects. The need for enlarging the local next adopter working group with additional stakeholders to fulfill the objectives previously described was agreed. Also, there was consensus on the preparation of a face-to-face visit to the Catalan oGP (Barcelona) to make operational the necessary changes of the local action plan. A two-day visit to Barcelona of a small delegation was done on late April 2023 wherein was agreed that a longer hands-on visit with a larger delegation should be planned.

In summary, the updated action plan has all the ingredients to generate a success story if the strategy currently in place is properly executed

### 3.1.4 ASL Napoli 2 Nord, I (ASL NA2)

Main achievements of the next adopter were: i) implementation of a new protocol for enhanced home-based management of frail patients and transitional care after hospital discharges of frail people, ii) integration of a technological platform (ddPAST), for access by social services operators in the municipalities adhering to the ASL Napoli2 Nord, and implementation of interoperability with hospital information systems. The negative impact of the COVID19 epidemic, the lack of human resources and the need to respond to further regional priority programs limited full execution of the initial action plan. The

main deviation was the elimination of the "frailty observatory" action which would have allowed us to stratify the population and carry out a detailed analysis of health needs. Such a deviation weakens the district governance system.

During the project, the team has activated links with the Municipalities of the area ASL, for the following interventions: i) enhanced care in community houses and community hospitals, ii) supporting health and social care during transitional periods after hospital discharge (shared protocols), ii) strengthening of social structures for elderly and/or disabled people; and iii) access of the social services of the municipalities to the regional IT platform (ASL) facilitating integration of social and health services.

The results of the JADECARE practice are linked to local/regional/national health policy strategies and will become part of broader health system transformation schemes as foreseen by the National Recovery and Resilience Plan (PNRR) executed at Italian level.

### 3.2 Overall assessment

To our understanding, the activity carried out within WP6 is offering a highly positive balance, supported by three tangible achievements well covered by all four NA:

1. Identification of a relevant challenge at the local level and formulation of a well-defined action plan to face it.
2. The capacity to adapt of the initial work plan to unexpected factors encountered during the implementation process.
3. Formulation of strategies for sustainable adoption of the targeted interventions

No doubt that the interactions among WP6 stakeholders, and with the consortium partners, have contributed to enriching our knowledge of how to realize the potential of scalability of integrated care, as well as to better understand the tempos required to reach a certain degree of maturity in the field.

The collaboration with the OECD team provided the opportunity to participate in the assessment of three selected practices. Also allowed to understand the huge potential of the available modelling techniques to assess value generation and transferability of the interventions. One lesson learnt from such collaboration was the identification of the need for better alignment of data collection strategies across countries/regions to fully exploit the computational power.

Both the structure and methodologies used in the project have been highly scored by the partners, as well as the pragmatic approach adopted in the use of the evaluation tools. The heterogeneities among NA recommended site customization of the tempos and methodologies.

### 3.3 Key learnings

This subheading of the document aims to contribute to facilitate the preparation of the agenda for the Key Learning Meeting to be held in Barcelona on May 2023. As such, it will be shared with all WP6-NA to jointly shape, before Easter, the granularities of the one-day workshop.

We propose to organize the debate in four areas, as indicated below. Within each area, we would like to have brief contributions from all WP6 stakeholders, followed by a group debate. We will encourage to look for consensus on the conclusions and proposals for action.

The debate in each of the four areas should have a twofold target: i) WP6-NA perspective, and ii) whole consortium perspective. The former aims to refine the sustainability plan of each NA, whereas the latter will generate proposals for action/debate to be submitted to the consortium during the post-implementation phase.

The content of the subheadings indicated below reflects the oGP positions for each of the areas proposed for debate:

### 3.3.1 Key learnings – Block 1 Health Risk Assessment

- Awareness on the role of appropriate health risk assessment strategies (for both health policy and clinical support purposes) is needed as a key component for scalability of integrated care.
- Dissemination of structured knowledge on implementation for health risk assessment, considering heterogeneities across EU countries/regions, is mandatory.
- Local GDPR applications appear as a relevant limiting factor for health risk assessment in some sites.

The oGP can trigger the debate by sharing a draft version of the manuscript: *Toward adoption of health risk assessment strategies: population-based and clinical settings* (in preparation, see Table 4). The debate should be based on NA's experiences (Marche, Estonia), as well as on clinical needs identified by all participants.

### 3.3.2 Key learnings – Block 2 Adoption of Innovative Services

- Lessons learnt from specific use cases assessed in WP6.
  - Integrated care approaches to reduce unnecessary hospitalizations.
  - Prevention of cardiovascular complications of diabetes
- Pragmatic use of implementation science tools for evaluation of services adoption

The oGP can trigger the debate by sharing a draft version of the manuscript: *Implementation of Adaptive Case Management of Chronic Patients Proposals for prevention of hospital admissions in high-risk patients* (in preparation, see Table 4).

### 3.3.3 Key learnings – Block 3 Digital Transformation

We propose to debate on key components required for a mature digital health transformation. The underlying hypothesis is that the elements of the Digital Health Network depicted in **Figure 5** are needed but are not sufficient. Ongoing initiatives at oGP level: i) Open EHR, ii) Health Circuit will be presented and debated.

### 3.3.4 Key learnings - Methodological aspects & Sustainability

The debate on structure and methodological aspects of the project may have been already triggered by WP3 and W4. However, we would propose to consider the introduction of this item in the agenda of the meeting.

In the concluding remarks, we aim to elaborate: i) a list of actions conforming to the sustainability strategy for each NA site, as well as ii) a list of proposals for action to be submitted to the whole consortium.