JADE CARE

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

D5.1 THE BASQUE INTEGRATED CARE APPROACH ORIGINAL GOOD PRACTICE AND TRANSFER PROCESS

Core document

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Table of abbreviations

ACG-PM	Adjusted Clinical Group-Predictive Model
ACSS	Central Administration of the Health System Portugal
AFT	Aggregazioni Funzionali Territoriali (Functional Territorial Aggregation)
App	Application
ARS Tuscany	Agenzia Regionale di Sanità della Toscana (Tuscany Regional Health Agency)
ATC	Anatomical Therapeutic Chemical classification
AUTH	Aristotle University of Thessaloniki
B	Block
BI	Business Intelligence
CDSMP	Chronic Disease Self-Management Program
CHIF	Croatian Health Insurance Fund
CKD	Chronic kidney disease
CIPH	Croatian Institute of Public Health
CF	Core Feature
CT	Computed tomography
COPD	Chronic Obstructive Pulmonary Disease
COT	Centrale Operativa Territoriale (Territorial Operative Central)
COVID	Coronavirus disease
DKK	Danish Korone
DM	Diabetes mellitus
DPO	Data protection Officer
DTCP	Diagnostic and Therapeutic Care Pathways
EC	European Commission
ECDC	European Centre for Disease Prevention and Control
EDC	Expanded Diagnosis Clusters
EHR	Electronic Health Record
ENSP	Escola Nacional de Saúde Pública (National School of Public Health)
EPJ	Electronic Patient Journal
EU	European Union
FCN	Family and Community Nurse
FSE	Fascicolo Sanitario Elettronico (Regional Electronic Health Folder)
GDPR	General Data Protection Regulation
GP	General Practitioner
HCP	Healthcare professional
(C)HF	(Congestive)Heart Failure
HIS	Healthcare Information Systems
ICD	International Classifications of Diseases
I(C)T	Information (and Communication) Technology
ICP	Individualized Care Plan
ICU	Intensive Care Unit
IHD	Ischemic heart disease
IHO	Integrated Healthcare Organization
JA	Joint Action
KPI	Key Performance Indicator

LAP	Local Action Plan
LCF	Local Core Feature
LGP	Local Good Practice
MoH	Ministry of Health
MoHRS	Ministry of Health of the Republic of Serbia
NA	Next Adopter
NAWG	Next Adopter Working Group
NCD	Non-communicable Diseases
NHIF	National Health Insurance Fund
NHS	National Health System
oGP	Original Good Practice
PC	Primary Care
PDSA	Plan Do Study Act
PM	Project Manager
PHF	Personal Health Folder
PI	Predictive Index
PIP	Population Intervention Plan
PREST	Basque Country population stratification program
QA	Questionnaire
RND	Region of North Denmark
RUB	Resource Use Band
SDCN	Steno Diabetes Centre North Denmark
SMART	Specific Measurable Achievable Relevant Time-bound
SUS	System Usability Scale
SWG	Specific Working Group
UHO	University Hospital Olomouc
UNODP	United Nations Office on Drugs and Crime
USL Umbria 1	Unità Sanitarie Locali Umbria 1 (United Local Health Authority Umbria 1)
VR	Virtual Reality
WHO	World Health Organization

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1.1   Presentation of the original Good Practice

1.1.1   The trigger and the network

1.1.1.1   The trigger

The Basque Autonomous Region - Euskadi is configured by three constituent provinces. The Basque public healthcare system is a single-payer Beveridge type National Health System, serving a population of over 2.3 million people. The Ministry of Health controls policy planning, financing and contracting of health services, the Ministry of Employment and Social Affairs defines the social policies, whilst the contracting of social services is done by the Provincial Councils and municipalities. The Basque public healthcare system, *Servicio Vasco de Salud – Osakidetza*, is funded by taxes, and healthcare professionals (HCPs) are public employees. All the public hospitals and primary care centres of the Basque Region are under this organisation.

There are enormous financial, demographic, epidemiological and clinical safety pressures over healthcare systems around the world. These pressures are well known and are increasing every day. Chronic illnesses have become the principal challenge faced by the Basque Healthcare System. 10% of the Basque population (85% of them patients with chronic conditions, most of them multi-morbid, complex patients) consume 61% of the financial resources available; 63.55% of the total expenditure is spent on multi-morbid patients and approximately 50% of hospital admissions are non-programmed (non-elective) admissions[1]. Chronic illnesses represent a considerable restraint on life-quality, productivity and the functional state of people who suffer from them; they exert a strong influence on morbidity and mortality rates; and they accelerate the increase in health and social costs, which compromises the medium-term sustainability of the healthcare system.

In 2010, a new strategy to tackle chronicity was proposed by the Ministry of Health of the Government of the Basque Country. The overall goal of this policy was to turn the Basque Healthcare System into more proactive than reactive and more collaborative than fragmented.[2] The policy context in the Basque Country strived to build collaboration rather than competition in an organized progression, activating many levers of change. The reform of the Basque Healthcare System was driven by many projects which were framed as health service research in order to evaluate processes and outcomes and provide evidence for improvements. The main focus of the reform process was to achieve much more collaboration and proactivity in the healthcare system. As a consequence a wide range of tools were initiated and implemented simultaneously.

The reforms of the Basque Healthcare System followed, to an extent, the logic of the Chronic Care Model. In this model, care for chronic patients takes place on three overlapping levels: 1) the community with its policies and multiple public and private resources; 2) the health system with its supplier organizations and insurance schemes; and 3) the interaction with the patient in the clinical practice[3].

The following four broad lines of work at the policy level are key to driving forward implementation:

- Developing a favourable policy environment
- Stimulating system thinking with new models of care
- Aligning bottom-up and top-down 'integrators'

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[1] Bengoa R. Transforming health care: an approach to system-wide implementation. International Journal of Integrated Care. 2013;13(3):None. DOI: http://doi.org/10.5334/ijic.1206

[2] Bengoa R. Transforming health care: an approach to system-wide implementation. International Journal of Integrated Care. 2013;13(3):None. DOI: http://doi.org/10.5334/ijic.1206

[3] MacColl Centre for Health Care Innovation. The chronic care model. Group Health Research Institute. Available from: http://www.improvingchronic-care.org/index.php?p=Model_Elements&s=18

- Promoting a distributed leadership approach

The core actions focus on investing in an information strategy and the technology to make it possible. Also, in new approaches to educating patients to manage their illness and promote evidenced-based medicine and, finally, in the integration of primary care, hospital care and social care, as well as the development of new roles within integrated care.

Therefore, to achieve a greater scale, intervention at the policy level is needed to provide the health sector with a clear policy that sets the agenda for more proactive and collaborative care from the outset. The intention was to provide a narrative beyond the cost-containment policies prevalent in most of Europe. A key political decision of the Basque system was to consider this transformation process as 'organic', implying that it was to be seen as a cultural change. Hence, it was decided not to use a regulatory, legislative approach in the first instance.

1.1.1.2 The network

The main actors in the deployment of the integration model are the Ministry of Health of the Basque Government, represented primarily by its councillors in the last decade, and *Osakidetza* (the Basque healthcare public provider), represented by its general directors.

In addition to these two main actors, the good practice has been promoted and sustained by four main figures:

i. Basque Foundation for Healthcare Innovation and Research (BIOEF, for its acronym in Spanish), through the Innovation and Management Department,

ii. *Kronikgune* Institute for Health Services Research and

iii. Basque Foundation for Social and Healthcare Innovation

The aim was to reach the necessary alignment between local and corporate levels, seeking a better distribution of leadership where the central management created the conditions to promote organizational innovations inspired by local management and health professionals themselves. The local arena will be the place to find the necessary innovations[4]. A major effort was made to encourage a different type of leadership and to engage HCPs and staff.[5]

Optimal collaboration and coordination between professionals in the delivery of integrated care have become essential requirements for the provision of high-quality care[6].

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[4] Department of Health. A strategy to tackle the challenge of chronicity in the Basque Country. 2009. http://cronicidad.blog.euskadi.net/descargas/plan/ChronicityBasqueCountry.pdf

[5] Bengoa R. Transforming health care: an approach to system-wide implementation. International Journal of Integrated Care. 2013;13(3):None. DOI: http://doi.org/10.5334/ijic.1206

[6] Mays GP, Au M. Claxton G. Convergence and Dissonance: Evolution in Private-Sector Approaches To Disease Management And Care Coordination. Health Aff 2007. 26(6): 1683–1691.
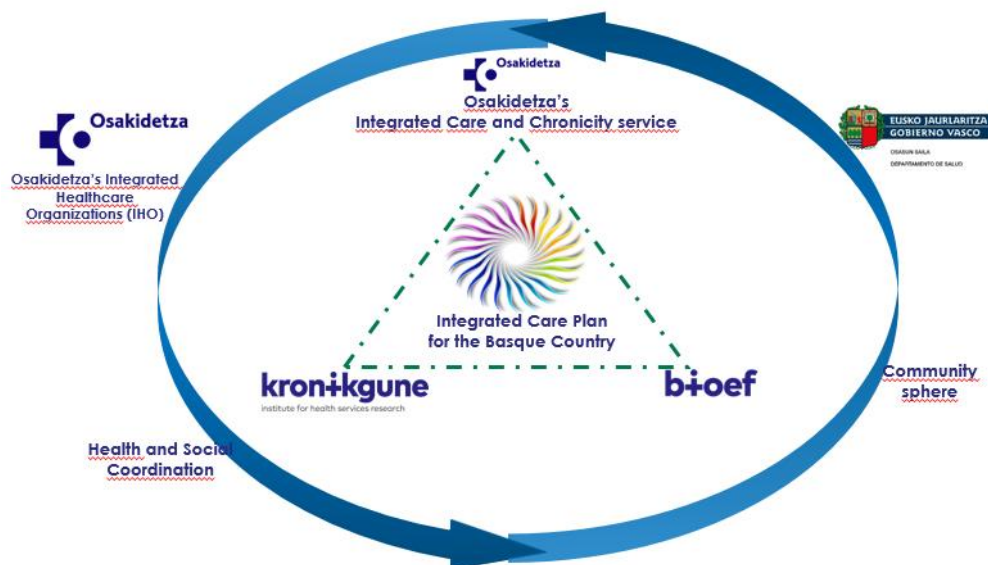
Figure 1: The Basque Good Practice Network

1.1.2 Scope of the practice

1.1.2.1 Problem/challenge description

The response to the needs of people with chronic illnesses has become the principal challenge faced by the Basque Healthcare System. These pathologies have multiple impacst: they represent a considerable restraint on life-quality, productivity and the functional state of patients; they exert a strong influence on morbidity and mortality rates; and they accelerate the increase in health and social costs, which compromises the medium-term sustainability of the healthcare system.

Progressing in this area demands a change in the existing conceptual frameworks where curing and caring take place and that are clearly outlined in the current health and social policies. The individuals and their environment, their health and their needs have become the central focus of the System at the expense of merely treating the illness.

Chronic conditions generally lead to a greater risk of incapacity and mortality in individuals. Moreover, some chronic pathologies are notoriously disabling. This close relationship between chronic illnesses and dependence is the determining factor when prioritizing and identifying the most suitable health and social policies.

In addition, chronicity implies a challenge to the quality of care provided, as people with chronic illnesses are more likely to not receive optimum care and to suffer adverse pharmacological side-effects.

Furthermore, the challenge of chronicity requires proactive measures to combat the health factors that cause them. Hence, the importance of anticipation, set up a framework of action which reduces its emergence and progression employing awareness and preventive actions.

To summarize, chronicity is a global challenge for the systems and consequently requires a systematic response. Beyond particular illnesses of specific groups of patients, it is a challenge which must consider the structural conditions and the lifestyles that cause them and also the social and health requirements of the chronic patients and their carers: from the initial stages up until the care provided during the final phase of life, including all aspects of care, convalescence, and rehabilitation.

Chronic patients tend to slip under the radar of the health system because for decades the system has been focused on rescuing and saving lives, thus, concentrating on acute illnesses. The increase in chronic illnesses

makes it necessary to consider also caring as well as curing, having a system that offers continuity of care throughout a person's life, with the added potential of preventing unnecessary hospitalizations and thus reducing costs.

The key factors in the interventions in chronic procedures are different to those for acute illnesses, whatever the particular illness. They are the followings:

1. They require a complete diagnosis of the patient including their social situation and their role as opposed to a traditional diagnosis focused on the illness and the acute symptoms.
2. Proactive, preventive (primary and secondary) and rehabilitation interventions are more important than a typically curative focus on the acute illness.
3. The patient and the carer play a much more important role in the successful outcome of the intervention. They need to change life-styles and adhere to these over long periods in contrast to the traditionally passive role of the care receiver.
4. They require a coordinated approach to care with an "individual vision" at all levels of care (primary, specialized, medium stay, mental health, emergencies, social services, health at work, etc.) throughout the duration of the illness as opposed to a rapid action of a limited number of specific departments.
5. The needs and priorities (medical but also emotional, social, material and even spiritual) of each patient are given more importance considering that we are often dealing with continual interventions over the remaining lifetime of an individual compared to a specific intervention which has a limited impact on a person's quality of life in the mid-term.

These differences in the focus of the interventions are such that the phenomenon of chronicity requires a model of care different to that typically used for acute illnesses[7].

1.1.2.2 General purpose of implementation

Having a clear strategic vision[8] to face the challenge of ageing, chronicity and dependency has provided explicit support, leadership and capacities to transform the health system towards integrated care in the Basque Country.

An integrated care strategy has been deployed, focusing on clinical and functional organizational integration. It deploys an integrated care model capable of providing continuity of care both at the health and social care levels. To this purpose, several processes and tools have been developed and implemented.

The aim of the new provision model in the Basque Country is to meet the current needs of the population, more efficiently with a population-based approach. To this end, it has been necessary to reconfigure and redistribute resources, gradually shifting them towards the home/community level and to primary care, whose decisions and proposals must be formulated locally.

This model is possible thanks to the tools already implemented and deployed over the years, which allow for the monitoring of complex and stratified patients in places other than the hospital, thus promoting personalised care for patients and their families in their environment. Incorporating follow-up activities, monitoring and stabilising the patient at home promotes the avoidance of admissions and, as a consequence, frees up hospital space. Likewise, over the years, alternatives or new modalities of hospitalisation have been promoted, that are more cost-effective and satisfy both patients and HCPs (e.g. home hospitalisation).

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[7] A strategy to Tackle the Challenge of Chronicity in the Basque Country, 2010
[8] http://www.euskadi.eus/web01-s2osa/es/contenidos/plan_gubernamental/xleg_plangub_13/es_plang_13/index.shtml

This type of decision, which mostly affects the organisation of processes and the redistribution of resources (gradually transferring activity to the community) were defined and implemented by the professional teams and local managers of the Basque Country's Integrated Health Organisations (IHO).
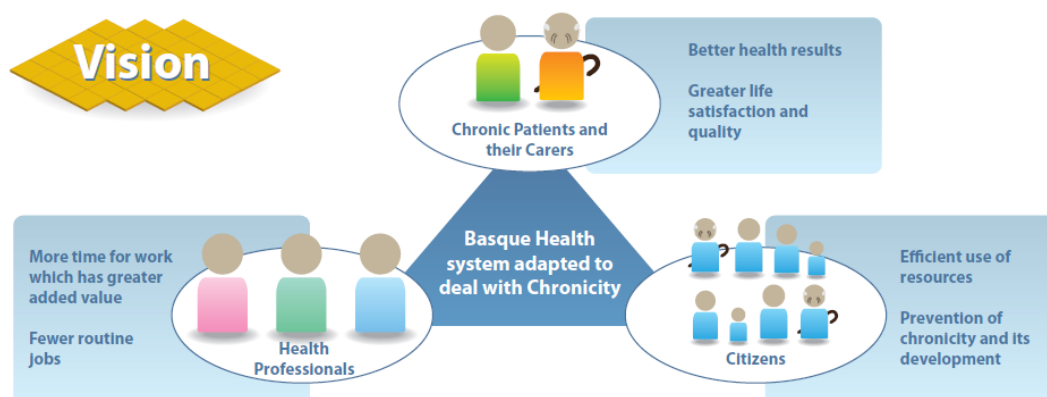
Figure 2: Vision of the Basque Country to tackle chronicity

1.1.2.3 Target population

Osakidetza has a target population of 2.2 million inhabitants. In 2019 more than 22% of the total population was 65-and-older.

In 2010, more than 19% of the total population of the Basque Country was older than 65 years and nowadays that percentage has increased to more than the 21%[9]. More than 45% of the Basque population has at least one chronic condition, and this proportion increases with age, being more than 80% of population older than 65 years[10]. Elderly multi-morbid patients are characterised by having complex health and social care needs, being at risk of the hospital or residential care home admission, and requiring a range of high-level interventions. Ageing and chronic conditions account for 80% of the medical consultations in the Basque Healthcare system, taking 77% of the total health budget[11].

Chronic illnesses have become the principal challenge faced by the Basque Healthcare System. In the Basque Healthcare System, 10% of the population (85% of patients with chronic conditions, most of them multi-morbid, complex patients) consume 61% of the financial resources available; 63.55% of the total expenditure is spent on multi-morbid patients and approximately 50% of hospital admissions are non-programmed (non-elective) admissions[12].

1.1.2.4 Information on main blocks and core features

The Basque Good Practice is organised in three Blocks (B) and nine Core Features (CF), as shown in the figure below:

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[9] EUSTAT- Euskal Estatistika Erakundea - Instituto Vasco de Estadística. Municipal Inhabitant Statistics.

[10] Esnaola S, de Diego M, Elorriaga E, et al. Datos relevantes de la Encuesta de Salud del País Vasco 2013. Vitoria-Gasteiz: Departamento de Salud, Servicio de Estudios e Investigación Sanitaria, 2013.

[11] Bengoa R. A strategy to tackle the Challenge of Chronicity in the Basque Country. Eusko Jaurlaritza – Basque Government – Department of Health and Consumer Affairs, 2010. https://ec.europa.eu/eip/ageing/sites/eipaha/files/practices/chronicitybasquecountry.pdf

[12] Bengoa R. Transforming health care: an approach to system-wide implementation. International Journal of Integrated Care. 2013;13(3):None. DOI: http://doi.org/10.5334/ijic.1206

BASQUE HEALTH STRATEGY IN AGEING AND CHRONICITY: INTEGRATED CARE (BASQUE COUNTRY, SPAIN)

B1: Risk stratification	*B2: Integrated Care*	*B3: Patient empowerment*
✓ CF1: Data extraction process and construction of dashboard	✓ CF1: Creation of Integrated Healthcare Organizations	✓ CF1: Deployment of a School of Health
✓ CF2: Classification of patients	✓ CF2: Deployment of integrated communication and information systems	✓ CF2: Empowerment programs for chronic and/or multimorbid patients
✓ CF3: Stratification in the framework contract	✓ CF3: Care coordination and communication between health providers	

Figure 3: Blocks and Core Features of the Basque good practice

1.1.2.4.1   B1-Risk stratification

Risk stratification aims to achieve an appropriate level of distribution of health and care resources defined by the dynamic needs of the patients and populations, enhancing risk prediction in the clinical scenario.

Risk stratification has two approaches:

- In a population approach, Service Selection drives the identification of population risk strata through risk stratification and the allocation of structured health programmes targeted to a specific population group according to their risk strata.
- At the individual clinical level, Service Selection aims at having adaptive personalized case management. It defines individualized care plans for patients with different individual risks and care needs, under the umbrella of the above-mentioned structured health programmes.

Population Service Selection	Patient Service Selection
Population risk stratification	Individual clinical risk assesment
Target Population Program	Individual care plan
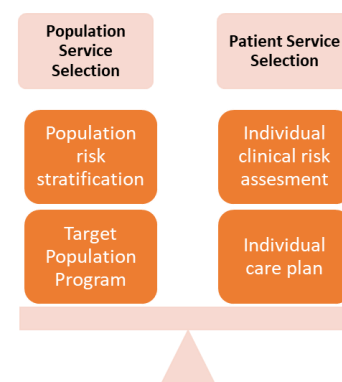
Figure 4: Approaches of the Basque Risk Stratification

There is consensus on the role of the population-based health risk assessment as a relevant driver for the large-scale deployment of integrated care services. Individual risk assessment can help to define the personalized health care that a particular patient needs, his or her individualized care plan. The central hypothesis is that health risk prediction and stratification optimize the definition of well-structured programmes and adaptive case management. It should help overcome current limitations for efficient healthcare planning and patient management, such as silos, gaps, overlaps and repetitions of care provision, both at meso (organizational) and micro (clinical) levels.

Overview of the risk stratification process in the Basque Country

The goal of the stratification in the Basque Country is to identify and select target groups that may benefit from specific programmes of action. The stratification in the Basque Country:

- Identifies and classifies the patients according to their risk of developing future problems
- Identifies patients with the greatest need for care
- Predicts the consumption of health resources over the next twelve months of the identified population

Thanks to it, Population Integrated Intervention Programmes for the following multi-morbid and specific disease patient groups have been deployed: Multimorbid, Chronic Obstructive Pulmonary Disease (COPD), Heart failure (HF), Bronchiolitis, Palliative Care, Oncology and Diabetics programmes. The ultimate objective is to provide anticipatory care and coordinated care to all patients identified through the risk stratification tool.

The stratification process in the Basque Country classifies all Basque citizens according to the estimation of their historical usage of resources in the next twelve months. The input data is provided by *Osakidetza* and the Basque Ministry of Health, and includes demographic, socioeconomic and clinical variables and data on the historical usage of health resources. The expected usage of health resources, the "output", is a proxy of patients' morbidity and severity with different needs of care. From this cost prediction, the Predictive Index is obtained with a simple calculation: predicted cost for each patient/average predicted cost per patient in *Osakidetza*. The risk score is displayed in *Osabide Global*, the Electronic Health Record (EHR) of *Osakidetza*. Clinicians have been trained to use the risk stratification information in patients' EHR.

The prospective stratification of all the population assigned to *Osakidetza* was performed for the first time in 2010 using the Johns Hopkins Adjusted Clinical Groups Predictive Model (ACG-PM) and since 2011, 100% of the Basque population has been stratified. The risk stratification tool is deployed at a regional level where the entire population of patients (approximately 2 million) is stratified every year In the Basque Country (until 2019 it was done once every two years). According to data on 2019 stratification, the 5% of the population with the highest Predictive Index included 69.628 people.

B1- CF1- Stratification Data extraction process and construction of dashboard

Adjusted Clinical Group-Predictive Model (ACG-PM)

Information of diagnostic codes, given as International Classifications of Diseases (ICD9-ICD10) and prescription of drugs, given as Anatomical Therapeutic Chemical (ATC) Classification is processed and transformed into morbidity groups by means of the Adjusted Clinical Group-Predictive Model (ACG-PM)[13]. The Basque Healthcare System designed a customized version of the ACG-PM that assigns each patient one of 34 mutually exclusive categories of healthcare costs.

The input data of the ACG-PM is obtained from the Electronic Health Record of all active patients of the Basque Country[14], including data on Primary Care, Hospital Basic Minimum Set of Data, outpatient appointments and tests, Emergency Department, day hospital, costs and others.
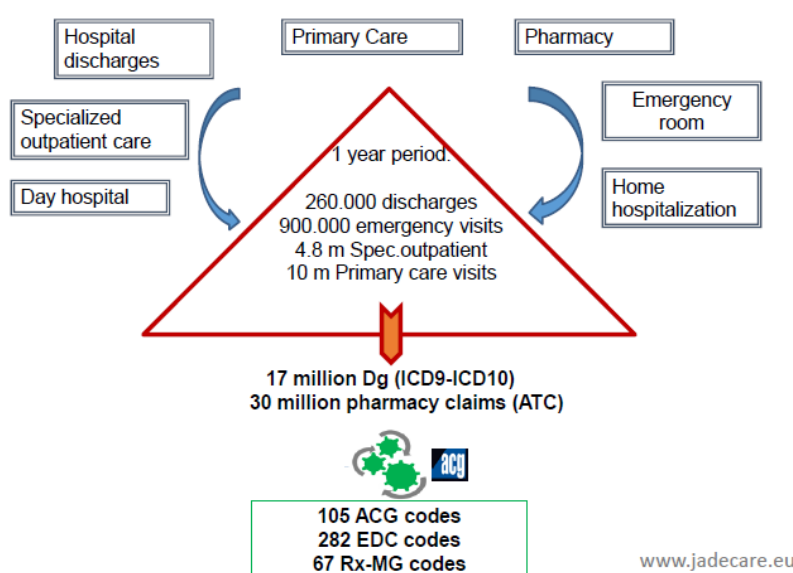
Figure 5: ACG-PM adjusted model in the Basque Country

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[13] The Adjusted Clinical Group-Predictive Model (ACG-PM) case-mix system was developed at Johns Hopkins University. It aims to: 'help system users gain insights around population and individual predictions, identify a unique population of patients at risk of certain outcomes, and focus on individuals with the greatest need for health intervention or care management.' (John Hopkins official website, available at: https://www.hopkinsacg.org/)

[14] Patients that have been at least one day in the system during the calculation period (1 year).

The model was already familiar to the Basque Healthcare System as it was used for monitoring performance and since 2011 was used for risk stratification. The process has moved away from a time-consuming and laborious procedure (3 months to 6 months) with requests for extraction of data coming from multiple, scattered and complicated data sources. The new calculation process is automated and offers fast data extraction: less than one-hour of file extraction using ACG Grouper. Furthermore, these dynamic calculations can be easily adapted to include new data sources.

The advantages of the ACG are that is a trustworthy and well-known tool scientifically recognised by Johns Hopkins name. Moreover, it includes a lot of possibilities for analysing data (different risk models –ICU, emergency room- different follow-up periods), detection of healthcare gaps, medication adherence gaps, emerging high-risk patients and it is continually improving; thus, it does not remain static.

On the contrary, some key limitations are that it is not free and that it is a black box, because it is difficult to know exactly the codes and definitions behind each variable. Furthermore, it is difficult to modify some criteria on your own. Finally, as the owners of the tool are located so far (U.S.A) there is a mediator company and this makes direct contact for answering questions and solving problems more difficult.

<u>Predictive modelling</u>

The risk stratification is based on the use of predictive modelling regression techniques. Various predictive variables from different sources serve as input for the model:

- Socio-demographics: age, sex
- Socio-economic data: census area of residence/deprivation index from MEDEA project[15]
- Historical usage of resources: obtained from Primary Care (PC)-EHR, hospital admissions (including emergencies) and specialist outpatient care database
- ACG: iso-morbidity, iso-consumption groups
- EDC: Expanded Diagnosis Clusters
- Rx-MG: morbidity markers according to prescribed drugs
- etc.

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[15] MEDEA is an EU funded Coordination and Support Action project the scope of which is to establish and further develop a regional Network of practitioners and other security related actors in the Mediterranean and the Black Sea region. Official website: https://www.medea-project.eu/
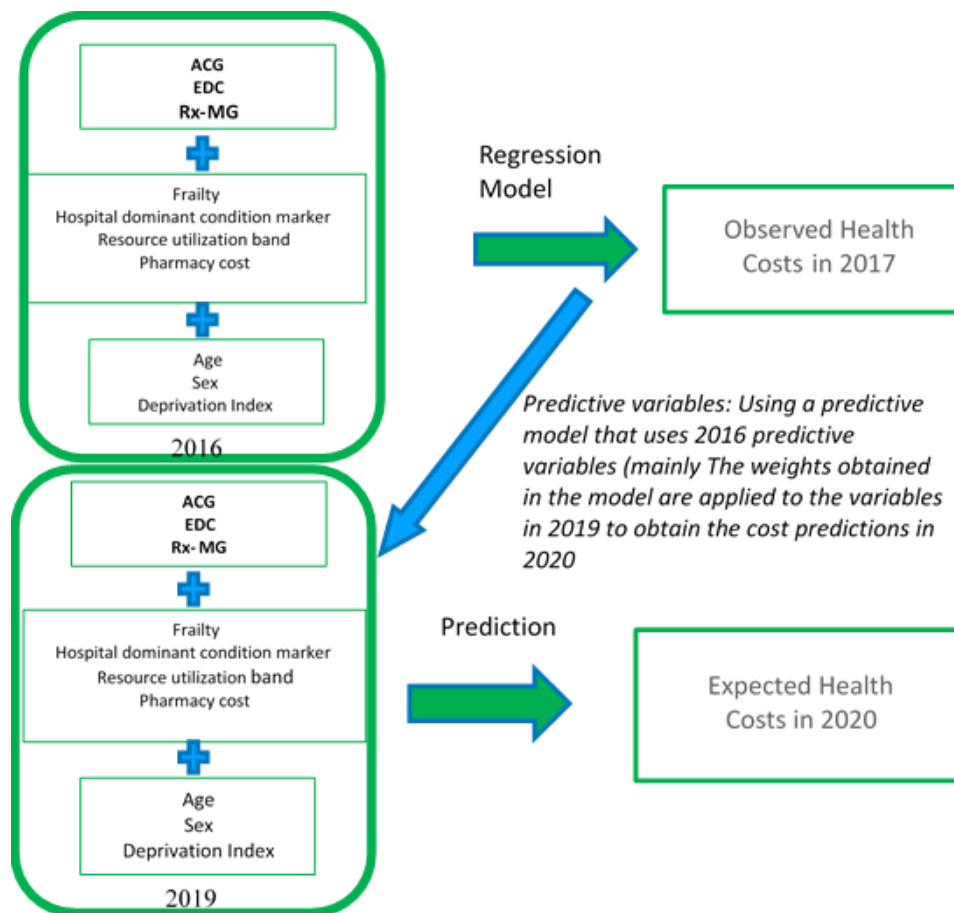
Figure 6: Example use case of the predictive modelling

The application of the regression model results in different weights. These are applied to the predictive variables to predict healthcare costs in future years using the statistical program "R", as shown in the figure above.

The expected future healthcare cost is then transformed into the so-called Predictive Index (PI), by dividing the expected healthcare cost of each individual by the expected average healthcare cost of the stratified population[16]. The result is a number with a lower limit of zero. The higher the number, the greater the risk (probability) of resource use. The PI of each individual may vary in different calculations as it depends on the data of the patients of the preceding year.

The model was developed and evaluated using SAS software (SAS Institute Inc., Cary, NC, USA) up to 2012 and, from then, using SPSS software (SPSS Inc., Chicago, IL, USA). Both the calibration and internal validation of the model have been done using the data (standardized costs of the admissions, visits and procedures provided to each patient) of the previous year. The patients' data confidentiality is ensured with an opaque identifier of the Basque Country population stratification program (PREST, for its name in Spanish) database.

Remarks of the risk-stratification model

The risk score provided by the risk stratification is meant to be used at emergency room visits, hospital admission and general practitioners' visits. The risk stratification tool is deployed at the regional level where the entire patients' population (approximately 2 million patients) is stratified annually.

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[16] Predicted cost for each patient/average predicted cost per patient in *Osakidetza*

In parallel, the research team performs periodic evaluations and optimization of the model. In this regard, the model is recalibrated (i.e. the parameters of the predictive model are calculated again) and minor changes are introduced in the set of independent variables used as input to the model.

The predictive performance of the model has been assessed using different metrics: namely, coefficient of determination (R^2), positive predictive value (PPV), negative predictive value (PPV), sensitivity, specificity and c-Statistic or area under the receiver operating characteristic (ROC) curve (AUC).

The figure below reports a summary of the results achieved by the R-Squared (RS) model. In this scenario, R^2 refers to the amount of cost variability that is explained by the model. The linear regression model was tested using different sets of input variables in order to evaluate their contribution to the overall predictive capability of the model. The highest R^2 (0.260) was achieved when age, sex, diagnoses, prescriptions, previous costs and deprivation index are used as independent variables.
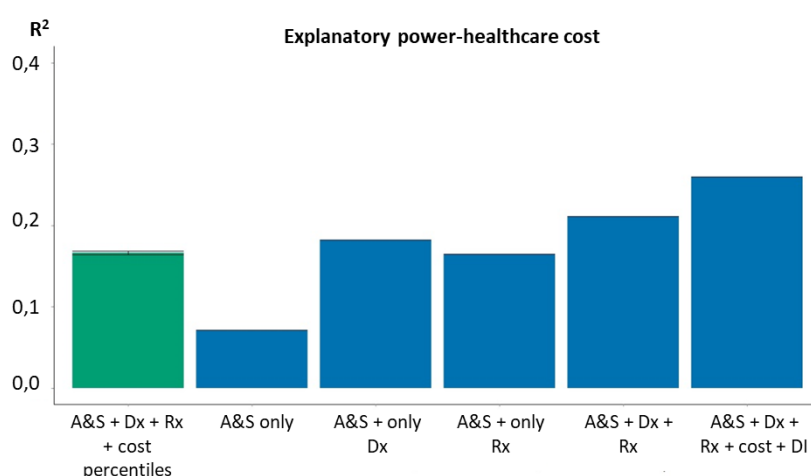
Figure 7: Graph reporting a summary of the results achieved by the RS model in terms of explained cost variability

The green bar indicates the mean R^2 achieved when the model was tested without a previous calibration on the local data (error bar spans over the min-max range, only for the green bar). Blue bars are used to report the results of the model with recalibrated parameters. A&S, Dx, Rx, cost and DI refer to age and sex, diagnoses, prescriptions, previous costs and deprivation index, respectively.

Finally, it must be said that stratification has implied changes to resource allocation and care intervention plans, but not in professionals' behaviour or in financial savings. The use of stratification to adjust funding is being tested now. Changes are not yet expected in the attitude of professionals.

B1-CF2- Classification of patients

The stratification of the patients uses the population model of the Kaiser Permanente Pyramid. The population is classified into four groups according to the presence (or absence) of chronic disease, with a special focus on the top[17] 5% of high-cost chronic patients. The patients are assigned to each stratum according to their Predictive Index (the risk levels are denoted by different colours: red, orange, yellow or green). Different interventions are designed for each stratum. As a result, a four-color pyramid is built with the following distribution:

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[17] https://www.researchgate.net/publication/259583721_Improving_Chronic_Illness_Care_through_Integrated_Health_Service_Delivery_Networks

- The "Case Management" stratum includes 5% of the chronic population, with a high predictive index of resource consumption (PI in the percentile >95). It is represented by a red triangle. This group corresponds to high-risk users who require complex interventions or case management.
- The "Disease Management" stratum groups constitute 20% of the chronic population, with a predictive index of intermediate resource consumption (PI in the percentile between >75 and <=95) represented by an orange triangle. These are the people with chronic conditions requiring constant medical attention, and those whose lifestyle makes them relatively intensive users of the system.
- The stratum of "Self-management" groups includes 75% of the chronic population, with the lowest predictive index of resource consumption (with a PI in the <=75th percentile), represented by a yellow triangle. These are the patients with chronic pathology but in good health.
- The "Promotion and Prevention" stratum, represented by a green triangle, groups the rest of the population with no chronic pathologies.
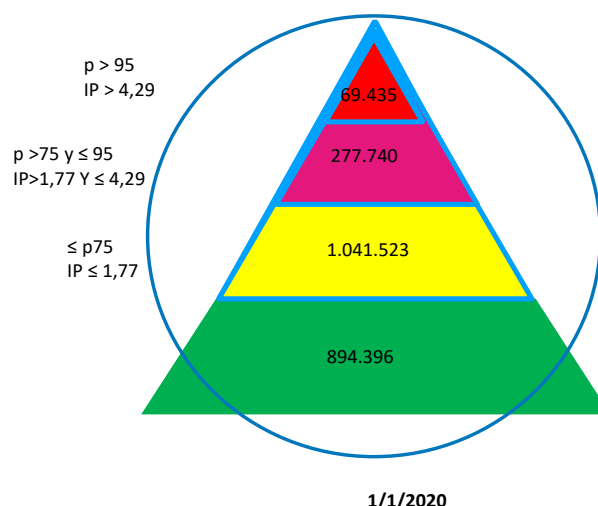
Figure 8: Pyramid of results of Predictive index

The adoption of a population approach gives guidance on how to direct our effort to improve patient care and contribute to the efficiency of the health system. In the Basque Country, population intervention plans have been designed for Multimorbid patients, COPD patients, HF Patients and Diabetic patients with poor metabolic control. These groups were chosen because they gathered very complex populations that consume a lot of resources (besides, most of them have more than one chronic disease)[18]. Currently, the responsibles of the model are trying to include new groups as frailty patients or patients at the end of their lives. Some of them could be identified using information already recorded on EHR, but not always –or not as good as they wished (e.g: Frailty).

Patients are tagged and assigned to a specific population to guide their care with a specific intervention programme common to each of these subpopulations. However, clinicians can include and exclude cases at any time; they can remove the alerts at any time and also put in new alerts (e.g. remove a patient's pluripathology alert but put in a COPD alert if considered).

In this framework, Ollero´s categories are used to identify patients with two or more chronic complex conditions which are high-risk patients that are not automatically detected by ACG grouper.

Category	Expanded Diagnosis Clusters (EDC)	
A	CAR03	Ischemic heart disease (excluding AMI)
	CAR05	Congestive Heart failure
B	REN01	Chronic renal failure
C	RES04	Emphysema, chronic bronchitis, COPD
D	GAS02	Inflammatory bowel disease
	GAS05	Chronic liver disease

[18] Long, P., M. Abrams, A. Milstein, G. Anderson, K. Lewis Apton, M. Lund Dahlberg, and D. Whicher, Editors. 2017. Effective Care for High-Need Patients: Opportunities for Improving Outcomes, Value, and Health. Washington, DC: National Academy of Medicine.

E	NUR05	Cerebrovascular disease
	NUR11	Dementia and delirium
F	GSU11	Peripheral vascular disease
	EYE13	Diabetic retinopathy
	END07	Type 2 diabetes, w/ complication
	END09	Type 1 diabetes, w/ complication

Table 1: Ollero´s categories

The inclusion and exclusion criteria for the four groups of patients are as follows:
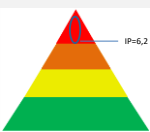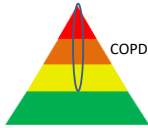
Patients	Inclusion criteria	Exclusion criteria	Figure
MULTIMORBID PATIENTS	>13 years AND at least 2 of these three conditions: COPD, Diabetes Mellitus (DM) and Congestive HF or 2 or more of Ollero's categories and PI >=6.2	Neoplasia, Dialysis, Transplantation, in Nursing Home with medical service or Patient with palliative care	IP=6,2
CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD)	>13 years old AND COPD	Neoplasia, Dialysis, Transplantation or are already on the pluripathological pathway	COPD
HEART FAILURE (HF)	> 13 years old AND HF	Neoplasia, Dialysis, Transplantation or are already on the pluripathological pathway	CH
DIABETES MELLITUS (DM)	>=45 years AND MD AND ((NO Hb1Ac in last 8 months) OR <=75 years AND last HbA1 in last 8 months is >=7 OR >75 years and the last HbA1 in the last 8 months is >=8)	Neoplasia, Dialysis, Transplantation or are already on the pluripathological pathway	DM

Table 2: Inclusion and exclusion criteria for targeted groups of patients

In order to facilitate and enable the use of risk stratification information, and thus perform a proactive intervention, the information is transferred to each citizen's EHR, including: (i) a tag with the stratum of the risk pyramid in which the citizen is found. It relates to the value of the Predictive Index, the numeric value of the PI and the date on which the stratification is carried out; (ii) an "alerts" section identifying the PI corresponding to that patient (if any).

Some limitations of the process are the time lag between data collection and when the tool is used. For example, 2015 Electronic Health Records feature the results of stratification carried out based on 2013 data. The updating frequency can widen the lag between coding and the actual use of the data.

Moreover, the quality and reliability of the data sources used for stratification need continuous improvement. There can be different ICD codes for the same patient in Primary Care or Hospital Care. Coding is very laborious and it is important to have the needed knowledge and training. In this regard, risk tool implementation, though, has boosted patient coding improvement, even if there is still some room for more and some challenges to

overcome. The use of an international system like ACG seems to help solve problems like under-recording of patients' data in medical records.

Another issue is the correct interpretation of risk information. The Risk stratification Score is a prospective value based on population data. Not all clinicians read it as the current status of the individual patient. This leads to misunderstandings as the prospective score might not match the clinical judgement on the patients' current health status. For this reason, more training and education of the front-line staff is needed to use the information correctly.

Osakidetza, together with *Kronikgune*, introduced in 2016 risk stratification training, especially targeting the clinical staff (nurses and general practitioners (GPs)). The training was mainly based on concepts such as: stratification, management of multiple co-morbidity patients, predictive index, and Population Intervention Plan and included the development of functions and tools needed to implement stratification. Despite certain resistance to change and different unfolding efforts that had to be made to ensure the correct implementation, the professionals who received the training felt that they were very involved, responded well to the tasks they were assigned and moreover, the communication with them was fluid and ongoing. Like in other regions, the number of experts in stratification in the Basque Country continued to be really small, while the training to use the stratification tool and information is broad.

B1-CF3- Stratification in the Framework Contract

Stratification is a very powerful tool to promote the shift of mind frame necessary for switching from financing health activities to planning and financing health needs. It has been useful for identifying target populations for healthcare interventions. The process of commissioning and funding of the Ministry of Health of the Basque Government defines the type and volume of activity to be performed and the budget allocated to the Integrated Healthcare Organizations (IHO)[19]. The Framework Contract is set as the main regulatory tool of the Health system. It sets the Users´ rights, accessibility criteria, and financing and reimbursement conditions. It aligns funding, resources and services to healthcare priorities established in the Health Plan and the strategic guidelines of the Ministry of Health of the Basque Government. According to it, funding is conditioned to:

1. Resources and/or types of resources that individual healthcare organizations deploy.
2. Services and/or type of services needed to meet the challenges facing the system and provide a health care patient-centred process.
3. Structural aspects and processes that support integrated care.

The 95% of the funding is allocated according to the population covered and the services offered and pending 5% is allocated according to different quality criteria.

The Framework Contract is evaluated yearly. The assessment model is structured around two main axes: (i) the design and planning of services and (ii) the performance of the organization measured with projects´ specific indicators (safety, effectiveness, equity, patient-centred, access and waiting lists, efficiency, integrated care and innovation). Project evaluation also assesses care coverage and results of patients identified through the risk stratification tool, as, for example, an indicator that measures the percentage of identified patients with a personalized care plan or the percentage of stratified diabetic patients with poor prior control (HbA1c > 7 in under 65s; or >8 in over 65s) who at the time of evaluation have adequate values.

Risk stratification is also used to compare real budgets with funding of the IHOs adjusted to the needs of their population. Based on the data of age, sex and diagnoses of the different people collected in the various Primary

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[19] The Integrated Healthcare Organizations (IHO) represent an organisational modality that blends a hospital and primary care centres (integrating the governance bodies) in one organization with a defined population catchment. It is based on article 23 of Law 8/1997, of 26 June, on Healthcare Regulation in the Basque Country.

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Care Units it has been possible to stratify the population into Resource Use Bands (RUBs). Six groups have been established, ranging from group zero (people who do not consume any type of resource) to group five (those that demand the greatest consumption of resources), as shown in the table below.

RUB-0	No proper use of resources or invalid diagnoses
RUB-1	Healthy users
RUB-2	Low morbidity, low expected costs
RUB-3	Moderate morbidity, moderate expected costs
RUB-4	High morbidity, high expected costs
RUB-5	Very high morbidity, very high expected costs

Figure 9: Resource Use Bands

Each RUB is constructed by adding the number of people who are classified in the ACG. The distribution of the population amongst the different RUBs is not homogenous for each IHO. Then, the cost for each IHO is calculated by multiplying the average cost per person in each RUB in the Basque Country per the number of people in that RUB in the IHO. The graph below shows a use case for the distribution of average costs per person in € (vertical axis) in the seven IHOs of one of the three Basque provinces (*Gipuzkoa*) in 2014 (horizontal axis).
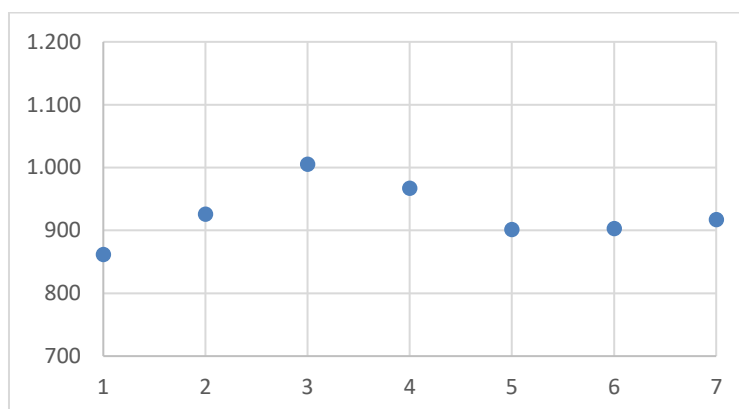
Figure 10: Distribution of average costs per person in € in the seven IHOs of one of the three Basque Provinces (2014)

In addition, the financing model takes into account patient flows and referrals to tertiary services amongst IHOs. However, it is constrained by the historical costs and the total budget approved every year by the Basque Parliament.

It must be said that stratification has allowed identifying the ideal financial capita of IHO, revealing significant differences with the real health expenditure of those IHOs, but however, there is still road to go. As *Osakidetza* is a public health system the closure of centres is not envisioned in principle, thus, effective financing based on theoretical capita is a key medium-long-term aim.

1.1.2.4.2   B2- Integrated Care in the Basque Country

A clear strategic vision[20] towards the challenge of ageing, chronicity and dependency has provided explicit support, leadership and capacities to transform the health system towards integrated care in the Basque Country. The integrated care strategy of the Basque Country focuses on clinical and functional organizational integration. It deploys an integrated care model capable of providing continuity of care both at health and social care levels and for this purpose, a number of processes and tools have been developed and implemented. Integrated care in the Basque Country is based on three pillars:

INTEGRATED CARE in the Basque Country

Integrated governance	Population approach	Culture and values
It establishes the agents participating in the organization and provision of integrated care services, including the organization of the care process management.	It sets the base for coordination with social and public health agents, multidimensional assessment and action in people aged 70 or older (Care Plan for the Elderly).	It implies a change from a culture of fragmentation to a culture of integration.

Figure 11: Three pillars of integrated care in the Basque Country

This new model of care implies important cultural changes within the organization; both in the way professionals relate to each other and also in the way they approach patients. In short, it is a question of giving coherence and seeking synergies between the different levels of the health system to ensure that healthcare is less fragmented, more coordinated, more efficient and of higher quality. There is no established, unambiguous formula for achieving this, as local circumstances and the characteristics of the health systems condition the way in which progress is made in care integration in practice. In the case of *Osakidetza*, the model of Integrated Healthcare Organizations (IHO) has been extended as a facilitator of integrated care.

B2- CF1- Creation of Integrated Healthcare Organizations

The Basque Healthcare System developed a plan to achieve a structural integration and introduced the concept of Integrated Healthcare Organizations (IHOs). In 2010, *Osakidetza* created the first IHO, the IHO *Bidasoa*, as an organisational modality that goes beyond the traditional separation between primary care and hospital care and which is based on article 23 of Law 8/1997, of 26 June, on Healthcare Regulation in the Basque Country.

An IHO blends a hospital and various primary care centres (integrating the governance bodies) in one organization with a defined population catchment area. Its main objective is to get a less fragmented, more coordinated, efficient and higher quality care, thus, maximising health outcomes for the population.

Starting from a pilot in the first IHO, IHO *Bidasoa*, this model has been progressively implemented in all primary care and hospital organisations in the Basque Healthcare System. This organisational transformation is completed by promoting changes in care management, in order to materialise care continuity and the organisation of activities carried out in different spaces and at different levels by different professionals, addressing actions in an integrated manner.

The organisational structure of the IHOs is based on the management bodies; the participation bodies and the care organisation of the hospital services and primary care units, as shown in the figure below:

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[20] http://www.euskadi.eus/web01-s2osa/es/contenidos/plan_gubernamental/xleg_plangub_13/es_plang_13/index.shtml

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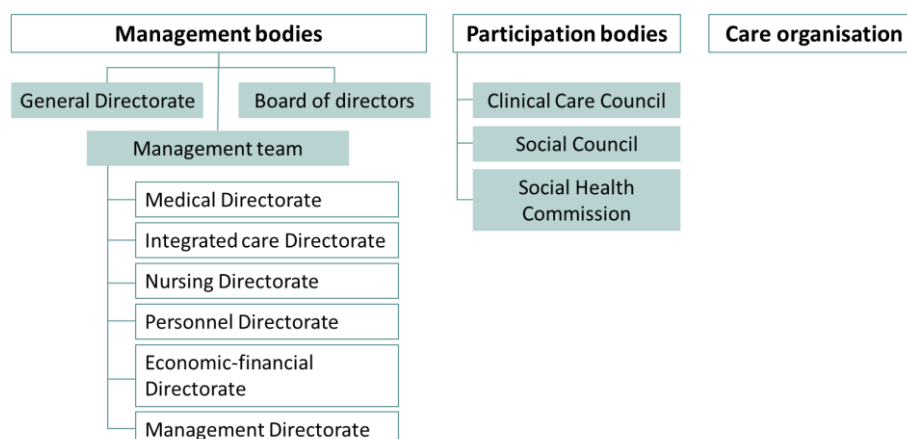
Figure 12: Organisational structure of the IHOs of the Basque Country

The Integrated care Directorate is the body responsible for integrating the outpatient care activity of the IHO's primary care and hospital levels, in coordination with the Medical Directorate and the Nursing Directorate. It is also the body responsible for coordinating this activity with that of other areas such as community and social healthcare, intended to promote links with the community through the promotion and prevention of health and social healthcare.

On the other hand, the care organisation of the IHO is structured around the hospital services and the primary care units.

- Hospital services: The care objectives of each hospital service are determined in accordance with the commitments of the IHO's Framework Contract. The latter defines the type and volume of activity of each IHO and the budget allocated to care providers. The starting point is the coordination with the other IHO units and services in order to ultimately provide integrated care to the population assigned to it. The head of each hospital service carries out the double management and care function, depending on the functions of the IHO's Medical Directorate. However, in those matters that may affect the scope of the Integrated Care Directorate, it will functionally depend on this Directorate, so that both will act in a coordinated manner. The service management is responsible for the care process, as well as for the organisation and management of the human and material resources assigned to the service.

- Primary Care Units: In order to provide the necessary assistance to the population they are assigned to, the IHO's level of primary care is functionally organized into primary care units. The primary care units are made up of the set of people, services, technologies and infrastructures to provide first-level care services, oriented towards the quality, effectiveness and efficiency of the care process. The care objectives of each primary care unit will be determined in accordance with the commitments of the IHO's Framework contract, taking as a starting point once again the coordination with the other IHO units and services to ultimately provide integrated care to the people assigned to the unit.

In 2020, 100% of primary care and hospital structures were merged into Integrated Health Organizations (IHOs). *Osakidetza* is composed of 320 primary care centres, 14 acute hospitals (4,278 beds), 4 sub-acute hospitals, 4 psychiatric hospitals and 2 contracted long-term mental hospitals. At this moment these organizations are under transformation towards 13 IHOs with a unique management team. Activity indicators of 2021 are: 5,167,34 primary care consultations, 2.994.032 hospital consultations and 738.012 paediatrics consultations. 126,617

hospital discharges, out of which 110,401 at acute hospitals and 21,141 surgical interventions (major outpatient surgery)[21]. Ageing, chronicity and dependence is one of its strategic priorities.

The IHOs' performance is assessed by means of six dimensions and 24 sub-dimensions that evaluate security, effectiveness, efficiency, equity, patient-centred care, accessibility and waiting lists, among others:

Dimenssion 1. Healthcare Organization

1.1 Commitment to leaders
1.2 Strategic framework
1.3 Population focus
1.4 Information, evaluation, improvement and innovation systems
1.5 Financing systems
1.6 Social and health policies

Dimenssion 2. Community Health

2.1 Community Strategies in Health Plans
2.2 Partnership with community stakeholders
2.3 Connecting patients to community resources

Dimenssion 3. Care model

3.1 Patient-centred care
3.2 Professional competencies related to patient-centered care
3.3 Multidisciplinary teamwork
3.4 Integration and continuity of care
3.5 Active patient follow-up
3.6 Innovation in patient-professional interactions
3.7 Clinical management of chronicity and incentive systems

Dimenssion 4. Self-care

4.1 Patient assessment for self-care
4.2 Structured therapeutic education
4.3 Psychosocial activation of the patient and mutual support
4.4 Tools for facilitating self-care
4.5 Shared decision making

Dimenssion 5. Clinical decision support

5.1 Shared protocols and guidelines
5.2 Continuous training
5.3 Consulting and liaison

Dimenssion 6. Information Systems

6.1 Information for clinical management and practice
6.2 Integration of clinical patient information
6.3 Communication of clinical information between professionals

Figure 13: IHO's evaluation framework

Out of the 24 sub-dimensions 16 refer to integrated care performance and are evaluated considering actions that favour a population approach in the context of integrated social and healthcare, deployment of elements that facilitate greater integration between care levels in the IHOs, elements that enable the sustainability of the system and initiatives to improve patient health outcomes.

B2- CF2- Deployment of integrated communication and information systems

The Basque Healthcare Service, *Osakidetza*, has made great investments in digitalization and e-health. As a result, a number of services to support integrated care and interoperability between communication and information systems have been implemented that enable non-face-to-face care focused on prevention, monitoring and health advice.

The Information and Communication Technology (ICT) platforms and communication channels align actions, avoid duplication of efforts and bridge gaps in patient care. Nowadays, in the Basque Healthcare System various relevant tools that support integrated care are implemented:

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[21] Osakidetza activity report 2012, available at: https://www.osakidetza.euskadi.eus/contenidos/informacion/osk_trbg_informa_econo_costes/es_def/adjuntos/presupuestos/memorias/2021_MemoriaPpto.pdf
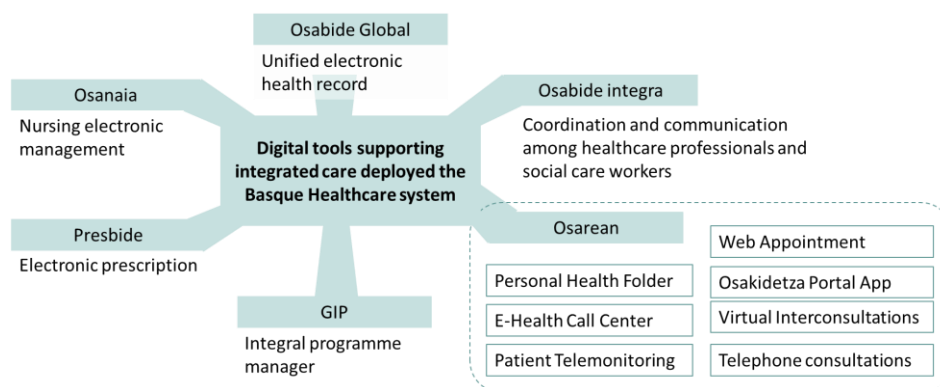
Figure 14: Digital tools supporting integrated care deployed the Basque Healthcare system

The Unified Electronic Health Record (*Osabide Global*)

Osabide Global is a single electronic health record (EHR) that provides unified and shared clinical information and is accessible to all HCPs. 100% of *Osakidetza* centres have implemented and deployed the EHR (including hospitals and primary care centres). The tool contains all health-related information of patients such as: appointments, fact sheets, recommendations, informed consent forms, social care history, pending tasks, reports, stratification scores, clinical data, diagnostic tests, etc. It greatly facilitates the care service and it enables the provision of new forms of healthcare such as tele-consultation between primary and specialized healthcare. In addition, *Osabide Global* interoperates with hospital Healthcare Information Systems.

The EHR was introduced in the Basque Healthcare Service around 1998 thanks to two strategic projects: *Osabide-AP* aimed at Primary care and *e-Osabide* for hospitals aimed at erasing all existing barriers between the organization of services, centres and care levels at that time.

Once all systems were renewed, both the at Primary care and Hospital level, in 2009 it was decided to move a step forward regarding EHR in the Basque Country. This new era increased greatly the quality of the existing systems and works mainly in two areas:

• The elimination of all existing organizational barriers, so that all professionals involved in care share all the existing information of patients supplied by communication mechanisms in real-time.
• The development of patient interaction mechanisms beyond face-to-face consultations: telephone consultation, email, video-conference, etc.).

The patient-centred approach of *Osabide Global* has significantly contributed to the care continuum and allowed to overcome the previously existing barriers between different areas and levels of care. *Osabide Global* interoperates permanently and very intensively with hospital healthcare information systems (HIS), called *e-Osabide*.

Nursing electronichealth record - *Osanaia*

Osanaia is the tool created for the management of nursing care, allowing to set and manage personalized nursing care plans for patients. It integrates information from primary care, specialized care and mental health.

Electronic prescription (*Presbide*)

The electronic Prescription service, *Presbide* has also been deployed and integrated as a module within the EHR systems (Osabide) and is operating in all the pharmacies in the Basque Country. The e-prescription involves the integration of all pharmaceutical supply procedures: prescription, permission, dispensing and invoicing, based on information technologies. It allows switching from the old concept of the pharmacist's prescription to the establishment of integrated pharmacotherapeutic plans, particularly relevant for chronic illnesses due to the

existence of multimorbidity, complexity and long duration of pharmacological treatments. Both primary and secondary care health professionals have access to the same information about the patient's pharmacological treatment, which improves drug management. This system has been implemented in 100% of *Osakidetza* centres as a module within the EHR system.

Virtual *Osakidetza* (*Osarean*)

It is the multi-channel Healthcare Service Centre of the Basque Country that increases the number of interaction channels of the Basque citizens with the health system. It includes the following services: Personal Health Folder, Call Centre, Patient Telemonitoring, Web Appointment, *Osakidetza* Portal App, Virtual Interconsultations, Telephone Consultations.

Personal Health Folder (PHF)

The PHF allows patients to have safe access to their medical records and also enables communication with HCPs, thus providing new non-face-to-face communication channels and allowing patients themselves to enrich their medical records. The PHF services can be grouped into four main areas:

1. Consult and retrieve information
   - Filiation data. The basic data of the patient is shown as well as the HCP assigned. Fields that can be updated by the user are also shown, such as telephone and e-mail.
   - My clinical history. This includes discharge reports, primary care reports, laboratory reports, radiological tests and surgical reports, the vaccination history, dosimetry (radiation received from Computed tomography (CT) scans) and active treatment sheet (from where the Sintrom dosage pattern can be accessed in case of use). A QR code with a summary of the medical history can be also downloaded.
   - Upcoming appointments. The patient can consult the pending appointments at both Primary and Hospital Care.
   - Surgical waiting list. Once included in the waiting list, information is displayed. This information can also be directly asked to the Patient Care Service by e-mail directly from the PHF.
2. Enrich the medical history
   - Self-tracking programmes. Tobacco and alcohol consumption, weight control and blood pressure.
   - Uploading of documents. Patients can upload health reports in their EHR after validation of the HCP.
3. Interaction with the healthcare system
   - Patient diary. This is a one-way channel where patients can write down information about their state of health on a daily basis when HCPs ask them to do so. This information is automatically included in their EHR. HCPs scan monitor patients' status thanks to the information included and also by means of dedicated forms.
   - Messages to the patient. This is another one-way channel, in the opposite direction to the above, where the professional contacts the patient to send information, recommendations and adjustments to the treatment. It enables a closer relationship between the HCP and the patient.
   - Doubts with your doctor. This is a two-way non-face-to-face channel. The HCP must authorise the patient to solve his/her doubts through the Health Folder for primary and/or specialised care. The patient writes down his/her doubt and the HCP sends the answer after accessing the virtual appointment created and visualising the data. Later, the patient receives an email confirming the answer from the HCP.
4. Allow access of third parties to the Health Folder: Parents, Legal Guardians and Authorised Persons.

The initial aim of the PHF was to give access only to the holder of the folder, who is over 16 years of age. However, as a consequence of several requests for access from duly accredited and authorised third parties, a new function was developed to allow these accesses directly from the PHF itself in the following cases:

- Parents and Legal Guardians. Given that the parents have the parental authority or the document of guardianship, as appropriate.
- Representatives of legally incapacitated patients that hold the corresponding document.
- People of legal age when authorised by the holder of the Folder.

In 2021 the number of accesses to the PHF was 570 which meant a 26,18% increase over the previous year. The number of people using the PHF in 2018 was 62,28, a 20,73% increase over the previous year[22].

e-Health Call Centre

It is a non-face-to-face care service provided by nursing professionals (aprox 23 nurses) 24 hours a day, 365 days a year) that includes:

- Direct telephone attention for people calling the free telephone number 900203050. These service include srecommendations for common health problems that do not require the intervention of a HCP, solving doubts and offering the most advisable guidelines according to the symptoms. The professional answering to the call has access to the Clinical History of the caller in order to individualise the advice.
- Monitoring of chronic patients included in various ICT based programmes (Tele HF, Tele COPD, Pluripathological patients, Palliative patients)
- Patients with Teleassistance (*Beti ON* programme, explained later). This is a socio-healthcare collaboration.
- Various health programmes:
    - Monitoring of Major Outpatient Surgery patients
    - Support for Advanced Practice Nurses
    - Support for Home Hospitalisation
    - Follow-up of patients on discharge from hospital
    - Suicide prevention
    - Monitoring of Palliative Care Patients at home
    - Monitoring of patients in the ICHOM program- Quality of Life STROKE and Prostate Cancer Programme.
    - Notification of deaths to the health centre out of their working hours or on public holidays

Patient Telemonitoring

At-home Patient Telemonitoring is a new form of healthcare that integrates the information of all tele monitoring devices and sensors that measure patients' clinical parameters at home, facilitating patient follow-up, care adherence and enhancing patient-professional communication. In 2020, there were around 14,306 patients[23] in *Osakidetza* included in the following Telemonitoring Programmes:

- Telemonitoring of patients with Defibrillators, Pacemakers and Holters
- Telemonitoring of HF patients
- Telemonitoring of HF patients 72 hours after discharge from hospital
- Telemonitoring of COPD patients
- Telemonitoring of pluripathological patients

[22] Osakidetza Transparency portal, available at: https://www.osakidetza.euskadi.eus/transparencia-buen-gobierno/-/presupuestos-y-contabilidad/
[23] Osakidetza: Balance of activity and waiting lists 2020. Available at: https://www.osakidetza.euskadi.eus/contenidos/informacion/osk_corp_informacion_sanitaria/es_def/adjuntos/listas_de_espera/Balance-de-actividad-y-listas-de-espera-2020.pdf

- Telemonitoring of patients with oral anticoagulation (OAT) treatment. This is done through two sub-programmes: nursing homes and self-monitoring at home.

Osakidetza Portal APP

The *Osakidetza* App is a digital tool focused on citizen empowerment. The following apps can be found and downloaded from the *Osakidetza* Portal app:

- Accessing to PHF
- Access to My treatment-Electronic Pillbox
- *Osasun Eskola* (School of Health, explained later)
- Messages to the patient
- Recruitment lists
- Cardiopulmonary reanimation
- Web Appointment

Virtual interconsultations between General Practitioners and hospital doctors

Nowadays professionals can consult each other about a patient's case through a virtual interconsultation avoiding the need of patients going to the hospital. In 2020, 62% (351,338) of the 565,620 interconsultations between GPs and hospital doctors were non-fac-to-face[24].

Telephone consultations

This is considered as a highly value-added service for the population. In Primary Care, patients can request telephone consultations on their own at the health centre, by telephone and also online through the *Osakidetza* website. In 2018, general practitioners made 1,647,403 telephone consultations and paediatricians did 207,738. In Hospital Care, telephone consultations are indicated by HCPs for the follow-up of chronic patients. In 2018, 300,040 telephone consultations were made in hospitals.

Interoperability between social and health information systems (*Osabide integra*)

A coordination model between health and social institutions has been developed, based on the harmonisation of the policies of both fields.

InterRAI-CA started in 2011 as a research project with the aim of identifying and validating an instrument to establish a common language for the social and health sectors and also enable the joint assessment of people with social and health needs. The deployment of InterRAI-CA started in January 2016 led by Basque Country Social-Health Coordination Team. It had a multidisciplinary approach as its use was focused on professionals of primary care and social services, mainly doctors, nurses and social workers. It involved the deployment of a coordinated action of Social and Healthcare professionals, 48 Municipalities, 92 Health Centres, 3 Provincial Councils, 1 Private Entity and 3 regional organizations dependent on the Basque Council of Social and Healthcare. Nowadays, 458 InterRAI-CA licences are implemented throughout the health and social system of the Basque Country (primary care centres, hospitals, City Halls, nursing Homes, etc).

The coordination of Social and Health at local level in the Basque Country is also promoted by linking Social and Healthcare teams and allowing the access of Nursing Homes to the *Osabide Integra* platform, including EHR.

In this framework, it must be also mentioned that the Ministry of Employment and Social Policies of the Basque Country implemented in 2011 the telecare service called *BetiON.* It integrates the information of all

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[24] Osakidetza: Balance of activity and waiting lists 2020. Available at: https://www.osakidetza.euskadi.eus/contenidos/informacion/osk_corp_infor-macion_sanitaria/es_def/adjuntos/listas_de_espera/Balance-de-actividad-y-listas-de-espera-2020.pdf

telemonitoring devices and sensors that measure patients' clinical parameters at home, facilitating patients' follow-up and care adherence and enhancing the communications between patients, HCPs and social care professionals. Furthermore, it has a central call centre that received 321,408 calls and made 969,664 calls in 2018. Operators can activate services entrusted to the eHealth Call Centre, such as telemonitoring or emergency department.

Finally, as mentioned in the chapter above, the main evaluation tool of the Basque Healthcare system is the Framework Contract. The Health and Social coordination of the IHOs are also assessed through this tool.
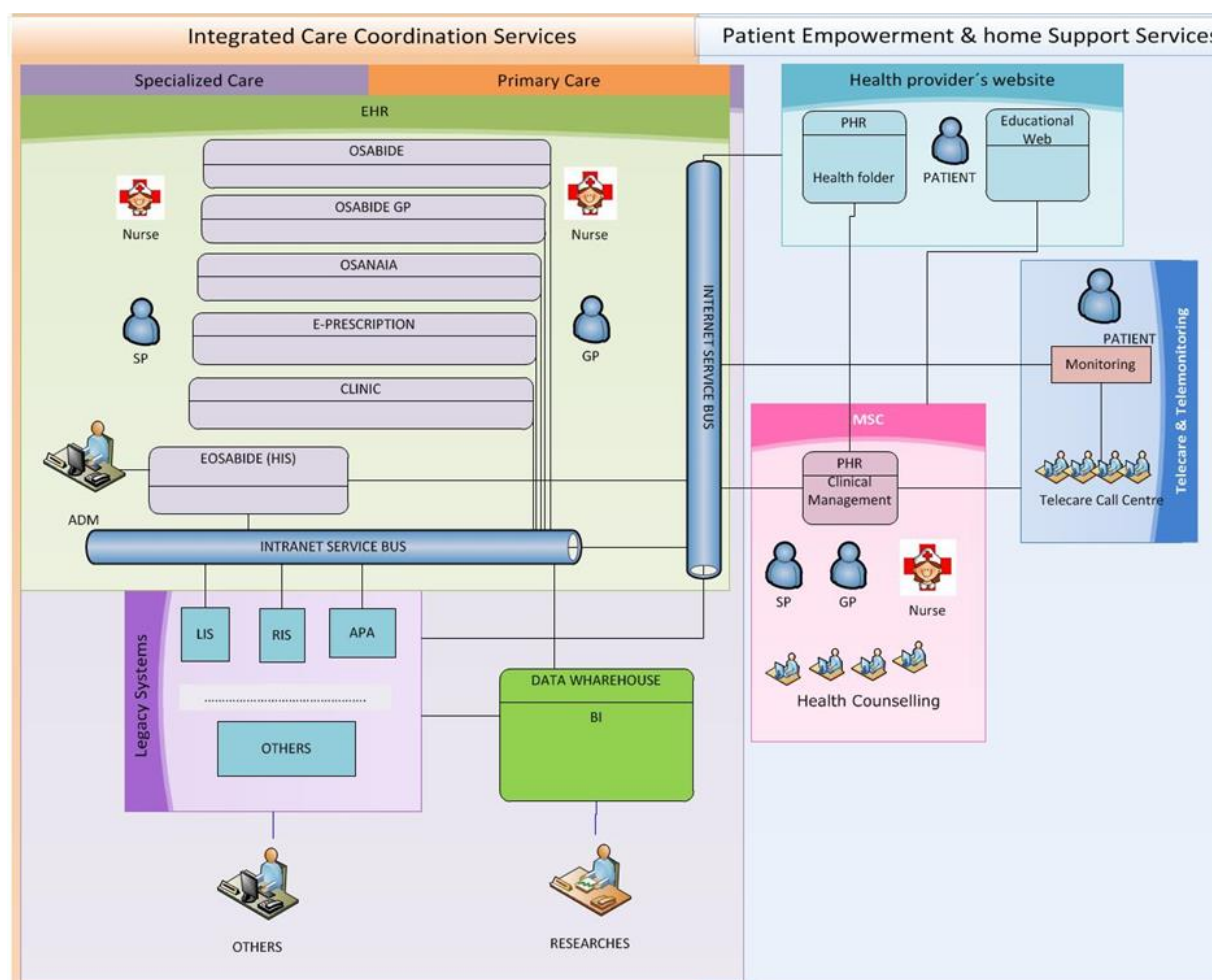
Figure 15: The Basque Healthcare system architecture

B2- CF3- Care coordination and communication between health providers

The Basque Healthcare system has developed clinical pathways for groups of patients classified according to their risk and conditions. The pathways include all levels of care, disciplines and coordination actions targeting multimorbid patients, patients with DM, HF, COPD, bronchiolitis, palliative care and oncology patients.

In addition, with the aim of supporting care coordination new figures and roles have been introduced in the Basque Healthcare System:

- Case manager/advanced skill nurse: usually a PC nurse responsible for specific case management, coordination with GP and providing support to patients in the hospital, emergency department and discharge process.
- Referent Internist: that has a consultant role to support PC in decision-making process, but also to coordinate other specialists during hospitalization.

- Hospital Liaison Nurse: together with the PC nurse is responsible for coordinating discharge with a comprehensive plan for the patients. Patient follow-up included contact patient 24-48h post-discharge and monthly telephone calls by the PC nurse to facilitate early worsening detection[25].

The working group that developed the pathway included professionals from different IHOs and medium- and long-term hospitals in *Osakidetza*, health care integration service, the *Osakidetza* Healthcare Directorate, e-Health Centre and *Kronikgune*.

In particular, the Complex Multimorbid Programme consists of an integrated pathway that aims to provide complex patients with several co-morbidities, resulting in coordinated multi-level and multidisciplinary care in all IHOs of the Basque Country. The programme offers:

- Coordination and communication between professionals
- Patient-centred care based on the empowerment of the patient/caregiver and health status monitoring
- ICT tools to enable the implementation of the interventions

It defines WHO is involved in caring for and supporting patients, WHAT functions these actors perform, and HOW different ICT tools facilitate the delivery of these activities. Thanks to it, multimorbid patients with complex health and social care needs at high risk of hospital or nursing home admission can have a reasonably good quality of life and improved clinical outcomes. The integrated care pathway includes amongst others[26]:

- Stratification of patients in different levels of intervention for care intensification or specific actions
- Interdisciplinary working team: nurse care manager, GP, social worker and specialists
- Care manager role: in charge of case management, coordination with GP and providing support to patients in the hospital, Emergency Department and the discharge process
- Consultant specialist role: in charge of providing support at decision-making process to PC
- Programmed follow-up outpatients for advanced worsening detection
- Making care transition support a priority: coordination between PC and the hospital care, contacting the patient 24-48h after discharge
- Using virtual or face-to-face multidisciplinary case meetings to facilitate communication between care providers
- Strengthen the patient self-management techniques, especially through motivational interviews

In the current organizational model for multi-morbid elderly patients, PC professionals (GP and GP nurse) are principally responsible for a patient's case management, therapeutic/care plan definition, drug prescription, patient training, home visits and follow-up when the patient is stable. The nurse care manager, the GP, social worker and specialists work as a multidisciplinary working team sharing explicit decision-making criteria (scales used in the initial assessment and social needs detection or identification of patient empowerment reinforcement needs).

1.1.2.4.3   B3- Patient empowerment

Osakidetza has developed a series of online services and information resources to facilitate citizens' access to health services and improve their decision-making capacity and management of their illnesses.

B3- CF1- Deployment of a School of Health

[25] Mateo-Abad M, González N; Fullaondo A; Merino M; Azkargorta L; Giné A; Verdoy D; Vergara I; de Manuel Keenoy E Impact of the CareWell integrated care model for older patients with multimorbidity: a quasi-experimental controlled study in the Basque Country. BMC Health Serv Res 20, 613 (2020). https://doi.org/10.1186/s12913-020-05473-2

[26] Mateo-Abad M, et al. Impact Assessment of an Innovative Integrated Care Model for Older Complex Patients with Multimorbidity: The CareWell Project. International Journal of Integrated Care, 2020; 20(2): 8, 1–11. DOI: https://doi.org/10.5334/ijic.4711

In 2013, the Basque Department of Health and *Osakidetza* created a School of Health named *Osasun Eskola*. It is an educational web[27] that aims to reinforce self-care skills of citizens, patients and caregivers, by offering information and training to teach people to make responsible decisions that affect health-disease process. It offers programmes of health education (face-to-face and online) for healthy people and chronic patients and also training and awareness programmes for HCPs on topics related to patient activation. This initiative arose from the corporate work of various specialists involved, ranging from cancer, cardiovascular disease, digestive, endocrine, etc. to mental health or chronic multi-morbidity specialists.

Osasun Eskola is responsible for defining its portfolio of services, developing communication plans of the programmes included, determining budgets and providing resources to each programme and finally evaluating the fulfilment of the planned objectives.

Currently, the following programmes are offered in *Osasun Eskola*:

- Active Patient Programme ("*Paziente Bizia-Paciente Activo*"): an educational programme to acquire knowledge and skills
- *Kronik ON*: a programme to help frail elderly patients and their caregivers to become more active and more health-literate
- Stages of life
- Healthy eating
- Physical Activity
- Take care of your heart
- *i-botika*: information about medicines
- Sexual and Reproductive Health
- Alcohol, Health and Wellness
- Smoking Prevention
- Addictions
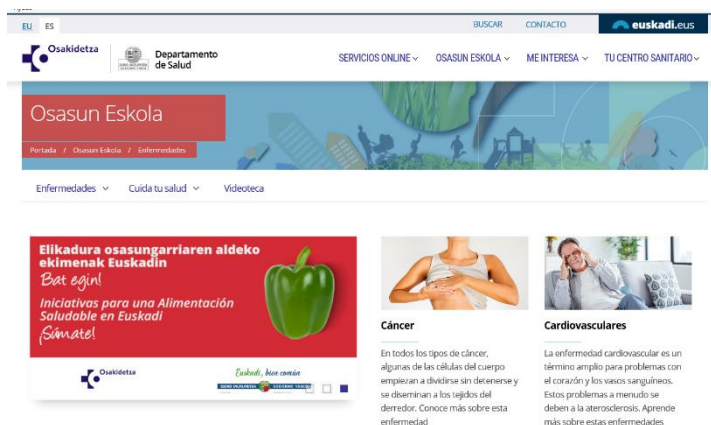
Figure 16: Main page of Osasun Eskola

B3- CF2- Empowerment programmes for chronic and/or multimorbid patients

Two main empowerment programmes for chronic and/or multimorbid patients have been deployed in the last years in the Basque Healthcare System: *Paziente Bizia-Paciente Activo* and *KronikON*.

On the one hand, the *Paziente Bizia-Paciente Activo* programme was launched in 2010. It is a self-care and self-management education program for chronic patients or people responsible for chronic patient care leaded by peers and based on the Chronic Disease Self-Management Program (CDSMP)[28] developed by the Division of Family and Community Medicine in the School of Medicine at Stanford University. CDSMP is a series of interactive sessions facilitated by two trained leaders, one or both of whom are non-health professionals with chronic disease. Furthermore, since 2014, the *Paziente Bizia-Paciente Activo* programme has developed its own methodology, which is better adapted to the needs of the Basque environment.

The target population of the interventions are not simple passive recipients of information or prescription, but active subjects of the educational relationship. Several studies on patient activation prove that a greater patient

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[27] Available at: http://www.osakidetza.euskadi.eus/osasuneskola/es/
[28] https://chronicdisease.org/mpage/domain4/selfmgmt/chronic_rt/

activation can predict greater adherence to health behaviours, improved health outcomes and lower care costs[29,30,31].

The methodology of the programme is based on Albert Bandura's self-efficacy theory[32], a social cognitive theory that states that the key predictive variables of successful behaviour change are confidence (self-efficacy) in the ability to perform an action, and the expectation that a particular goal will be achieved (outcome expectation).

The overall objective of the programme is to increase patient empowerment through training workshops of self-care and disease management, seeking to empower patients to better understand their disease, to take responsibility for their health and to participate in shared decision-making with HCPs. The workshops are held in group sessions of between 12 and 15 people on a weekly basis (2.5h-7/8 sessions). They are accompanied by educational material: a manual that talks about: self-care, health promotion and chronic illnesses, on a colloquial level; audios with relaxation exercises and also videos with physical exercise tables. In addition to basic knowledge about the disease, the workshops also work on healthy lifestyle habits: diet, exercise, rest, etc., emotional management, sexuality, symptom management, as well as skills that will help patients to better control their health, such as establishing action plans, problem solving, communication techniques, stress management techniques and shared decision making, all within the framework of peer support.

Currently various trainings are offered: Taking active care of my health (aimed at people living with any type of chronic disease and/or carers), Taking care of my diabetes (aimed at people living with type 2 diabetes and/or carers), Taking care of the health of the Romany population (aimed at the Romany community), and Taking care of my health after cancer (aimed at people who have undergone an oncological process, and/or carers).

More than 7,600 people have participated in the programme since it started in 2010. COVID-19 motivated the adoption of preventive measures in 2020 to guarantee the safety of patients and professionals, including limiting face-to-face activity and reinforcing online trainings.

The Framework Contract assesses the degree of deployment of the programme in each IHO by means of certain indicators. The recipients of the programme feel more control of their illness and are more responsible and more capable of doing something about it. Thus, the disease is no longer a 'curse', but they find that there are many ways to make it more bearable. Moreover, the patient begins to see him/herself as an active subject in the treatment of his own illness and is aware of the impact of his decisions on his/her health. Finally, the health-patient relationship is improved and a new model of care is promoted.

On the other hand, the _KronikON programme_[33] is a structured and standard corporate programme aimed at empowering individual complex chronic patients and/or caregivers. It was developed by a working group formed by nurses of both primary and hospitalized care.

The programme is structured in four sessions, one session per week, and a reminder session 2 months later. The duration of each session is estimated 20-30 minutes long, and is developed at the Primary Health Centre or at Patient´s home. The objectives of each session are:

- Assessment of the patient
- Identification and explanation of the pathologies

[29] Hibbard JH, Greene J, Shi Y, Mittler J, Scanlon D. Taking the long view: how well do patient activation scores predict outcomes four years later? Med Care Res Rev. 2015; 72(3):324-37.
[30] Hibbard JH, Greene J. What the evidence shows about patient activation: better health outcomes and care experiences; fewer data on costs. Health Aff (Millwood). 2013; 32(2): 207-214.
[31] Greene J, Hibbard JH, Sacks R, Overton V, Parrotta CD. When patient activation levels change, health outcomes and costs change, too. Health Aff (Millwood). 2015; 34(3): 431-437.
[32] Bandura A. Self-efficacy: toward a unifying theory of behavioral change. PsycholRev. 1977; 84(2):191-215.
[33] _KronikOn Programa. Paciente Crónico Complejo. Osakidetza, Departamento de Salud del País Vasco_. https://www.osakidetza.euskadi.eus/kronik-on-programa-paciente-cronico-complejo/ab84-oescon/es/

- Adherence to treatment
- Valuing empowerment
- Close purposes and objectives
- Self-monitoring of symptoms and alarm signs

Primary and secondary care nurses provide essential information to help patients in understanding their condition, to identify areas for improvement and to explore and agree upon the best methods of self-care. The PC nurses systematically follow-up the health status of their patients on a monthly basis by phone calls and use a validated questionnaire. All the supporting materials developed (videos, leaflets and presentations) are available online in the *Osasun Eskola* website[34].

Finally, regarding complex chronic patients it must be said that in addition to this programme, *Osakidetza* offers a battery of empowerment services such as *Osasun Eskola*, information through the PHF, corporative applications etc. Complex chronic patients are classified according to their health literacy using the VACS scale (for its name in Spanish: *Valoración de Competencia en Salud*) and then they are provided with the appropriate empowerment services. The empowerment level of these patients is assessed using the indicators of the Nursing Standard Taxonomy (NANDA, NIC and NOC). This taxonomy is included within the *Osanaia*, the tool created for the management of nursing care which is embedded the EHR. The specific indicators for assessing empowerment are:

- Does the patient know the disease signs or symptoms?
- Does the patient avoid the behaviour that can promote disease progression?
- Does the patient follow the recommended treatment?
- Does the patient know who to call in case of needs?

By scoring each of these indicators systematically over time, nurses can evaluate the progress in the empowerment of the patients and try to suggest specific actions if there is room for improvement.

1.1.3 Key dimensions for success and sustainability

In order to move towards the new model of health provision in the Basque Country the following have been key factors:

- Development of Population Intervention Plans (PIPs)
- Effective use of new nursing skills
- Empowering the role of the contractor and funder
- Technological infrastructure: *Osabide*, *Presbide* and *Osarean*
- Evaluation according to integration achievements and associated incentives
- Connection and involvement of public health in prevention and promotion interventions
- Stratification with a population focus and consequent tailored interventions
- Increasing participation of clinicians
- Patient Empowerment Processes
- Governance and local leadership
- Support from the macro level (Standard/Creating conditions for change)

Among these key factors for change, local leadership has been fundamental and will be even more so in the coming years. There are already numerous examples of such leadership in the Basque Country that are progressively promoting clinical participation, which turns to be another key factor for transformation.

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34 http://www.osakidetza.euskadi.eus/r85-chpapp00/es/

Furthermore, the Basque Country also accounts on the tools that allow to move forward; stratification, active patients, technologies for non-face-to-face care and new nursing competencies, among others.

In this regard, an assessment was made, based on a qualitative approach, about the perception of the key actors of the Basque Healthcare System about promotion and inhibitor factors for integrated care at system level[35]. The most valued facilitators were: resources available in the community, availability of assets, information clinical systems and patient empowerment. The less mature domains for integrated care were: professional assessment, structure of incentives, decision-making roles, and virtual integration and transaction costs. As a conclusion, it was stated that there was a large space for improvement.

On another range of issues, one of the most important success factors of the Basque Healthcare System is that all the tools deployed are totally aligned with the global health strategy of the Basque Country to address the challenge of chronicity, ageing and dependency and approach the coordination between health and social fields.
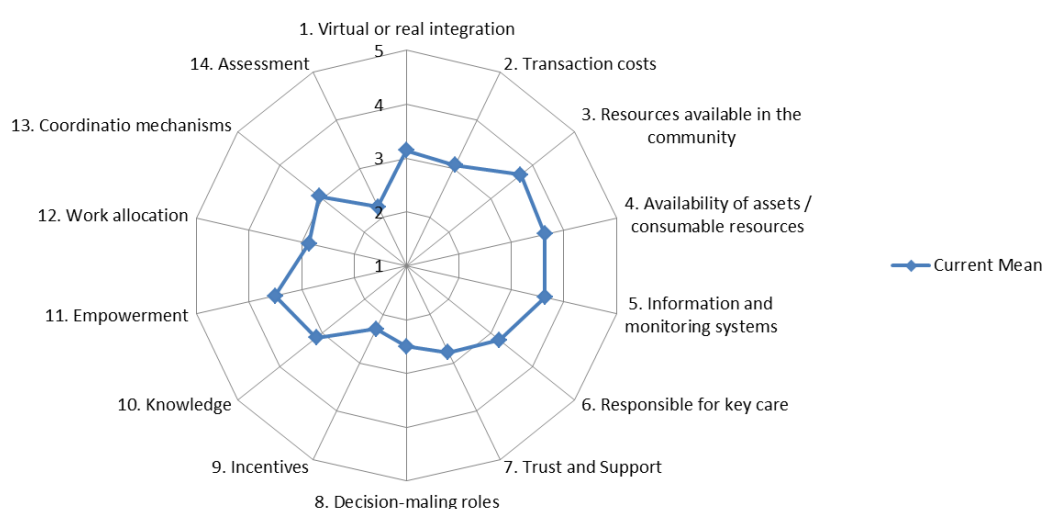
Figure 17: Assessment of Integrated and Coordinated care in Basque Country

The greatest potential of the tools described above is that they have introduced an innovation in the current model of social and health care coordination, since they encourage the interoperability between both fields. Inter-RAI tool for example allows assessing the need for long-term home support services in the community module and streamlining referral and discharging processes from hospital levels in the emergency module. Furthermore, *BetiON* telecare services integrates all the information and measure patients' clinical parameters at home facilitating patients follow-up both from the social or health side.

The Basque Social-Health strategy aims to facilitate the work and coordination of the socio-health professionals as they can have a common diagnosis of the person, can access the case, can consult their assessments and finally can define a joint care plan. On the other hand, an approach to interoperable systems is achieved in practice what turns to be a prelude of the shared electronic socio-health record.

Some of the key factors to ensure the sustainability of the adoption and deployment of solutions for health and social care coordination in the Basque Country have been:

• To contract of a flat rate of unlimited licenses of the tools available with the software provider.
• To identify and nominate a professional as the reference in the use of the tools in each organization.
• Support of the scale-up of the tool in the Basque Country by the social and health coordination team

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[35] de Blas A, Zabala I, Landaluze G et al. D4.2 New Organisational Models for Improved Delivery of Integrated Care https://c3-cloud.eu/wp-content/uploads/2019/06/D4.2_v1.pdf

- To establish direct and regular contact (face-to-face meetings) between coordination team and reference professionals.
- The introduction as an indicator the use of this tools and coordination between health and social professionals in the Ministry of Health of Basque Governments' assessment tool, Framework Contract.
- The continuous improvement of the tools taking into account professionals´ and patients perspective: functionally, conceptually and contextually, by adapting the tools to the socio health reality of the Basque Country.

The barriers and difficulties that the Basque Government experienced in the coordination of the social and healthcare are:

- The difficulty in identifying and communicating all tools available at all levels (macro, meso and micro level).
- The initial poor involvement and collaboration of key agents.
- Cultural barrier for using new tools and accepting new working processes
- The low levels of legitimacy and confidence in some instruments. Currently, there is still reluctance of some practitioners to its full use.
- The uncertainty associated with the learning curve
- Lack of short/mid -term results in the meso/micro levels.
- The complexity to articulate and communicate a shared vision of social and health field.
- The difficulty of integrating (interoperability) of some tools, such as Inter-RAI with the EHR, *Osabide* and the Socio Health Record.

In addition, the mitigation factors designed for overcoming the experienced problems are:

- Establish a social and health network of professionals at the micro and meso level to tackle new challenges of ageing population.
- Set up a strategy to make interactive tools easy to use for professionals (make revisions, changes and updates).
- Know-how generated. The experience and learnings obtained in the implementation of the tools which will have an enormous value in the development of the future Socio Health Record.
- Greater knowledge of social and health coordination at the micro level. A great example can be seen on how different professionals involved deal with the people that have social and health needs.

On another range of issues, the cases which activate a sole intervention (e.g. remote medical monitoring from home, or training patients for self-management) may not achieve the desired efficiency impact. To obtain efficiency improvements, it is necessary to systematically intervene, working several levers of change, using the models outlined above in an integrated and coordinated way[36]. Achieving a scale requires a necessity and a policy-level intervention that from the outset provides the health sector with a clear policy that sets the agenda for more proactive and collaborative care. The aim in this case was explicitly raising chronicity to the policy level[37]. Furthermore, the process of transformation of the Basque Healthcare System was set in a context of a very deep economic crisis of the country. Simultaneous to the multidimensional reform, it was necessary to manage the implications of this crisis on healthcare. That day-to-day crisis management was focused on taking some major cost-containment decisions, especially regarding human resource salaries and the pharmaceutical budget. In Europe and elsewhere most of the policy decisions in healthcare relate the decision to ration or to

[36] Chronic Disease Management: Evidence of Predictable Savings; J. Meyer and B. Markham. 2008
[37] Department of Health. A strategy to tackle the challenge of chronicity in the Basque Country. 2009. http://cronicidad.blog.euskadi.net/descar-gas/plan/ChronicityBasqueCountry.pdf

transform. Rather it is about finding the right balance of both and not letting the first dominate the policy agenda[38].

In this framework, there was a high need to evaluate the effect of the integrated organizational model. The CareWell project answered to this need providing the evaluation of the impact of a new integrated care programme for older patients with multimorbidity. There were a significantly lower number of admissions to hospital, and less total days per year in hospital. When looking for patients with more than one admission, they spent in average three days less per year. Patients had fewer visits to the emergency room and almost one less contact with the specialist. The number of visits to GPs however was higher. Patients felt more secure and empowered in the management of their health and more satisfied[39]. Finally, the budget impact of the previous integrated care model showed no change in the resource consumption[40].

1.2 Maturity Requirements for the Basque original Good Practice implementation

The self-assessment process about the readiness for integrated care of the Basque Country and its "Health strategy in ageing and chronicity: integrated care" was accomplished by means of the Scirocco Tool[41]. (For full detail, please see Milestone 14. Report on general principles of successful implementation of original good practices.) The use of the Scirocco model has been the reference for Next Adopters to analyse the feasibility of adopting the selected original Good Practices' (oGPs) core features in their local settings.

The professionals involved in the process (definition of maturity rankings and requirements) were the following key stakeholders of the Basque Healthcare System:

Proffesional	Profile	Organization
Igor Zabala	Head of the Integration and Chronicity service of the Healthcare Directorate (Context)	*Osakidetza*
Dabi Santano	Quality and Information Systems sub-directorate's professional (B2: Integrated Care)	*Osakidetza*
Mikel Ogueta	Quality and Information Systems sub-directorate's professional (B2: Integrated Care)	*Osakidetza*
Eduardo Millán	Health care sub-directorate's professional (B1: Risk stratification)	*Osakidetza*
Puy López	Health care sub-directorate's professional (B3: Patient Empowerment)	*Osakidetza*
Ana Porta	Integration and chronicity service's professional (B3: Patient Empowerment)	*Osakidetza*
Rosa González	Integration and chronicity service's professional (B2: Integrated Care)	*Osakidetza*
Esteban de Manuel	Director (Context)	*Kronikgune*
Jon Txarramendieta	Project manager (Coordinator of the assessment)	*Kronikgune*

Initially, the professionals assessed the current situation of deployment of integrated care in the Basque Country by rating the 12 dimensions on a scale from 1 to 5 where answer 5 represents the most advanced maturity level

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[38] Bengoa, R. Transforming health care: an approach to system-wide implementation. Int J Integr Care 2013; Jul–Sep, URN:NBN:NL:UI:10-1-114747

[39] Mateo-Abad M, González N; Fullaondo A; Merino M; Azkargorta L; Giné A; Verdoy D; Vergara I; de Manuel Keenoy E Impact of the CareWell integrated care model for older patients with multimorbidity: a quasi-experimental controlled study in the Basque Country. BMC Health Serv Res 20, 613 (2020). https://doi.org/10.1186/s12913-020-05473-2

[40] Soto-Gordoa M, Arrospide A, Merino M, et al. Incorporating Budget Impact Analysis in the Implementation of Complex Interventions: A Case of an Integrated Intervention for Multimorbid Patients within the Carewell Study. Value Health 2017. 20:100-106.

41 The SCIROCCO self-assessment tool is an online instrument with the objective 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 develop a radar diagram which reveals areas 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.

in each section. Once all the stakeholders shared their individual assessment with the coordinator of the assessment, they got into consensus in the scores and maturity requirements on an online meeting. As a result, a radar diagram was built that reveals areas of strength, and gaps in capability regarding integrated care, as shown in the figure below.

Figure 18: Maturity Model for Digitally enabled Integrated Care – consensus stage

In parallel, they defined 33 maturity requirements for the 12 dimensions.

Dimension	Score	Maturity requirements
D1: Readiness to Change	3: Vision or plan embedded in policy; leaders and champions emerging.	• Leadership in organizational change at both political and management level at the healthcare field. Desirable at the social field too • Plans and strategies that support and formalize the need for change/changes • Construction of discourse, dialogue and communication seeking the alignment of all the stakeholders involved in the change
D2: Structure & Governance	2: Formation of task forces, alliances and other informal ways of collaborating.	• Formation of working groups, alliances and other informal collaboration, supported by governance bodies • Existence of agreements between funders and providers and between different levels of care to align objectives, activities and funding
D3: Digital infrastructure	2: Digital infrastructure to support integrated care are piloted but there is not yet region wide coverage. A set of agreed technical standards	• Plans to have a digital infrastructure and digital developments that allow the collection, management, extraction and analysis of information • Plans to have a digital infrastructure and digital developments to ensure data security

	exists to enable shared procurement of new systems; some large-scale consolidations of ICT are underway.	• Plans to have a digital infrastructure and digital developments that allow for two-way patient-system communication
D4: Process Coordination	2: Consolidated innovation funding available through competitions/grants for individual care providers and small-scale implementation.	• Guidelines and plans for the development of coordinated care processes • Some coordinated processes for data analysis and management, including agreements on indicators, need to be in place already • Some care coordinated processes already in place • Some citizen empowerment coordinated processes already underway
D5: Funding	2: Some standardised coordinated care processes are underway; guidelines are used, some initiatives and pathways are formally described, but no systematic approach is planned.	• Financing plan in accordance with the proposed integration objectives • Ensure that initial and ongoing costs can/will be financed • Funding allocated to implement the innovations, even on a small scale
D6: Removal of inhibitors	2: Strategy for removing inhibitors agreed at a high level.	• Identify and analyze the main barriers to integrated care, and plan possible solutions to these barriers • Actions to continuously identify new barriers, minimize their impact and address issues
D7: Population Approach	2: Risk stratification approach is used in certain projects on an experimental basis.	• A population-based risk approach is applied to integrated care services, but not systematically or to the entire population • To have databases with demographic, clinical and resource use information
D8: Citizen Empowerment	2: Citizen empowerment is recognised as an important part of integrated care provision, effective policies to support citizen empowerment are in place but citizens do not have access to health information and health data.	• The importance of empowering citizens as part of integrated care is recognized • Effective policies to support empowerment in place • Patients have access to their health data • The system must be able to involve citizens to participate in empowerment activities • Existence of tools and digital infrastructure that support the development of face-to-face and online empowerment programmes
D9: Evaluation Methods	2: Evaluation of integrated care services exists, but not as a part of a systematic approach.	• Evaluation procedures of integrated care services on a continuous basis, with a defined periodicity, in place.
D10: Breadth of Ambition	3: Integration between care levels (e.g., between primary and secondary care) is achieved.	• Ambition of integration within the same care level (primary care, hospital care) • Ambition to integrate the different levels of care (primary care and hospital care) • Coordination between the health and social sectors is desirable
D11: Innovation Management	2: Innovations are captured and there are some mechanisms in place to.	• Capacity to capture innovations from professionals and the citizenship in a standardized way, to advance integration and transfer, and generate knowledge • Willingness to continuously adapt the innovations developed in risk stratification, integrated care and patient empowerment, to new needs

D12: Capacity Building	1: Some approaches to capacity building for integrated care services are in place.	• Promote the development of professionals' skills in the areas of integrated care, stratification and empowerment, in terms of technology use, continuous improvement tools and processes and platforms • To have the possibility of developing a training plan at a macro level (policy) and meso level (management) • To develop continuous digital improvements according to the capacities of the citizens

Table 3: Consensus stage of the Basque Health Strategy

1.3 Maturity Requirements of the Core Features of the Basque original Good Practice

The next part presents the feedback collected in form of tables to analyze the maturity requirements of each Core Feature of the Basque good practice. A cross indicates that CFs meet the previously defined maturity requirements and should be considered during implementation.

Dim.	Maturity requirement	B1- Risk Stratification			B2- Integrated Care			B3- Patient Empowerment	
		CF1- Stratification Data extraction process and construction of dashboard	CF2- Classification of patients	CF3- Stratification in the Framework Contract	CF1- Creation of Integrated Healthcare Organizations	CF2- Deployment of integrated communication and information systems	CF3- Care coordination and communication between health providers	CF1- Deployment of a School of Health	CF2- Empowerment programmes for chronic and/or multimorbid patients
D1 Readiness to Change	Leadership in organizational change at both political and management level at the healthcare field. Desirable at the social field too	X	X	X	X	X	X	X	X
	Plans and strategies that support and formalize the need for change/changes	X	X	X	X	X	X	X	X
	Construction of discourse, dialogue and communication seeking the alignment of all the stakeholders involved in the change	X	X	X	X	X	X	X	X
D2 Structure and	Formation of working groups, alliances and other informal collaboration, supported by governance bodies	X	X	X	X	X	X	X	X

Dim.	Maturity requirement	B1- Risk Stratification			B2- Integrated Care			B3- Patient Empowerment	
		CF1- Stratification Data extraction process and construction of dashboard	CF2- Classification of patients	CF3- Stratification in the Framework Contract	CF1- Creation of Integrated Healthcare Organizations	CF2- Deployment of integrated communication and information systems	CF3- Care coordination and communication between health providers	CF1- Deployment of a School of Health	CF2- Empowerment programmes for chronic and/or multimorbid patients
	Existence of agreements between funders and providers and between different levels of care to align objectives, activities and funding			X	X	X	X	X	X
D3 Digital Infrastructure	Plans to have a digital infrastructure and digital developments that allow the collection, management, extraction and analysis of information	X	X	X	X	X	X	X	X
	Plans to have a digital infrastructure and digital developments to ensure data security	X	X	X	X	X	X		X
	Plans to have a digital infrastructure and digital developments that allow for two-way patient-system communication				X	X	X	X	X
D4 Process Coordinati	Guidelines and plans for the development of coordinated care processes				X		X		X

Dim.	Maturity requirement	B1- Risk Stratification			B2- Integrated Care			B3- Patient Empowerment	
		CF1- Stratification Data extraction process and construction of dashboard	CF2- Classification of patients	CF3- Stratification in the Framework Contract	CF1- Creation of Integrated Healthcare Organizations	CF2- Deployment of integrated communication and information systems	CF3- Care coordination and communication between health providers	CF1- Deployment of a School of Health	CF2- Empowerment programmes for chronic and/or multimorbid patients
	Some coordinated processes for data analysis and management, including agreements on indicators, need to be in place already	X	X	X	X	X	X	X	X
	Some care coordinated processes already in place		X		X	X	X	X	X
	Some citizen empowerment coordinated processes already underway				X	X	X	X	X
D5 Funding	Financing plan in accordance with the proposed integration objectives	X	X	X	X	X	X	X	X
	Ensure that initial and ongoing costs can/will be financed	X	X	X	X	X	X	X	X
	Funding allocated to implement the innovations, even on a small scale	X	X	X	X	X	X	X	X

Dim.	Maturity requirement	B1- Risk Stratification			B2- Integrated Care			B3- Patient Empowerment	
		CF1- Stratification Data extraction process and construction of dashboard	CF2- Classification of patients	CF3- Stratification in the Framework Contract	CF1- Creation of Integrated Healthcare Organizations	CF2- Deployment of integrated communication and information systems	CF3- Care coordination and communication between health providers	CF1- Deployment of a School of Health	CF2- Empowerment programmes for chronic and/or multimorbid patients
D6 Removal of Inhibitors	Identify and analyze the main barriers to integrated care, and plan possible solutions to these barriers	X	X	X	X	X	X	X	X
	Actions to continuously identify new barriers, minimise their impact and address issues	X	X	X	X	X	X	X	X
D7 population approach	A population-based risk approach is applied to integrated care services, but not systematically or to the entire population	X	X	X	X	X	X		X
	To have databases with demographic, clinical and resource use information	X	X	X	X	X	X	X	X
D8 Citizen empowerment	The importance of empowering citizens as part of integrated care is recognized				X	X	X	X	X
	Effective policies to support empowerment in place				X	X	X	X	X
	Patients have access to their health data					X			X

Dim.	Maturity requirement	B1- Risk Stratification			B2- Integrated Care			B3- Patient Empowerment	
		CF1- Stratification Data extraction process and construction of dashboard	CF2- Classification of patients	CF3- Stratification in the Framework Contract	CF1- Creation of Integrated Healthcare Organizations	CF2- Deployment of integrated communication and information systems	CF3- Care coordination and communication between health providers	CF1- Deployment of a School of Health	CF2- Empowerment programmes for chronic and/or multimorbid patients
	The system must be able to involve citizens to participate in empowerment activities					X	X	X	X
	Existence of tools and digital infrastructure that support the development of face-to-face and online empowerment programmes					X	X	X	X
D9 Evaluation methods	Evaluation procedures of integrated care services on a continuous basis, with a defined periodicity, in place	X	X	X	X	X	X	X	X
D10 Breadth of ambition	Ambition of integration within the same care level (primary care, hospital care)			X	X	X	X		
	Ambition to integrate the different levels of care (primary care and hospital care)			X	X	X	X		
	Coordination between the health and social sectors is desirable			X	X	X	X	X	X

Dim.	Maturity requirement	B1- Risk Stratification			B2- Integrated Care			B3- Patient Empowerment	
		CF1- Stratification Data extraction process and construction of dashboard	CF2- Classification of patients	CF3- Stratification in the Framework Contract	CF1- Creation of Integrated Healthcare Organizations	CF2- Deployment of integrated communication and information systems	CF3- Care coordination and communication between health providers	CF1- Deployment of a School of Health	CF2- Empowerment programmes for chronic and/or multimorbid patients
D11 Innovation management	Capacity to capture innovations from professionals and the citizenship in a standardized way, to advance integration and transfer, and generate knowledge	X	X			X	X	X	X
	Willingness to continuously adapt the innovations developed in risk stratification, integrated care and patient empowerment, to new needs	X	X	X	X	X	X	X	X
D12 Capacity building	Promote the development of professionals' skills in the areas of integrated care, stratification and empowerment, in terms of technology use, continuous improvement tools and processes and platforms		X		X	X	X	X	X
	To have the possibility of developing a training		X		X	X	X	X	X

Dim.	Maturity requirement	B1- Risk Stratification			B2- Integrated Care			B3- Patient Empowerment	
		CF1- Stratification Data extraction process and construction of dashboard	CF2- Classification of patients	CF3- Stratification in the Framework Contract	CF1- Creation of Integrated Healthcare Organizations	CF2- Deployment of integrated communication and information systems	CF3- Care coordination and communication between health providers	CF1- Deployment of a School of Health	CF2- Empowerment programmes for chronic and/or multimorbid patients
	plan at a macro level (policy) and meso level (management)								
	To develop continuous digital improvements according to the capacities of the citizens					X		X	X

Table 4: Maturity requirements of the Core Features of the Basque Country

2 Transfer and adoption process and results

The Basque Good Practice has been transferred to eight Next Adopters (NAs) of seven European regions. Five of them transfer core features only of the Basque Country, while three of them adopted a mix and match approach, meaning that they transfer features of other good practices of JADECARE.
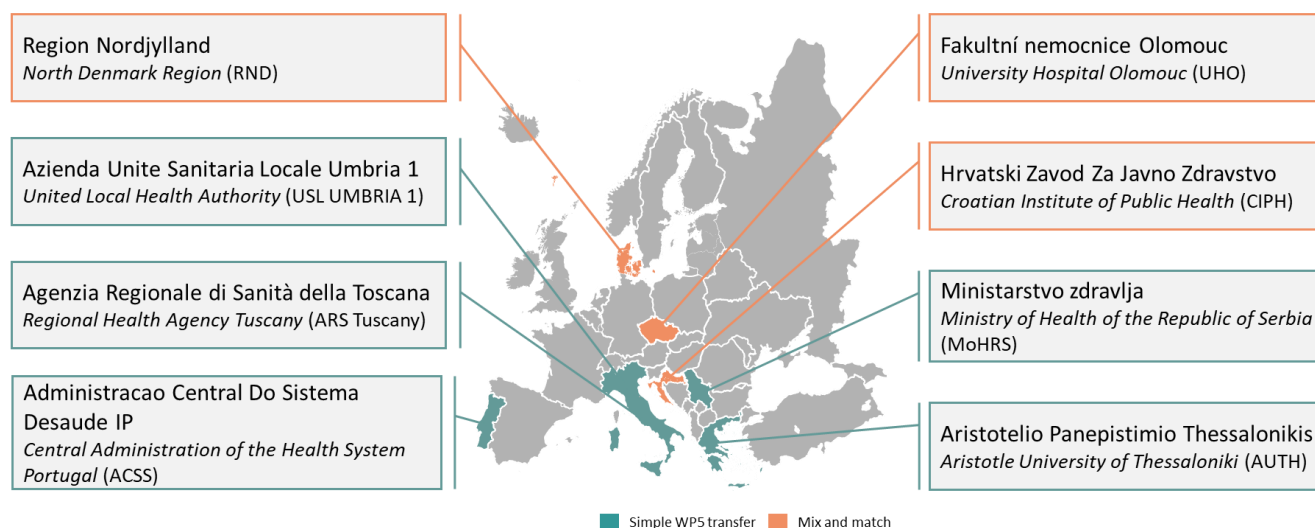

Region Nordjylland
North Denmark Region (RND)

Azienda Unite Sanitaria Locale Umbria 1
United Local Health Authority (USL UMBRIA 1)

Agenzia Regionale di Sanità della Toscana
Regional Health Agency Tuscany (ARS Tuscany)

Administracao Central Do Sistema Desaude IP
Central Administration of the Health System Portugal (ACSS)

Fakultní nemocnice Olomouc
University Hospital Olomouc (UHO)

Hrvatski Zavod Za Javno Zdravstvo
Croatian Institute of Public Health (CIPH)

Ministarstvo zdravlja
Ministry of Health of the Republic of Serbia (MoHRS)

Aristotelio Panepistimio Thessalonikis
Aristotle University of Thessaloniki (AUTH)

Simple WP5 transfer   Mix and match

Figure 19: Map of the Next Adopters of the Basque Good practice

North Denmark Region (RND)

The region of North Denmark is the smallest region of Denmark with an extension of 7,883 km^2 and a population of approximately 600.000 inhabitants and it is divided into 11 municipalities. Some data on their clinical activity: 1.750 hospital beds, including psychiatry, 120.000 surgeries per year, 120.000 admissions and discharges per year and 850.000 outpatient visits including A&E per year. Moreover, the annual budget for hospitals, including support services, is 8bn DKK. The main responsibilities of the region are: (i) providing healthcare and psychiatry, (ii) creating a framework for the optimal regional development and (iii) running and developing highly specialised institutions for, among other, disabled children and adults.

The Steno Diabetes Centre North Denmark (SDCN) is part of RND. It is one seven centres in Denmark and it has a broad focus on diabetes. It operates from December 2017, granted with 100M€ by the Novo Nordisk Foundation. It aims at improving the longevity and quality of life of everyone with diabetes and create coherent treatment near people's homes and halt the growth of people developing diabetes. The Hallmark of the SDCN is "Digital Health" and the centre has recruited highly skill employees in the field, who have worked many years with digital transformation.

United Local Health Authority (USL Umbria 1)

Azienda USL Umbria 1 is a public Local Health Authority assisting the largest and most populous area of the Umbria region (about 900.000 inhabitants), delivering the three levels of assistance in Italy:

• Collective Prevention and Public health
• District assistance
• Hospital assistance.

The territorial scope of the Company includes 38 municipalities and 501,186 inhabitants assisted by 6 social-health Districts, 6 hospitals and many residential structures (nursing home, hospice, rehabilitation) spread

throughout the area or located within hospitals. Into this area insists *Azienda Ospedaliera di Perugia*, the biggest high speciality hospital of Umbria which plays the role of "hub" integrated with other hospital "spoke".

Regional Health Agency Tuscany (ARS Tuscany)

The Italian National Health System (NHS) is a public service funded by taxes and highly decentralized, where each region is responsible for the organization and delivery of health services. Tuscany Region is divided in 3 Local Health Authorities, namely the North-West, the South East and the Central which in turn are organized into different districts, 10 for both the North West and the South East and 8 for the Central. These discrits provide primary and hospital care and social care in collaboration with the municipalities. For JADECARE project, ARS Tuscany has opted to work and im-plement the project with professionals belonging to *Piana di Lucca* District, a district within the North-West that counts approximately 170.000 inhabitants.

Central Administration of the Health System Portugal (ACSS)

The population of Portugal is about 10 million people. The health budget in 2021 was 12,5M€, which translates into 1,250€ per capita. They have a universal health coverage system financed by income taxes (Beveridge Model). They are organized in Primary Care facilities, composed by 55 health centre groups in 5 different regions and 581 family health units; and Hospital Care facilities, that gather 21 hospital centres, 9 hospitals and 3 public-private partnerships, that in total account for 17.647 acute beds. In addition, there are 8 Local Health Units with 2.313 beds that integrate Primary Care and Hospital Care in the same organisation.

Trying to obtain a successful participation in JADECARE, they firstly aimed at a national approach, but finally decided to conduct a pilot project with 1M population involving 5 providers in 3 different regions.

University Hospital Olomouc (UHO)

Olomouc region is located in the central part of Moravia and extends into its northern part (north-east territory of the Czech Republic). The total area of the region 5,267 km2 makes up 6.7% of the total area of the Czech Republic. With a population of 631,660 (as of 30 September 2020), the Olomouc Region is the sixth most populous among the 14 regions in the Czech Republic, i.e. 6.1% of the total population of the Czech Republic. The Olomouc Region consists of 5 districts – *Jeseník, Olomouc, Prostějov, Přerov and Šumperk*. From the territorial-administrative point of view, together with the Zlín Region, it forms the NUTS II Cohesion Region - Central Moravia.

Olomouc University Hospital is the biggest healthcare institution in the Olomouc Region. A part of the hospital is the Czech National eHealth Centre that systematically and long term develops observations, knowledge and experience in digital innovations in healthcare. It has unique technologies and is a Competence centre in the area of eHealth (esp. telemedicine) of the Ministry of Health in the Czech Republic and a Reference Site of the European Innovation Partnership on Active and Healthy Aging.

Croatian Institute of Public Health (CIPH)

Croatian health system is legally regulated by the Health Care Act from 2018. The Ministry of Health is the main institution in charge of designing different health related policies and programmes, healthcare planning and regulation. Facilities involved in healthcare activities are either state, country or private. All the public facilities receive funds by means of contracts with the Croatian Health Insurance Fund and local authorities are responsible for financing infrastructures, maintenance and capital investments. Health services financed by state budget are organized to cover everything from health promotion to end-of-life care accessible to all population.

Primary care consists of health care centres, public health services and public pharmacies. Patients are referred to secondary level (specialist consultative and hospital health centres) and tertiary level (the most complex forms of the latter) of healthcare services by their general practitioners.

Ministry of Health of the Republic of Serbia (MoHRS)

The estimated population for the Republic of Serbia in 2019 is 6,945,235, which is a decrease of 552,766 - 7.4% compared to the population of the 2002 census year (7,498,001). The growing share of the elderly population will increase the pressure on the pension fund, health fund and social care. The rate of population decline is uneven across regions, with rural areas losing more than urban areas, and several border areas particularly affected by population decline.

Healthcare of the population in the Republic of Serbia is directly implemented through the healthcare institutions network at three levels: Primary healthcare (health centre, pharmacy and institutes where secondary level is also performed if there is no general hospital in their headquarters), Secondary healthcare (general and special hospitals) and Tertiary healthcare (clinical-hospital centre, clinic, institute and clinical centre).

Healthcare institutions from the Healthcare Institutions Network Plan are mainly financed from the funds of the National Health Insurance Fund (NHIF). At the same time, the Ministry of Health is in charge of capital investments. The provision of health services is provided through the funds of the NHIF. In terms of healthcare services in the private sector, they are mostly paid for by patients out of their own pockets and are also reimbursed to a small extent. The non-integration of private and public healthcare providers within the existing system affects out-of-pocket payments and duplication of services between the public and private sectors. Financing of healthcare "out- of-pocket" is concentrated in the population with middle or higher incomes in Serbia and expenditures for medicines make up the largest part of it.

In Serbia, all primary, secondary and tertiary healthcare institutions have and use their own information systems. However, the exchange of digital information between healthcare providers has not yet been fully implemented or fully regulated. In addition to that, Serbian citizens do not have access or have minimal access to parts of their personal health data in digital form. The clinical data exchanged are not fully standardized, which prevents the use of information technology in the unified processing of information and its use as a source for analysis and reporting. The integrated information system includes e-referral, electronic scheduling, electronic doctor's reports, e-prescription and review of prescribed medicines, access to reports and diagnostic images.

Aristotle University of Thessaloniki (AUTH)

The National Health System (ESY for tis name in Greek) consists of 130 general and specialized hospitals with 40.000 beds that provide emergency, outpatients and in-patients care. There are also approximately 13 military hospitals and 9 university hospitals with a total capacity of 4.000 beds. The Primary Healthcare system includes health centres, the Secondary Healthcare system includes the general hospitals and the Tertiary one includes University Hospitals.

In regard to the area of Thessaloniki, the target population is 2.000 people. The 4th Regional Health Authority leads the participation in JADECARE with the collaboration of the Hippokration General Hospital and the Ahepa General University Hospital.

The eight Next Adopters of the Basque Good Practice have built their following Local Good Practices:
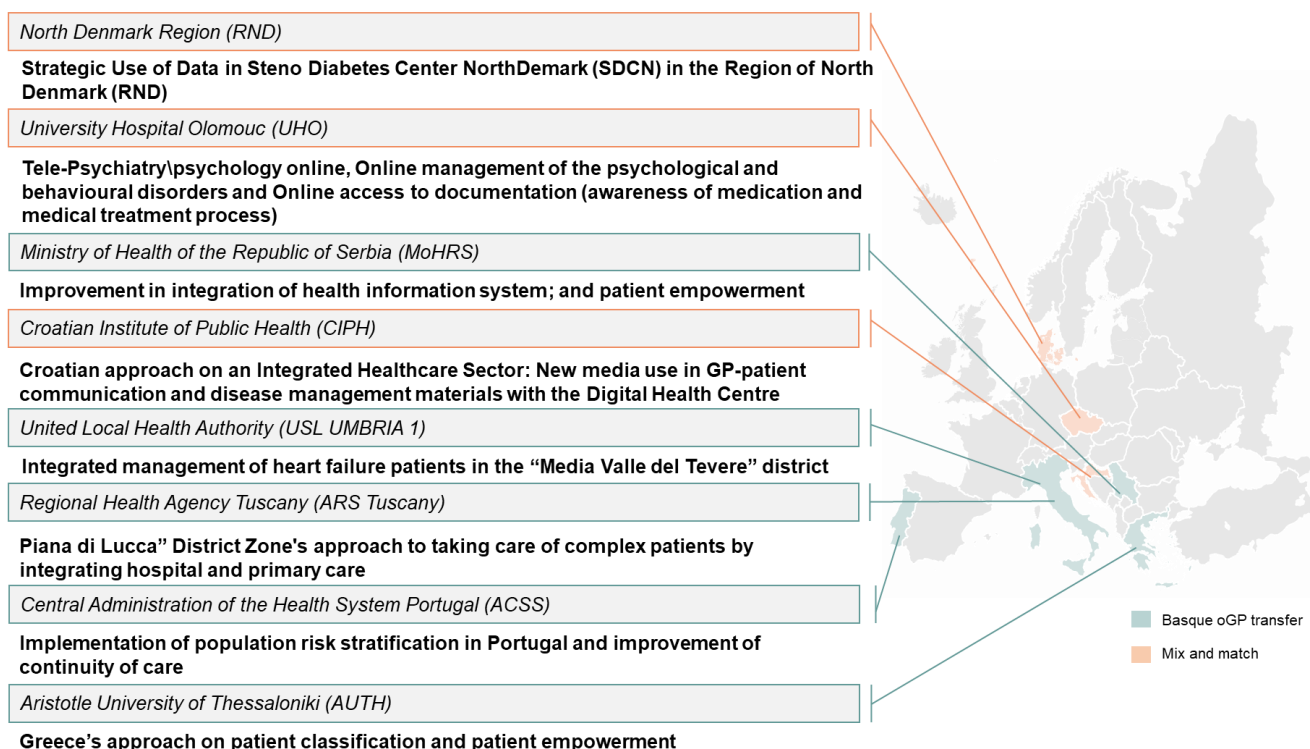
North Denmark Region (RND)	
Strategic Use of Data in Steno Diabetes Center NorthDemark (SDCN) in the Region of North Denmark (RND)	
University Hospital Olomouc (UHO)	
Tele-Psychiatry\psychology online, Online management of the psychological and behavioural disorders and Online access to documentation (awareness of medication and medical treatment process)	
Ministry of Health of the Republic of Serbia (MoHRS)	
Improvement in integration of health information system; and patient empowerment	
Croatian Institute of Public Health (CIPH)	
Croatian approach on an Integrated Healthcare Sector: New media use in GP-patient communication and disease management materials with the Digital Health Centre	
United Local Health Authority (USL UMBRIA 1)	
Integrated management of heart failure patients in the "Media Valle del Tevere" district	
Regional Health Agency Tuscany (ARS Tuscany)	
Piana di Lucca" District Zone's approach to taking care of complex patients by integrating hospital and primary care	
Central Administration of the Health System Portugal (ACSS)	
Implementation of population risk stratification in Portugal and improvement of continuity of care	
Aristotle University of Thessaloniki (AUTH)	
Greece's approach on patient classification and patient empowerment	

Basque oGP transfer
Mix and match

Figure 20: Local Good Practices of the Next Adopters transferring the Basque Good Practice

2.1 North Denmark Region (RND)

2.1.1 The context and trigger

In Denmark they are strong in data and there is a very large potential in cross-sector collaboration around data. Conversely, General Data Protection Regulation (GDPR) and new data systems present a number of challenges. Precisely for this reason, RND would like to be part of the JADECARE collaboration, to learn from oGPs about how they have met these challenges.

In the earlier phases of the project, it was clear that the Basque and German Good practices had a different approach to data than SDCN. They focused more on the entire population, risk stratification and cross-sectoral strategic collaboration. Through JADECARE, SDCN investigated the possibility of integrating parts of data work from the Basque and German Good practices into RND database.

SDCN already had a programme for data analysis (Qlik sense) and a large number of hospital data sources. These are clinical values from "*Labka*", activities from "Bookplan", discharges from "PAS" and medicinal information from the "medicinal module". During the project, these data sources were transferred to "NordEPJ".

The aim of the work in JADECARE was therefore not about the purchase of software, but instead dialogue about further development and new perspectives on the existing database.

The actual rationale behind the project was that SDCN is part of Danish healthcare law and therefore cannot create the same financial incentives and calculations as Germany. But SCDN can be inspired by their strategies and programme descripted in the original good practices. Although SDCN does not directly lose funds due to patient absences or geographical health problems, SDCN nevertheless had an interest in optimizing these areas.

As particular strengths of RND, there are that they have a large data pool and almost real-time data on patients. Moreover, they have ambition to use data and the staff has a generally high level of competence in relation to data and IT.

As their weaknesses appear the difficulty to get things done even though data supports new initiatives, to share data across sectors and also the lack of quality in registration.

The main opportunities for them are the data-driven competence development leading to adaptive services for patients, the cross-sectoral exchange of data and knowledge with other health actors and patient empowerment.

And finally, the threats for the intervention were the existence of inappropriate breaches of data definitions and data flows associated with new EHR and other new systems, the difficulty to change the habits within the health field and GDPR issues.

2.1.2   The Local Good Practice

Strategic Used of Data in Steno Diabetes Centre North Demark (SDCN) in the Region of North Denmark (RND)

The intervention aimed on building a new dashboard, using risk stratification on patient absences and having a strategical discussion about how to obtain useful insights from it.

To achieve this a large working team working team (Next Adopter Working Group, NAWG, as it is named) was involved. It consisted of 12 participants with a mixed health professional background. This includes a "Core" NAWG of six experts that has participated more actively in some implementation activities such as theme days and thematic workshops.

- Head of Digitalization: Tina Heide
- Strategical innovation consultant: Bente Koch
- Data manager: Søren From Knudsen / vacant (Substitute Ulrik Appel)
- Quality manager: Amar Nikontovic
- Project manager: Ulrik Appel
- Ceo SDCN: Poul Erik Jakobsen

Building a new dashboard included examining the programmes used by the German Good Practice and conducting online consultations with experts on the existing database in RND. They also planned to examine data sources in both Good Practices and analyse relevant file and contractual documentation in the field. Moreover, they planned to examine an analyse relevant information of selected activities and diabetes projects of both Good Practices on the basis of data, identify the location and conditions for Danish data sources by means of a fit gap analysis that would determine how well RND current data access fit the model of the Good Practices. In other words, to help RND identify the areas where problems are occurring and how severe they were. And finally, they planned to develop a new dashboard in the diabetes field within the regions with "Qlik" system.

For the work with patient absences, they aimed at building a mock up for a new dashboard with risk of non-attendance. To do so they planned the activities supported by an external expert stakeholder.

Finally, as a result of the strategical discussion about how to obtain useful insights from data, a new reflection and strategical discussion of the population approach was defined. For that means, they planned to prepare a strategic paper about the strategic use of health data about vulnerability in the North Jutland Region, and to design an action plan for new specific cross-sectoral initiatives on the basis of the report: (a) new network with specialists and support functions, (b) mapping of legal frameworks and (c) project on data an vulnerable diabetes patients.

For the assessment of the intervention they did not designed an internal follow-up research. However, the effects of the project can be seen in the fact that the activities would not have been carried out without JADECARE.

2.1.3 The implementation process and results

To build the new dashboard a large number of data reports from the Basque and German Good practices were collected. Their reports were turned into a series of mock-ups (hand drawings of desired new dashboards) in an internal SDCN workshop. Next, there was a dialogue with healthcare professionals about these mock-ups before the Business Intelligence unit built the reports. Subsequently, there were discussions with health professionals, experts of the Basque and German Good Practices until version 2.0 of the reports was planned.

To sum up, they reached the goal in JADECARE and they are continuously expanding the database with new data sources and reports, also after the project ends. In the future, SDCN will run a dedicated "data track" in the digital health department.

Regarding the work with data on patient absences (Risk factors), they had meetings with both the Basque and German Good Practices about working more risk-based. However, SDCN only focuses on diabetes patients and many risk stratification tools focus on all diseases and risk on another level. Therefore, they concluded that the analysis had to be done in a different way. Together with the German Good Practice, the focus on absences and diabetes was selected. The final risk analysis was developed together with the "Alexandra Institute", who has a number of programmes for artificial intelligence. The-Alexandra-Institute received data on 2,649 patients and 31,248 post-ambulatory activities. Based on AI calculations, SDCN received a proposal to work with different groups with different risk profiles.

For the strategical discussion about population approach in RND, they set up a network with participation from 17 regional policy departments, clinical units and research institutes: the Department for Regional Development, the Department for International Cooperation, the department for BI and analysis, "The Idea Clinic", the Department for Quality and the Working Environment, the Danish Centre for Health Research, Telecare Nord, the Department of Intersectoral Health, "The health profile", the practice unit (GPs), Psychiatry unit, the Aalborg University, the Institute for Public Health, the Institute for Medicine and Health Technology, the Centre for general medicine, the Aalborg municipality and the Frederikshavn Municipality.

Five meetings have been held with up to 30 participants and between the meetings they prepared a Report (50 pages) for political processing. A political decision is expected to be taken after JADECARE is completed and the expectation is that the network will continue.

During the implementation, RND faced 3 major limitations in JADECARE:

1. Firstly, COVID-19 caused problems with holding physical meetings and, in addition, made it impossible to involve healthcare professionals to the same degree as expected.
2. Second, RND changed their Electronic Patient Journal (EPJ). So, for most of the second year of the project, 2022, there was no access to data. Furthermore, the Business Intelligence (BI) unit of SDCN was to focus on ensuring the operation of the new system rather than developing new dashboards.
3. Finally, the data engineer in the project got a new job and the position was vacant in the project.

2.2 Local Health Authority (USL Umbria 1)

2.2.1 The context and trigger

The population scenario of the *Media Valle del Tevere* District, the state of the art of the integrations in USL Umbria 1 and the will to implement sustainable and lasting interventions were the elements that led to the development of the Local Good Practice. More specifically, three main problems were identified:

- Corporate heart failure Diagnostic and Therapeutic Care Pathways (DTCP) approved for years but never implemented
- Non-sharing of information between the hospital care pathway and primary care
- Lack of culture in target patients on the management of chronic disease

In the design of the intervention, they found various supportive elements. Regarding the "deployment of integrated communication and information systems" intervention, the AGENAS guidelines described how the management of primary care should be organised. With their intervention they wanted to make available to health professionals as much of the patient's clinical information.

Concerning care coordination and communication between health providers, the DTCP for HF disease of USL Umbria 1 described how the care of the chronic patient must be organized in an integrated way. With this intervention they wanted to make the request for specialist visits more efficient.

And finally, the Basque Good Practice's experience with patient empowerment was the model for the intervention on empowerment programmes for chronic and or multimorbid patients.

As particular strengths of USL Umbria 1, they found the capillarity of general medicine in the territory and relationship of trust with the carers, the complete computerization of most business health processes end full interoperability between the hospital clinical software and the fact that the Regional Electronic Health Folder (FSE, for its name in Italian) is active for the entire adult population.

Regarding the weaknesses, they identified the difficulty of interaction between primary care and hospital doctors and the poor professional integration between hospital and territorial teams in the case of the Territorial Operative Central (COT, for its name in Italian).

The most relevant opportunities were the extension of COT functions through IT tools (bed dashboard, ESF, remote monitoring) and the strengthening of company operations centres.

Finally, the most significant threats were the outdated organisational model in the management of territorial services and the excessive bureaucratization in operation.

2.2.2 The Local Good Practice

Integrated management of heart failure patients in the *Media Valle del Tevere* district

Its main goal being to implement the integrated treatment / assistance pathway for patients with known structural heart disease at high risk of evolution towards HF or already suffering from HF, according to the provisions of the DTCP on heart failure using the ICT tools, also by promoting patient compliance, through telemedicine systems.

The target population of the intervention have been patients who are carriers of known structural heart disease at high risk of evolution towards HF or are already suffering from HF.

It consisted on three activities, being the first the <u>deployment of integrated communication and information systems</u>. In the last 10 years, USL Umbria 1 has invested many human and economic resources in the digitization of hospital care pathways. The hospital software ecosystem involves all the departments of the five company hospitals and all the strategic software applications are integrated with each other. However, this digital transition process has not involved primary care with the same impact, and at the moment in fact, it is not possible to access all the necessary clinical information from primary care software applications. In this scenario, they chose to use the JADECARE Joint Action to allow professionals who participate in the chronic patient care path in the local area to be able to access all the clinical information created in their hospitals, through four software integrations:

a. Regional Electronic Health Folder (FSE) > Telemedicine Platform
b. Telemedicine Platform > GPs Portal
c. Hospital Electronic Medical Record > Regional Primary Care Management
d. Telemedicine Platform > Regional Primary Care Management

Secondly, they aimed at improving <u>care coordination and communication between health providers.</u> In addition to allowing the sharing of information, they deemed it necessary to provide healthcare professionals with tools that favour collaboration and communication between the local area and the hospital. To achieve this, they implemented two new tools:

a. Multidisciplinary Group Heart Failure *Media Valle del Tevere* through the corporate telemedicine platform
b. "Fast-track" booking for heart failure disease in *Media Valle del Tevere* District through the regional booking system SAR

Finally, the third activity consisted on developing <u>empowerment programmes for chronic and or multimorbid patients</u> by means of various activities, such us the development of educational materials for distribution to heart failure patients and the design of a training course "Empowerment of the chronic patient suffering from heart failure with the aim of providing healthcare professionals with the notions of empowerment to be transferred to patients during the treatment process,

To achieve this, the NAWG was made up of 11 professionals of USL Umbria 1 company with different profiles: *Media Valle del Tevere* Hospital Director, *Media Valle del Tevere* District Director, two coordinators of territorial operations centre, Data Protection Officer (DPO), five IT staff members, a financial staff member, a training staff member and a member of the communication staff.

The analysis of the intervention was performed in various ways. The software integrations were qualitatively evaluated by means of the correct functioning of the new software procedure. Moreover, quantitative analysis concerning number of accesses made by health professionals to the new functionalities, number of patients managed through the new tools, number of participants of the empowerment training courses were also completed. These latter, were also assessed observing the publication of educational materials developed for HF patients.

2.2.3 The implementation process and results

The intervention of the four software programmes, was completed at different degrees.

a. Regional Electronic Health Folder (FSE) > Telemedicine Platform integration (Health-meeting). The intervention was completed and tested. By accessing the corporate telemedicine platform, it is possible to view all the patient's clinical information present in the regional FSE repository.

b. Telemedicine Platform (Health-meeting) > GPs' Portal (ECWMED). The intervention was completed and tested. By accessing the company platform of general practitioners, it is possible to open the telemedicine application software in context, which allows access to the patient's clinical data. They have not yet deployed to all GPs but only to the test group because they need to regulate privacy access and they have to train GPs.

c. Hospital Electronic Medical Record (Galileo) > Regional Primary Care Management (Atl@nte).

d. Telemedicine Platform (Health-meeting) > Regional Primary Care Management (Atl@nte). They drafted the project and the supplier made the economic proposal for the construction. They had to interrupt the activities due to financing problems but they will proceed with the order in the coming months

They conformed the multidisciplinary Group "Heart Failure *Media Valle del Tevere*" through the corporate telemedicine platform (Health-meeting), trained the staff and the GPs enrolled patients during the implementation period. Furthermore, the same steps were accomplished for the "Fast-track" booking agenda for heart failure disease through the regional booking system SAR

Additionally, they carried out the training course "Empowerment of the chronic patient suffering from heart failure" with the identified personnel and produced and published online the educational material for HF patients.

During the implementation, USL Umbria 1 faced two main limitations or challenges. Firstly, all interventions were chosen to be replicable on all corporate structures, thus, project sustainability being their main guideline in the pre-implementation phase.

On the other hand, even if the fast-track experiment for direct access from GPs to hospital is working, two main aspects are required for it to be deployed to the other USL Umbria 1 structures: (i) Hospital doctors must dedicate a time slot for visits booked by GPs and (ii) GPs need to learn and use the new function for the direct booking of visits

2.3   Regional Health Agency Tuscany (ARS Tuscany)

2.3.1   The context and trigger

The increasing number of chronic diseases and the frequent presence of multimorbidity represent a public health priority and a shared challenge in both the Italian and European contexts. In particular, the situation of the complex patient, often characterized by fragmentation of care, polypharmacotherapy and a lack of reconciliation of individual DTCPs (Diagnostic and Therapeutic Care Paths) into one Individualized Care Plan (ICP), underlines the urgency of providing efficient, personalized and integrated care that promotes an improvement in the quality of services. As of 2010, both at national and regional level, the need and urgency of defining a functioning and sustainable management model for complex patients has been repeatedly emphasized. Several national and regional healthcare plans, healthcare programmes and regional laws have been issued but a specific and pragmatic response on how to manage these patients is still lacking. Our project takes inspiration from the Health Care Initiative Model developed in Tuscany in 2016, focusing in particular on patients belonging to "target A", namely complex patients. In this perspective, the project intents to provide a model of taking care of complex patient that is workable and sustainable.

As for the strengths of ARS Tuscany they identified the availability of current good quality administrative health data, a consolidated organization of General Practice in Functional Territorial Aggregations, the presence of the Family and Community Nurses, the presence of Hospital-territory continuity project (ACOT), the use of electronic health records by general practitioners, nurses and specialist, a well-coordinated and consolidated outpatient specialist care at corporate level and leadership open to innovation have been crucial. Likewise, external

opportunities have been: National/Regional plans, laws and initiative supporting the topic of chronicity and the increased development of ICT tools as a result of the emergency situation. As for weaknesses, the heterogeneity and lack of interoperability between hospital, nursing and GPs' EHRs, shortage of time, professional and financial resources, communication difficulties between healthcare professionals have been challenging factors. Likewise, external threats have been: healthcare professionals overwhelmed by COVID-19 pandemic, resistance to integrate different EHRs, possible inertia in the reorganization of the Regional Health System, lack of strong regional governance for developing integrated models of "Proactive Health Care", National working table for identifying unique stratification system at a deadlock, privacy issues.

2.3.2 The Local Good Practice

<u>*Piana di Lucca* District Zone's approach to taking care of complex patients by integrating hospital and primary care</u>

It aimed at identifying the population of complex patients and improving their care through enhanced integration and proactivity of primary and hospital care.

ARS Tuscany defined and implemented a workable model of taking care for complex patients by enrolling complex patients and identifying professionals to be included in a multidisciplinary team. The functioning of the model is as follows:

1. Identification of complex patient by an automatic extraction string, containing specific criteria, uploaded to the GPs' EHR. Main inclusion criteria consist of: having ≥18 years and two or more chronic conditions among ischemic heart disease (IHD)/CHF, chronic kidney disease (CKD), COPD, DM. Furthermore, they included additional criteria to enrich clinical information and a preferential criterion whereby priority for the enrolment has been given to the patients who are followed on an outpatient care level by the specialists of the O.U. of *Piana di Lucca* District.
2. Selection and enrolment (signing an informed consent) of complex patients by GPs
3. Drafting of a clinical ICP containing at least medical history, therapies and diagnostic follow-up exams, by GPs and sending of their patients lists to the Coordinator of Family and Community Nurses and the Coordinator of Primary Care
4. Carrying out a multidimensional assessment and drafting of a nursing ICP by Family and Community Nurse (FCN) previously selected by the Coordinator of Family and Community Nurses
5. Performing a teleconsultation, arranged by the Coordinator of Primary Unit, with professionals belonging to the multidisciplinary team to discuss and share both the ICPs. The multidisciplinary team consisted of GP, FCN and from two to five specialists in accordance with the pathologies of the patient (cardiology, nephrology, diabetology, pulmonology and internal medicine). In order to carry out the teleconsultations the Regional Platform for the Teleconsultation has been provided and used.
6. Performing monthly follow-up assessments by FCN. The follow-up can be carried out at outpatient clinic, home or by telephone
7. Review of ICPs by means of a second teleconsultation

The NAWG has been composed by 14 professionals, five from ARS Tuscany, such as project managers (PM), Scientific Project Manager, Administrative officer, Consultants, and 9 from *Piana di Lucca* District Zone, such as Director, Coordinator of Primary Care, Coordinator of Territorial Nursing Care, Coordinator of Family and Community Nurses, GPs and Coordinators of two Functional and Territorial Aggregations, Coordinator of Internal Medicine Unit-San Luca Hospital, Coordinator of specialists' Functional and Territorial Aggregations, Coordinator of Citizen Participation Committee.

Finally, they planned to study the impact of the model qualitatively through a retrospective analysis of the process and the added value produced. To this end, three surveys, one for each participating professional (GP, FCN, Specialist) have been drafted. After the filling in, three focus groups will be carried out in order to examine results in more detail. They did not consider a quantitative impact survey to be feasible and meaningful due to privacy problems and the small sample size, which would generate results with background noise and statistically invalid data.

2.3.3 The implementation process and results

ARS Tuscany achieved the following main results as a result of their intervention:

- Establish criteria and methods for GPs to identify complex patients using the outpatient EHR: an automatic extraction string, containing specific criteria, has been elaborated and uploaded to the GPs' EHR. The string consists of three inclusion criteria (mandatory, preferential and additional) and two exclusion criteria.
- GPs identification: At the beginning, 10 GPs have been successfully identified to join the project, with a slight deviation concerning the composition of the group according to the AFT they belong to.
- Train all identified GPs on the methods to be used to identify complex patients: 2 training sessions (2h30) have been carried out and all identified GPs have attended.
- Identify complex patients and including them in the "ICP Folder" of the outpatient EHR: there has been a slight deviation from the number of patients identified (76/100) due to a lack of time. However, the most important issue has been that they have just received 4 patients' lists of 10 expected due to a significant drop out of GPs (6/10).
- Define how to involve nurses and specialists to encourage adherence to the project: these activities, due to lack of time and professional resources, have taken longer than expected.
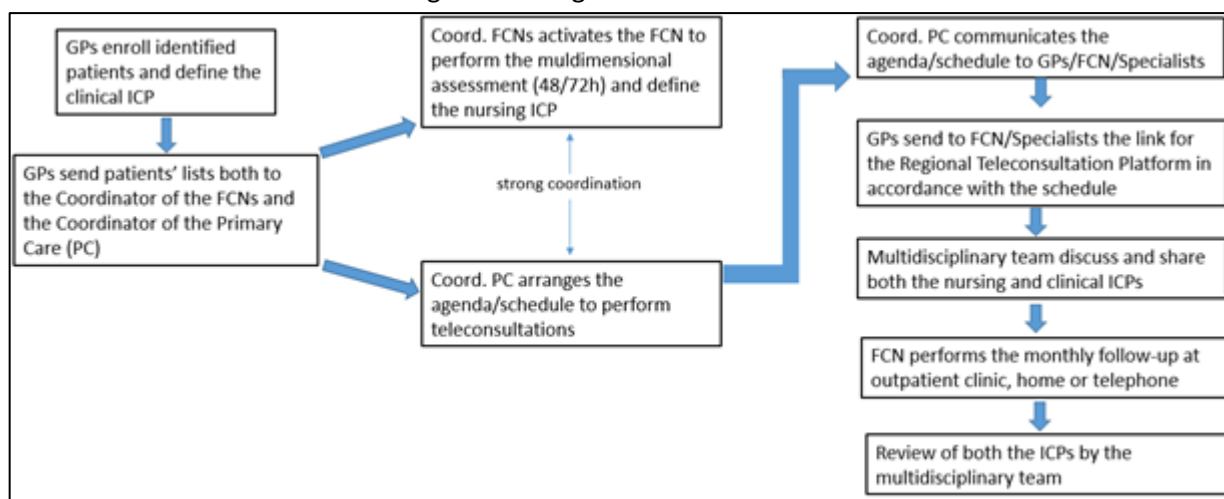- Define the roles and functioning of the integrated clinical network:

Figure 21: Model of taking care of the Local Good Practice of ARS Tuscany

*Coordinator of Family and Community Nurses (Coord. FCNs)

- Define the multidimensional assessment system for complex patients and follow-up tools: all assessment and follow-up tools have been set for each relevant aspect. It has been decided to maintain the tools already in use by the FCNs to which the following tools have been added on the basis of the oGP Basque: Up&Go Test and Follow-up questionnaire. Moreover, a flow chart defining the modalities on how to carry out the follow-up has been elaborated.

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

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- Identification of the professionals within integrated and structured clinical network including (multiprofessional and multidisciplinary team): 4 GPs, 5 Specialists (Coordinators of Cardiology, Pulmonology, Nephrology, Diabetology and Internist Medicine) and 12 FCNs have actually participated. Internist Medicine has encountered more difficulties to take part in teleconsultations as it doesn't provide currently outpatient care.

- Enrolment of complex patients previously identified by GPs and signing of informed consent: 41 patients have been enrolled.

- Multidimensional assessment of enrolled complex patients: from 01/08/2022 to 19/12/2022, 36 multidimensional assessments have been performed

- Sharing within multiprofessional team of the "clinical ICP" and "nursing ICP": from 05/08/2022 to 21/12/2022, 36 teleconsultations have been carried out

- Periodic telephone, outpatient and/or home-based follow-up for complex patients: from 26/08 to 18/01, 33 patients have received at least 1 follow-up. Among them, 6 patients have received 2 follow ups, 3 patients up to 3 follow-ups and 11 patients up to 4 follow-ups.

- Review of ICPs: Just 1 review has been performed due to lack of time

- Communication plan addressed to regional and national stakeholders: several meetings and webinars concerning the dissemination of the project have been successfully performed. Thanks to these communication activities other Tuscan sites intend to implement our project in their contexts. An intense supportive work to foster these "branching activities" is already in place.

- Actions to support the Health Department in the process of solving privacy issues: attempts to solve this aspect have been tried. However, this activity seems out of our reach, an intervention from the National level is needed.

- Actions to support the Health Department in the development of an integration process between the EHR of the GP and the FCN: this activity due to its complexity has not been fully addressed. It is planned to work together with the regional professionals already involved in these activities under the National Recovery and Resilience Plan (NRRP).

Finally, ARS Tuscany faced some limitations during the implementation. The generalizability of the project was influenced by the Tuscan context in which it has been developed. In fact, their context, thanks to the numerous projects, models and programmes proposed over the years to tackle chronicity, has proved fertile ground for JADECARE. Moreover, privacy problems and COVID-19 pandemic have put a strain on implementation, requiring greater efforts from both management and healthcare professionals

2.4 Central Administration of the Health System Portugal (ACSS)

2.4.1 The context and trigger

Portugal is the third country in Europe with the highest percentage of elderly population (22,3%). Multimorbidity affects more than 1/3 of the Portuguese population, according to the National Health inquiry 2019, being more prevalent among women, elderly, in some regions and with a lower education. Healthy life expectancy at 65 is 7,3 years, lower than EU average (Statistics of Portugal). Only half of the population reports its health status as good or very good (2019).

Several studies concluded that fragmented healthcare lead to delay in diagnosis, especially in the most prevalent chronic diseases, to care multiplication, avoidable hospital admissions, worse quality of life and higher costs. As a conclusion, the fragmented and hospital centric care that do not fit people needs, especially those with complex needs entails a national problem in Portugal.

As particular strengths they highlight that at the national level they account on a great amount and quality of data that can be used to stratify the population. More specifically all episodes are coded with ICD10 in hospitals and ICP in primary care, all the pharmaceuticals bought by patients in the pharmacies are also coded, costs with hospital episodes, primary care episodes, pharmaceuticals and medical tests, all of it disagregated at the patient level.

However, current information systems do not respond to the needs of patient-centred practice and there is lack of information sharing and it is a challenge to allocate IT resources, what entails relevant weaknesses.

Another strength is the existence of good practices already in place in some locals (Local health units, case managers, hospital at home) and also several tools to support the practices like telemedicine, electronic prescription, among others.

As highlighted external opportunities, there is the Recovery and resilience plan that has goals aligned with patient centred integrated care and the commitment of leaderships at the local and national level.

And finally, the main threats are the absence of a strategy of the Ministry of Health (MoH) for Integration of Care and patient-centred care.

2.4.2 The Local Good Practice

<u>Implementation of population risk stratification in Portugal and improvement of continuity of care</u>

More specifically, it consists on implementation of risk stratification as a basis for identifying needs by population groups that will allow the adaptation of care models, using information and communication systems, as well as financing and commissioning as facilitators. Its main goal is to improve citizens' quality of life, continuity of care and system efficiency, based on risk stratification.

For this means, four specific lines of action were planned:

1. To develop a population approach based on risk stratification. This included training health professionals on risk stratification, purchasing risk stratification tools and comparing them to support the decision about which one to adopt.
2. To develop instruments to facilitate communication among health professionals. This included creating groups to design care pathways at the local level and training in co-design to include the patient perspective.
3. To propose changes in the financing and commissioning model based on population´s risk. That includes to define indicators for commissioning and test several scenarios for risk adjusted financing in integrated care organizations (Local Health Units).
4. To improve the information systems, including the definition of the minimum set of information to share among professionals, design a chronic medication chart and incorporate the care pathways in the information system.

The NAWG included several organizations at the National and local level (Administration of the health system, shared services of the Ministry of Health, national school of public health, five pilots among hospitals, primary care and local health units) with a total of 21 members approximately.

Finally, in order to assess the implementation, they will do an impact assessment after JADECARE, as planned in their population risk stratification strategy. The plan includes a study by an academic partner to look at some indicators (to be defined) before and after the implementation of the population risk stratification.

2.4.3 The implementation process and results

The approach to implement risk stratification needed to be modified along the deployment of the intervention. Instead of choosing one tool, there was a decision to compare three of them, to support the decision. Because the public tender for purchasing risk stratification tools was delayed, a home-made risk stratification tool (power BI) was developed to make it available until the final decision about which tool they are going to use. They also had a bilateral meeting with the Basque Good Practice experts to discuss technical details about risk stratification. Finally, the home-made tool is not yet available because of GDPR issues and they are doing protocols with the pilots trying to solve these issues. In parallel, they have the databases to feed the tools fully completed and they are analysing the outputs of one.

During the implementation 262 professionals, 162 from pilots (doctors, nurses, managers, primary care, hospital, public health) were trained in risk stratification, through an e-learning platform (SPMS - eStudo - Estratificação da população pelo risco - Percursos Formativos (min-saude.pt). Additionally, they developed a communication plan for different targets to engage stakeholders. This action was not planned in the first cycle, but they felt that they needed throughout the project.

They organised an international meeting to discuss risk adjusted financing models with other countries/regions. 143 members of executive boards of health providers participated and the general level of satisfaction of the attendees was 4,4/5. Furthermore, they organized a workshop about the financing of integrated care organizations that accounted on 36 participants. These actions were not planned in the first cycle again, but they felt that it was necessary to raise awareness on the issue among the hospitals and primary care boards.

On another range of issues, 21 Professionals (primary care and hospital nurses, primary care and hospital medical doctors' abd social workers) were trained in co-design in order to provide them with the tools needed to include patients in the definition of the care pathways. This action was not initially planned, however, after a comment from JADECARE, it was considered relevant to include.

Four care pathways were designed (COPD, Heart failure, diabetic foot and multimorbidity) and one of the providers managed to digitalize the care pathways. In this regard, they organised an in-person meeting for the groups to share the work done about the care pathways.

Finally, a plan for the improvement of the electronic health record, including the care pathways, was designed aligned with the Recovery and Resilience Facility (RRF). It covers four goals: (i) reinforce interoperability among information systems, (ii) optimize patient summary, (iii) optimize information systems for medication management and (iv) reinforce referrals in the information systems.

Even if they took a national approach with local pilot implementation, so the generalizability and scale up could be done, other limitations appeared during the deployment of the intervention, such as GDPR issues, resistance of some professionals to use risk stratification information, lack of time of professionals, either healthcare professionals or professionals to work on risk stratification and lack of commitment/time of the professionals in charge of the information systems. However, all the process had the support and commitment of ACSS and the Ministry of Health and the leadership in each pilot was a success factor to achieve the goals.

Furthermore, the estimation of time and resources needed was imprecise. The first plan was very ambitious, but over time they found that the public tender was longer than expected and all the actions took more time than expected. They also planned to test several scenarios for risk adjusted financing, but because it will only be possible after the decision of the tool, they did at least a raising awareness international event. As a consequence, most of the efforts to minimize or adjust the plan implied rescheduling the actions and dropping some of them.

2.5   University Hospital Olomouc (UHO)

2.5.1   The context and trigger

In the earlier stages of the JADECARE project, it was evident that a new law on digitalisation in healthcare would be passed in the Czech Republic, moving them closer to new practices and approaches in ICT-enabled healthcare delivery. Until then, the improvements in this field were rather small, limited to a few interventions, fragmented and without conceptual direction. Health service providers tried to make their way often using private ICT projects, but also in various other country-internal and EU projects, especially during the COVID-19 pandemic.

The overall situation in the Czech Republic in terms of eHealth has been delayed, both in terms of training programmes, laws, and actual services provided. The Czech Republic is at the lower half of the digitalisation of healthcare in terms of Europe. Nevertheless, the process of development can be effectively accelerated thanks to the possibility of obtaining valuable experience from other EU projects.

Already 2 years before JADECARE, UHO prepared the change to a new hospital system (NIS) by implementing an integration platform to unify the various clinical systems and codebooks. UHO was preparing to purchase a new NIS when it became clear that the old system no longer met the requirements for interoperability, modern EHR capabilities, security, access to patient records, quick and easy data sharing, and collaboration with other healthcare providers. It was necessary to set the terms of the procurement correctly and sufficiently to ensure that the NIS met all the elements for building, processing and using hospital data.

The MoH (responsible for health digitalization) decided to put more pressure on education, experience and dissemination of best practices. Until then, one of the few areas where telemedicine was actually being used was, for example, cardiology, where there was a sufficiently well-defined group of patients. This area was under development thanks to the personal implication of Professor Milos Taborsky, who was behind the establishment of the National Telemedicine centre at UHO.

However, the real reason for the project was that the National Telemedicine centre at UHO is the competence centre of the MoH for telemedicine in the Czech Republic and due to the fact that it is a large provider of health services, it has greater possibilities in terms of introducing innovations for example in pilot mode, subsequent data analysis, etc. and processing the output for later practical use. Moreover, given the experience with cardiology patients, it was assumed that it would be possible to later extend the experience to another target group. At the same time, as UHO is the largest and most modern health centre in the region, they could expect that they would serve as inspiration for others and, as a result, the new approaches would help to spread further.

The main strengths of UHO were to have adequate network of health services in place, the high professional capacity in the University Hospital Olomouc, the existence of the National Telemedicine Centre at the UHO, the available ICT in the Czech Republic and in the Olomouc region, the existence of European projects that offer inspiration from abroad for adoption, the developing digital integrated care platform within the UHO and the cooperation with the MoH in the field of digital services where UHO is the MoH competence centre for telemedicine.

As their weaknesses, they highlighted the poor access to care in peripheral parts of the country, the fact that technologies are used at a lower user level, the lenght of introduction of innovations (technologies) into routine practice as well as their acceptance and sustainability, the uncertain financing of future eHealth related costs, having uncontracted relationship with health insurance companies regarding eHealth, a lack of eHealth legislation and a county health policy and also the weak activity of health insurance companies in the implementation of innovations.

Nevertheless, the following opportunities were also noted. The use of UHO experts for other entities, integrated healthcare, digitalization of healthcare, etc. being a suitable political topic, the existence of an emerging platform for digitalization of integrated patient care including shared documentation, the transfer of innovations from abroad and within the Czech Republic, looking for more efficient care solutions, time savings for clients, simplification of some processes, in sum, a better coordinated care; the need to connect actors in social and health services where it makes sense in client care, an individual interest in innovation, quality and accessibility of care, integration, the possibility of sharing information about patients and an opportunity to improve health literacy and increase the status of the citizen in the health system.

Finally, the most salient threats were their complicated health financing system, an insufficient involvement of health insurance companies and also health professionals, the fact that the coordination, communication and collaboration of care is not at the required level and does not have sufficient support. Furthermore, fake news and fears arising from various unverified sources, insufficient PR (awareness) regarding innovation and integrated care, decreasing number of GPs especially in peripheral parts of the country, increasing average age of GPs and lack of replacement planes and shift in priorities of political issues in the country were also noted.

2.5.2   The Local Good Practice

Tele-Psychiatry\psychology online, online management of the psychological and behavioural disorders and Online access to documentation (awareness of medication and medical treatment process)

Its main objectives were to (i) improve communication between health organisations, (ii) prepare the introduction for video consultations as a normal part of psychiatric practice (including a set of appropriate patient groups, (iii) Create and update an online space as a solution for more effective data sharing, communication, etc. and (iv) create a new application, modification of NIS, IT communication model, etc.

The intervention aimed to influence the development of the eHealth in their region and influence others with the ultimate objective of being well prepared for selected changes in the health sector in the country.

Thanks to UHO management (Čeněk Merta) an eHealth working group within the Olomouc Region, "eHealth", was created to prepare a reservoir of project fiches in the field of eHealth and to propose them for implementation with contributions from the Olomouc Region budget.

UHO started working to create a new approach to ICT, trying to push for faster approval of changes in the law. Moreover, they also tried to compile foreign experience a pilot testing in the Czech Republic and finally held a strategic discussion on future approach. In turn, they planned to work on the creation of software (custom solution for telemedicine application, integration platform for documentation sharing meeting interoperability conditions). They also worked to adapt the application for the needs of psychiatry, psychology and finally, to introduce and implement video consultation as a valid part of psychiatry.

The NAWG dedicated to the implementation was composed with multiple expertise. However, the number and membership of the "core" NAWG, which had participants in theme days and theme workshops, varied from time to time. It included the head of Digitization, and strategic Innovation Consultant, a researcher and academic from Palacky University Olomouc, a regional policy representative for the social area, a project Manager, an IT project support staff, representatives of the MoH representative, representative politicians and officials of the city and the region and selected members of the e-Healh working group within the SMART[42] Region Committee.

The project had a number of specific key performance indicators to assess the intervention such as the introduction of a new approach in the clinic, creation of new SW with the possibility of mutual communication,

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[42] Specific Measurable Achievable Relevant Time-bound. Britt Bjerke M., Ralph Renger. Being smart about writing SMART objectives. 2016

communication through an app, a cooperation agreement between two entities providing health services, etc. A clear evaluation outcome was also the creation of a grant project that would sustain and further enhance the knowledge gained in the Joint Action (JA). The evaluation was carried out by counting whether the objectives were achieved or not. Evaluation calls were made, procedures were evaluated in meetings, consultations at the ministry, and also within the regional policy framework. In this regard, the structure of the PDSA[43] was helpful in its instructional approach.

2.5.3 The implementation process and results

Regarding the creation of a new approach to ICT, a large amount of information, experience, data and concrete outputs were collected from the Basque, Catalan and Danish Good Practices. With sufficient concrete information, preparations were initiated for the gradual transition and adaptation of existing hospital systems, creating a custom telemedicine application as an input experience to the new more robust ICT systems or full integration of this application into new systems.

Furthermore, they had conversations with health professionals within the county, entities that have a national scope and can be valuable companions in terms of pressure for change, its implementation and also e.g. success in case of new project submissions, which in turn are important for sustainability.

More precisely, talking about the creation of a software, they reached the goal in the project and moreover, are continuously extending the software with new data sources, reports and features. The conditions for the selection of the supplier of the new hospital system is completed and the focus after JADECARE will be on system interconnection. The application has been adapted to the needs of psychiatry and psychology and is planned to be further addressed within the framework of the forthcoming national project. Finally, the piloting of video consultation in psychiatry has verified the possibilities of this approach in the Czech Republic and also extended its applicability to other areas where video conferencing can be suitably used (psychology, communication with patients within the palliative team, communication of doctors, etc.). Moreover, there is a suitable group of patients (diagnosis, stage of disease, etc. for whom video consultation is an appropriate method within the psychiatric treatment process). That will be further developed with the participation of a network of physicians and professional societies in psychiatry.

In JADECARE and in cooperation with NAWG (eHealth group from Olomouc region) and possibly others, several pilot tests related to the importance of data transfer and sharing and also videoconsultation have been carried out:

- In addition to Telepsychiatry where video consultations were conducted with selected and defined patients of the psychiatry clinic.
- Video consultations with palliative patients or their guardians (psychosocial support, etc.) are ongoing.
- Collaboration between GP and UHO in teleophthalmology, a total of 43 patients were measured at the GP, including data sharing and possible follow-up.
- Gestational diabetes, sharing patient data via our portal with UHO. We have 25 monitoring kits which were purchased with funding from the Olomouc Region.
- Tele-consultation and data sending between the UHO and the follow-up hospital.

The validation and analysis of the lessons learned from foreign experiences and pilot testing showed the importance of transforming existing systems and also the feasible change in the system. The analysis of the

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[43] The Plan-Do-Study-Act cycle presents a pragmatic scientific method for testing interventions in complex systems using an iterative approach. Speroff, T., & O'Connor, G. T. (2004). Study designs for PDSA quality improvement research. Quality Management in Healthcare, 13(1), 17-32

outcomes was carried out partly in terms of both quality and quantity, with quality - feasibility, adoption, etc., being of greater interest to us.

In addition, a National Recovery Plan grant programme has been prepared to disseminate the knowledge gained through interventions in telemedicine and to implement it in routine practice. This project guarantees the sustainability of the project whether the beneficiary is UHO or someone else within the country. Even so, they can expect to be partners at a minimum. It is expected that after the completion of JADECARE, a policy decision will be taken due to the large project, which will ensure not only the maintenance but the acceptance and further development of the interventions started.

The ultimate goal is to connect healthcare providers/healthcare facilities to eHealth services according to interoperability rules and to fully operate the eHealth portal, ideally with enhanced functionality and a catalogue of services.

As main limitations of the project, they highlight the impact of COVID-19, which caused problems in arranging physical meetings and also prevented the involvement of health professionals to the extent expected. This was particularly the case at the beginning of the project. Furthermore, it was more complicated for UHO to ensure the development of dashboards, software... that were needed to justify and implement changes in the health system (sharing dal, preparing for patient summary as a step towards EHR, preparing for patient portal as a step towards patient empowerment, etc.). In general, they founded very difficult to get an IT expert because the hospital cannot compete with private companies that offer completely different terms.

2.6 Croatian Institute of Public Health (CIPH)

2.6.1 The context and trigger

The presumed level of health literacy in Croatia is relatively low. In addition, there is an increasing demand from GPs to reduce the administrative workload. According to a survey conducted by a Croatian news portal, two thirds of the population have low levels of health literacy[44]. It is well known that a low level of health literacy can lead to late diagnosis and poor disease management, especially for chronic non-communicable diseases.

In this framework, it is highly likely that the creation of a webpage that would be tailored to patients' needs, and written in collaboration with healthcare providers would help in overcoming everyday problems that patients with chronic diseases face.

The Health Portal (*Portal zdravlja*) was created to provide Croatian citizens access to a part of their own healthcare information from the Central Health Information System of the Republic of Croatia (CEZIH for tis name in Croatian). The Health portal also enables active communication between the patient and the doctor if some options have been activated (e.g. patients could make and cancel appointments with their primary care physicians, send a request for prescriptions for medication approved for reissuing by the physician etc.) This could make GP-patient communication more efficient but there were no actual data of how many GPs are actually using it but there were suggestions that this Portal needed more promoting.

To sum up, CIPH identified various main problems such as no specific, multidisciplinary approach to complex chronic patients, low health literacy, and specifically lack of patient oriented and trustworthy content on chronic diseases. Furthermore, lack of human and financial resources in healthcare and an increased workload of GPs due to aging population and the interruption of COVID-19 resulting in less time available for the patients. And also, a low rate of health digitalization amongst general population.

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[44] https://www.telegram.hr/pitanje-zdravlja/proveli-smo-prvo-istrazivanje-o-zdravstvenoj-pismenosti-u-hrvatskoj-stanje-jednostavno-nije-dobro/.

As main opportunities they found collaboration with patient organizations, professional associations and EU projects and also the existence of global trends toward prevention and patient empowerment.

2.6.2   The Local Good Practice

Croatian approach on an Integrated Healthcare Sector; new media use in GP-patient communication and disease management materials with the Digital Health Centre

Its main aim has been to improve health literacy and thanks to that increase the efficacy of the healthcare system, especially in the population with chronic diseases, resulting in an improvement of health outcomes, reduction of the workload of GPs regarding informing patients on the specifics of their conditions, and also reduction of the time needed for the care of chronic patients (regarding drug prescription for chronic conditions) through digital means and tools.

The target population of the intervention were patients with leading chronic non-communicable diseases (NCDs) (COPD, hypertension, DM, multimorbidity) with special focus on patients with DM and also physicians (general practitioners).

The intervention consisted on four main lines of action, being the first one to conduct an on-line survey on the use of the Health Portal (*Portal zdravlja*) for active communication between physicians (general practitioners) and patients and analyse the results. Furthermore, they planned to promote its use by encouraging GPs to use it to actively communicate with their patients and also promoting that GPs introduced it to their patients and also encouraged them to use it.

On other range of issues, CIPH planned to create a Website intended primarily for patients with leading non-communicable diseases, but also for the general public. They planned to design and include disease management materials (creation of the materials on NCDs: DM, COPD, hypertension etc). One section of the website would contain information on the most frequent risk factors for non-communicable diseases and would be focused on prevention. Another section would include recommendations on diet, physical activity, stress management, sleep hygiene, smoking cessation and alcohol intake reduction. Moreover, they planned to contact patient groups and advocates to evaluate the webpage content and gather input for easy-to-use suggestions as well as new ideas from their point of view, what would make this specific intervention more efficient.

The excepted outcomes of the intervention included providing timely and more appropriate personalized care for NCDs patients based on their care needs, enabling better and more efficient communication among healthcare professionals and patients with focus on digital communication, empowering patients by providing user friendly educational materials, in both digital and paper form and finally, improving the time dedicated to each patient, by providing ready-made materials and resources for patients.

The NAWG of CIPH has consisted of experienced medical doctors with specialist in occupational medicine and sports medicine (4) and epidemiology (4), medical doctors currently doing residency in epidemiology (2), medical doctors currently doing residency in occupational and sports medicine (3), psychologist (1), social educator (1), nurse (1) and administrative assistant (1), IT experts (3), medical doctor specialist in public health (1).

Finally, the assessment of the intervention was done by means of quantitative analysis to see the increase in Portal zdravlja app use and also to track web page visits and material downloads with a special focus on data analysis regarding Diabetes mellitus.

2.6.3 The implementation process and results

The questionnaire (QA) on the use of the Portal zdravlja application was disseminated online to all the GPs in Croatia. Later, the results were analyzed and a short training was held in order to promote the app.

Furthermore, a patient oriented, evidence-based web page was desgined with information on most common chronic diseases being its target group the patients with leading chronic NCDs (COPD, hypertension, DM…multimorbidity). Educational materials have been created on NCD'S (diabetes, hypertension, COPD, osteoporosis etc.) and demo version of the web page was launched.

Finally, due to the interest on digital health promotion and disease management of Diabetes mellitus, an invitation letter was sent to GPs, National Reference Centre for diabetes and Croatian Federation of Diabetic Associations to inform about the intervention.

The limitations related to the launch of the survey were firstly that it had to pass the permission of the Ministry of Health and the Croatian Health Insurance Fund (CHIF), which took longer than expected due to the administrative procedures. Later, they could not confirm how many GPs received the questionnaire because primary healthcare systems use several different digital service providers. Moreover, they could not ensure whether in some GP offices only nurses replied and even opened the QA. Therefore, the sample of the GPs may be biased, with those using the app being more prone to answer the QA. Moreover, some GPs are not willing to participate due to other work-related obligations.

As for the web page creation, basic concept and preliminary materials were sent to the designers and web developers, and demo version of the web page is available, even if the process took longer than expected. Major issue in the web page creation was a financing problem; namely, the funds for the web page were not allocated in the project budget, so they had to organize their own funding in the CIPH on a very short notice, what slowed down the process.

Last but not least, the COVID-19 pandemic affected the implementation of planned activities, especially because the project team (CIPH) has been very much engaged in controlling the COVID-19 pandemic activities including continuous vaccination. As family physicians had also been extremely engaged it was finally agreed that a questionnaire should be sent later when the pandemic slows down.

2.7 Ministry of Health of the Republic of Serbia (MoHRS)

2.7.1 The context and trigger

Aging and increase in prevalence of non-communicable diseases lead to a greater need for long-term care and optimization of the entire health care system. Introduction of digital communication between health care workers at all levels of health care should make the healthcare services more efficient and patients more satisfied. Improvements in coordination between health providers should contribute to continual health care and better quality of patient care. Deployment of relevant web based health -information and access to them can strengthen patient capacity to recognize disease and manage their own health

Regulation on introduction of new services in the nomenclature of health services financed by state budget, financial resources limitations, organizational issues in healthcare institutions, as well as established patient access to health care which are difficult to change can influence the implementation and expected outcomes.

2.7.2 The Local Good Practice

Improvement in integration of health information system; and patient empowerment

Its main aim is to improve health care in order to provide affordable, efficient, quality services, interventions and programmes with a sustainable continuity in their provision in the areas of prevention and treatment of persons suffering from chronic diseases, and in accordance with their needs. More specifically it has two objectives:

1. Improving digital healthcare integration through the introduction of electronic health record with access to data provided from all levels of health care, clinical pathways for multimorbid conditions and improvement of communication between health professionals as well as between patients and health professionals.
2. Empowering patients through access to information that can strengthen their capacity to recognize disease and manage their own health.

The NAWG to accomplish it was formed by professionals of two centres: Primary Healthcare Centre"Zemun" and Primary Healthcare Centre "Novi Beograd" including director of the health center-medical doctor, head of the GP service department-medical doctor, head of the GP department, nurses working in team with doctor and medical doctors -specialist of GP, nurse working in team with doctors.

The intervention works on two areas. On the one hand the improvement in integration of health information system by developing E-health record and ensuring the conditions for establishing communication channels between health professionals on primary and hospital/clinical level. On the other hand, by promoting patient empowerment through E health portal upgrade and ensuring the setting for personalized access.

Finally, the intervention tartget a population of 360.000 adults in Primary Healthcare centres in two Belgrade municipalities, pilot project sites: PHC „Zemun", PHC „Novi Beograd", and a Gerontology Centre „Beograd" (social care institution in Belgrade with primary healthcare service providing).

2.7.3   The implementation process and results

The intervention achieved to integrated the module of of E-health record with local information system, to train the health saff on its access and use and furthermore this traininghas been expanded to 23 geronology centres and 5 nursing homes in the territory of Serbia.

The Rulebook on Nomenclature of Health Care Services on Introduction of E-consultation through E-health portal has not been amended as planned, because of political circumstances (elections, technical government..).

On the other hand, integration of the module for e-consultations with local information system has been completed in the field of diabetes in the following 5 institutions:

* 3 Healthcare Institutions on primary health care level; HI " Zemun", HI"Zvezdara", HI "Valjevo"
* 1 General hospital on secondary health care level: GH "Valjevo"
* 1 institution on tertiary health care level, clinical centre: University Clinical Centre of Serbia

In regard to patient empowerment activities, risk assessement on personal data protection was accomplished and a mobile E-health application (Google play, iOS) was released. Furthermore, a working team was set up for developing the contents relevant for patient empowerment through the E-health portal and E-Health portal was extended with introduction of 14 topics of relevant medical contents made by health proffesionals, publicly available. The instructions for the use of E-health portal were also publicated and partiatlly promoted in media. Finally, 200.000 authentications for personalized access to E-health portal were issued.

The main limitation in the process was the political circumstance as the Government constitution constrainted the Adoption of Rulebook on nomenclature of health services (amendment on e-health consultation) on time.

The mitigation actions implemented in this sense were to conduct the pilot project "E-diabetes" in order to implement the e-consultation between GPs and specialists, regardless the regulation obstacles on service financing.

2.8 Aristotle University of Thessaloniki (AUTH)

2.8.1 The context and trigger

In Greece, the concept of digital health is just beginning to form. As a result, patient data is not being collected and analyzed in a systematic way. The concept of stratification is not widespread and no attention is being paid to the concept of minimizing hospital visits and trying to foresee the financial cost of health. On the other hand, the available pathways of public health focus on the presentation of the HCPs as "godlike" individuals, leaving the patients in their mercy and not paying any attention to the concept of joint decision making. Patients and their caregivers have no information apart from what they can find online through informal channels on diseases and symptoms management and they are always bound to their doctors and nurses for help. As a result, the emergency rooms are always over capacity, crawling with people that come in for simple problems, manageable outside as easy[45]. Furthermore, HCPs during their medical training do not receive any guidance for enhancing the doctor-patient communication. This leads to phenomena where they are perceived as unapproachable by their patients. The latter are sometimes reluctant to address their questions to their HCPs, as they might be confronted with rudeness and even laughed at.

Extreme overburden of the primary, secondary and tertiary health system due to the COVID-19 epidemic, lack of sufficient funding in the majority of the participating counties created a fertile ground for the expansion of multiple serious public health and safety related problems. Numerous studies have highlighted the lack of available resources and targeted interventions' measures that created an even more difficult situation since available cost saving interventions were not implemented to those that in need such interventions and vice versa, people with mild conditions were spending valuable resources that could save others people lives. Therefore, the majority of the studies show evidence that the available resources were not spent sufficiently and highlighted several targeted strategies such as stratifying patients[46],[47],[48] into distinct sub-groups that can help in guiding treatment decisions and focusing therapies on the appropriate populations in order to avoid overtreatment, improve success rates, and save costs.

AUTH has focused their approach in JADECARE in two main contemporary personalized based models. On the one hand, patient empowerment with the paradigm shift of the patient from passive recipients of the interventions to active agents to their recovery. This is supported by evidence that active involvement and engagement of the patient leads to more favourable outcomes. Patient empowerment has been recognized by the major international organizations WHO, UNODP, ECDC[49] as a fundamental element for patient improvement, moving away from the passive recipient to active agent in her/his recovery plan[50],[51].

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45 Eskolin, S. E., Inkeroinen, S., Leino-Kilpi, H., & Virtanen, H. (2023). Instruments for measuring empowering patient education competence of nurses: Systematic review. Journal of Advanced Nursing

46 Torres Moral, T.; Sanchez-Niubo, A.; Monistrol-Mula, A.; Gerardi, C.; Banzi, R.; Garcia, P.; Demotes-Mainard, J.; Haro, J.M.; the PERMIT Group. Methods for Stratification and Validation Cohorts: A Scoping Review. J. Pers. Med. 2022, 12, 688. https://doi.org/10.3390/jpm12050688

47 Russo, E., Di Bari, S., & Agnoletti, V. (2022). Benefits of patient risk stratification and targeted interventions on multidrug resistant pathogens prevention and control. Discover Health Systems, 1(1), 6

48 Abdelnour, C., Agosta, F., Bozzali, M., Fougère, B., Iwata, A., Nilforooshan, R., ... & Traber, M. (2022). Perspectives and challenges in patient stratification in Alzheimer's disease. Alzheimer's Research & Therapy, 14(1), 1-12

49 Kohl, S. (2018). WHO/Europe and ECDC intensify collaboration on infectious diseases and health emergencies. European Journal of Hospital Pharmacy, 25(2), 111-113

50 Prigge, J. K., Dietz, B., Homburg, C., Hoyer, W. D., & Burton, J. L. (2015). Patient empowerment: A cross-disease exploration of antecedents and consequences. International Journal of Research in Marketing, 32(4), 375-386

51 Anderson, R. M., & Funnell, M. M. (2005). Patient empowerment: reflections on the challenge of fostering the adoption of a new paradigm. Patient education and counseling, 57(2), 153-157

The sharing of information is crucial to patient empowerment and there's ample research which suggests that health outcomes are better in patients who are more involved in decisions about their treatment[52]. Plus, as patients understand more about their illness, they can actively take steps at home to aid their recovery, potentially reducing hospital visits in the future and lowering further costs.

By implementing resources to support patient empowerment, patients will have access to everything that they need instantly, such as ordering meals if they're an in-patient, a digital map of the hospital and their appointment date and time. Taking the responsibility through self-care reduces unnecessary costs in the health system and increase the quality of patients' lives. Ultimately, patients will no longer need to ask staff for assistance, meaning staff will spend less time tending to non-medical queries and can focus on other important matters.

Furthermore, patient empowerment is so much more than enabling patients to assert greater control over their healthcare. It enables a more collaborative relationship, where doctors and patients can work together to decide on the most appropriate care pathway and treatments.

Furthermore, they included the concept of empathy as a "sine qua non" of human interaction and in particular patient-doctor relationship, that is, a determining factor of any type of successful treatment. The basic assumption here was that increasing medical personnel's empathic understanding will increase their capacities to connect with their patients and understand them more effectively while at the same time patients will foster their capacities and skills regarding their condition avoiding in this way the patient-doctor dependency, or the unnecessary hospital visits.

In the same line is the second approach that they selected to implement patient classification/ risk stratification. The goal of risk stratification is to help patients achieve the best health and quality of life possible by preventing chronic disease, stabilizing current chronic conditions, and preventing acceleration to higher-risk categories and higher associated costs. The success of population health management depends, in part, on "accurately identifying patients at high risk for poor health outcomes as well as preventable and costly health events," the report authors explained. "Risk-stratification approaches typically focus on clinical markers[53]. Risk stratification is the foundational step for targeting patients at various levels of risks, and further, scheduling follow-ups and keeping them aligned with their care plans. Here's why risk stratification is important:

- Predict risks: Risk stratification can help providers to proactively identify patients at risk of unplanned hospital admissions. Almost one-third of all the readmissions that take place in the United States are preventable.
- Patient-specific care plans: Identifying patient-specific risk factors that may pose a threat in future can help physicians and health coaches develop care plans tailored to their needs.
- Understanding population health trends: With a continuous assessment of risk factors and the use of risk scores, providers can understand their patient population and find answers to critical questions.

Finally, it's the need of the hour to implement risk stratification in any successful population health management model to classify patients into high-risk, low-risk, and rising-risk groups and to achieve the Triple Aim: better health outcomes, quality care and lower costs of care[54].

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52 Oh, H. J., & Lee, B. (2012). The effect of computer-mediated social support in online communities on patient empowerment and doctor–patient communication. Health communication, 27(1), 30-41
53 Janes, H., Pepe, M. S., & Gu, W. (2008). Assessing the value of risk predictions by using risk stratification tables. Annals of internal medicine, 149(10), 751-760
54 Sheets, L., Lyttle, K., Popejoy, L. L., & Parker, J. C. (2017). The Paradox of Higher Charges for Lower-Risk Inpatient Admissions: When Healthier Patients Cost More. In MEDINFO 2017: Precision Healthcare through Informatics (pp. 1158-1162). IOS Press

Having all this in mind, the basic assumption in this regard was that if AUTH managed to classify the patients based on some criteria they will be able to predict (if not in terms of cause and effect relationship) but more as increase, their probabilistic capacities to group certain type of patient that through previous evidence have been shown to react more positive to certain type of treatment, or sub-group of patients that share similar characteristics. They will be able to be more accurate in their prediction of the treatment retention in intensive care or hospitalized care and thus manage to expand their cost -effectiveness and cost saving approach.

The main strengths of AUTH were the team experience regarding innovative health-oriented interventions, also the team experience in digital innovation, the focus and deep knowledge on co-creation methodologies, community-based approaches, and the e-health hub platforms. Furthermore, primary care teams are used to working together, health professionals are open to trying new approaches and leadership open to innovation.

As main opportunities appear the State's digital transformation (N 4727/2020) and citizens' web portal (gov.gr), the fact that the pandemic acted to speed up digital transformation of health, the expertise from European Actions and participation in corresponding projects and the participation of team members in Networks of health professionals, some of them holding special roles e.g., President of HL7 Hellas and leveraging expertise. Health professionals have been educated in using digital health systems. Ability to engage effectively with and gain the support of diverse stakeholders. The cooperation and participation of national and regional networks and support from European Commission (EC) and close cooperation with major media partners and promotional tools ensures appropriate media coverage, visibility and dissemination of the project activities and results

As particular strengths of their work for classifying the patients they highlight that the database for patients has begun to be created due to vaccination needs and that e-prescription is already integrated in health system. As opportunities they see to strengthen the ICT e-Governance and Management Model, to change the Administrative subordination of the Informatics Organization Sub-Directorates of the Hospitals to the logic of independence and directly cooperate with the hospital administration.

Regarding patient empowerment, team experience in this field, projects involving patient empowerment already running, the increased role of the patients regarding decision making and the wide use of the internet by people of all ages are highlighted. The opportunities in this regard appear as increasing population awareness for need of self-empowerment, to increase the knowledge, skills, attitudes and self-awareness about their condition to understand their lifestyle and treatment options and make informed choices about their health.

2.8.2   The Local Good Practice

Greece's approach on patient classification and patient empowerment

Aimed at empowering the population in order to improve their quality of life and prevent avoidable emergency room visits reducing unnecessary costs and advance on patients' classification through a patient classification tool in order to increase the quality and effectiveness of the healthcare system. Their approach focuses on classification of patients, empowerment of patients and caregivers and digitally enabled integrated care.

AUTH implemented a Local Good Practice (LGP) based on the local needs and capacities of the health system. In Greece, the Medical Health Records – Personal Health Record has not been widely used, leading in a shortage of digitally available medical data. Nevertheless, hospitals have their own digital database, providing the NAWG with a large amount of data available for the performance of classification.

At the same time, patient empowerment has gained ground during the last few years, offering great opportunities, and getting medical professionals accommodated with the idea of managing their patients based on their own needs. For that purpose, the empowerment of the patients was implemented in two different

levels: the patients' level and the medical professionals' level. On the patients' level, they were offered with a large variety of different digital tools, which they can use to educate /inform them on how to manage their symptoms, increase health literacy as well as expand their knowledge regarding their rights and obligations, decision making on issues that affects them (treatment plan etc.). On the medical professionals' level, they were trained in empathy with the use of virtual reality, a skill that is missing from the curricula of the medical schools but is necessary when interacting with patients. Furthermore, the medical professionals were also informed on the patients' and their own rights and obligations when it comes to healthcare. The target population have been patients and their caregivers, as well as HCPs and IT staff.

The NAWG included three research profiles with full participation and a professor and a research institute director as consultants.

Finally, regarding the assessment of the implementation, in regards to the risk stratification it must be said that Greece is moving towards digitalisation, so it would be safe to assume that any changes in the data collection, handling, storage and analysis that may occur in the near future will not come as a result of the policy recommendations that were put together during the project. The best thing that the team can hope for is for these recommendations to form a basis upon which the policymakers will start thinking about the importance of predictions and the valuable outcome they may have for the economy of the country. As a result, there is no way to measure whether the change that is coming our way will be influenced by JADECARE.

As for the work on patient empowerment, they chose indicators to assess the acceptability and feasibility of the studies conducted in the context of JADECARE. These studies included the testing of the mobile and of the VR application, number of downloads, SUS and open questions to participants to assess acceptability.

2.8.3   The implementation process and results

In regard to risk classification, even if AUTH planned to use the ACG grouper, the data that they obtained was of poor quality, so they needed to change the approach and decided to use self-implemented classification algorithms. After that, they did a regression analysis and descriptive statistics of the data implemented and the results were of poor accuracy so that it forced them to abandon the classification approach. Finally, they produced some policy recommendations for risk stratification that were shares with policy makers.

As for patients' empowerment, AUTH planned to create mobile app with scenarios. During the implementation they integrated the JADECARE scenarios on an already existing application and finally they implemented a new application for JADECARE including only targeted scenarios. Furthermore, the work for HCP's empathy for implementing virtual reality (VR) scenarios was accomplished as expected.

To sum up, the main outcomes of the intervention of AUTH were:

- Use of regression analysis and numerous classifiers for patient classification. 150.000 patients classified, even if not with good accuracy due to poor quality of the data.
- The bioethics committee delayed the pilots for mobile and VR apps. Nevertheless, the pilots are completed, USE and SUS collected, modifications made and the mobile app is available in store.
- Creation of a policy recommendations' document regarding patient stratification and sharing the document with local policymakers

The main limitations of AUTH during the implementation were that the classification approach was limited to 2 hospitals of Thessaloniki. The lack of satisfying results led to the abandonment of the proposed method and to targeting policymakers rather than hospitals. On the other hand, the mobile app pilot was limited to one hospital. However, the app is already available on google store. Furthermore, dissemination techniques of the

mobile app need to be investigated in order to raise the spread of it. Finally, the empathy training was limited to one hospital and the scenarios will be now implemented in a non-digital way. If this programme proves successful and well received, perhaps more hospitals will adopt it.

3 Main conclusions and key learnings

3.1 North Denmark Region (RND)

RND started the project with a number of clear objectives developed in collaboration with the Basque and German Good Practices. Along the way, the project was affected by COVID-19, replacement of core staff and the implementation of a new electronic Patient Journal (EPJ) in RND. However, JADECARE achieved the desired results for RND, largely due to a flexible and adaptable approach from the Basque and German Good Practices.

RND has had their data area expanded, both in the form of new dashboards, but also in the form of new discussions around the strategic use of data. More specifically, before JADECARE they had activity data on patients, but did not use it for prevalence or the population approach. They have built a number of new dashboards with input from the Basque and German Good Practices, as well as had a good dialogue with HCPs and other end users about the application. The reports that they have built are both a good basis for expanding with more data in the area of diabetes, as well as expanding to other areas of health.

As for the data on patient absences (Risk factors), they have obtained a good overview of which groups are absent. This empowers them to use this risk stratification together with HCPs to create a more targeted organization of appointments. Moreover, the data can eventually be expanded with more socio-economic data (income, employment and level of education) and PRO data. Both parts will provide a better approach to population data and risk stratification. In addition, there is an opportunity to spread the thinking to other areas, as "diabetes diagnosis code" can relatively easily change to other diagnosis codes.

And finally, regarding the strategical discussion about population approach in RND, before JADECARE they lacked a network where they could work strategically with data. They have now started a good discussion with a wide range of health actors within the field of diabetes and have reached an agreement that in the future RND must have more focus on data and diabetes

To sum up, the above work will form the basis for RND to be able to work more strategically with data in the area of diabetes in the future. The upcoming work in 2023 and 2024 will build on experiences, networks and knowledge gained through JADECARE. Compared to other projects, JADECARE has worked well as it has contributed with new perspectives, networks and concrete input to give RND a solid foundation for this work. It has been very useful for SDCN is sustainable after the project ends, as data dashboards is rooted in SDCN's core activities. In addition, future projects can benefit from working with artificial intelligence.

3.2 Local Health Authority (USL Umbria 1)

The project tried to solve some shortcomings of the Local Health Authority Umbria 1 in terms of information sharing. The improvement of communication between professionals and the fast track for bookings represent a model to be followed in similar cases for the management of chronic diseases.

Clearly the interventions carried out do not solve all the problems but go in the direction indicated by the national guidelines on primary care, territorial operations centres, interoperability of application systems, being some examples of it:

- They have made available to GPs a clinical information set that was not available before the JADECARE project, allowing for better treatment of the clinical case.
- They have speeded up the management of patients with the principle of heart failure by creating a direct channel between the GP and the hospital cardiologist.

- They have trained the professionals who participate in the treatment of heart failure on the empowerment techniques to be transferred to patients.

Finally, the USL Umbria 1 is one of the very few healthcare companies in Italy that allows GPs to access all the historical clinical information of the patients from within their own EHR management system. They think this feature can help spread the use of the Regional Health File and help GPs in the patient care.

3.3   Regional Health Agency Tuscany (ARS Tuscany)

The project has been developed under the European Project JADECARE, and has been structured and concretized in a series of planning, execution, reflection and evaluation processes that have allowed to build a solid management ground for the implementation of our "Model of taking care of complex patients". In particular, the Model has sought to respond to the needs, emphasized at both regional and national level, on the importance of outlining a management model for the complex patient. The emerged model, based on improving communication between professionals and on overcoming the fragmentation of care, has provided the Region of Tuscany with valuable elements that can be used to improve the pathway for the management and care of complex patients.

As a result of the project, professionals belonging to the ARS Tuscany and *Piana di Lucca* District Zone have outlined and implemented a viable model of taking care of complex patients characterized by an integration between territorial and hospital health services that results into the identification of multi-professional and multidisciplinary teams.

The project has produced valuable elements that can be used to improve the pathway for the management and care of complex patients. Evidence of this is that other Local Health Authorities of Italy have also requested to implement the project (without funding) on their sites. So far, five new implementations are sprouting up and ARS Tuscany has been working with them to foster and enhance these processes. Moreover, ARS Tuscany, in order to foster a better replicability and sustainability, has confirmed its commitment to implement and develop new actions to improve the model.

3.4   Central Administration of the Health System Portugal (ACSS)

The project was very important to support the change for a population approach based on risk stratification. ACSS consider that they have not gone so far without JADECARE and it helped to structure the National approach to population risk stratification. In this sense, all the project helped to improve capacity building especially in terms of planning. The project was a solid step for moving to a population-based approach, increasing access and quality of care as well as sustainability of the system. Leadership in the pilots, high level of commitment with population risk stratification and the support of oGP were particular strengths of the project.

They highlight the achievement of key results and learnings of the implementation like having the professionals trained in risk stratification make them capable of using risk stratification information which will have impact in the change for a population approach. Moreover, training on co-design was relevant for the professionals to include the patient perspective in the development of future care pathways and adaptation of those designed during JADECARE. The design of care pathways had as unexpected consequence to improve the communication among teams, especially between hospital and primary care, improving care coordination and communication among professionals. The approach joining the national level with local level implementation was also a strength, aligning professionals working for a common goal. The aim of a national approach with pilot implementation was to test the pilots and then spread all over the country and this is precisely what they will do as they are going to make the information available for all providers until the end of 2023 and introduce risk adjusted financing in all integrated care organizations.

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

Co-funded by the
Health Programme of
the European Union

Finally, having a risk stratification tool implemented is a sustainability key factor, since it will be used to help professionals on decision making, in resource allocation (human resources and financing) and performance assessment. They are also participating in a Joint Action – CIRCE with the aim to develop a personalized plan of care for complex chronic patients that will be identified through the risk stratification. Besides the care pathways, this will be another relevant instrument to improve the coordination of care and communication among professionals. The risk adusted financing will also foster patient centered integrated care.

3.5   University Hospital Olomouc (UHO)

JADECARE has been very useful to UHO and is sustainable after the end of the project because ICT, the need for collaboration, etc. is embedded in UHO's core activities.

During the project, a working group has been formed and expanded to include another group, which is part of the Olomouc Region eHealth. Within this group, a regional subsidy programme for this area has been established, in view of the need for its further development and expansion.

The introduction of video consultation in psychiatry has reached other psychiatrists and there is a growing interest in this service, which is in place in 6 out of 7 health insurance companies. In addition, there is a possibility to extend the ideas to other areas, as the "video consultation code" can be extended to other clinics quite easily. Telemedicine in general has gained more awareness and interest from other clinics. This has led to the development of gestational diabetes, tele ophthalmology, etc. using the dashboard for documentation sharing, communication, integrated care, etc.

It can be assumed that this approach will continue to expand and evolve as the need for better, stratified data collection increases, which can be further augmented with additional data, UDIs, etc. Longer extensions to include collaboration with social, field services in healthcare to a more holistic view of the person allowing risk stratification etc. to machine learning with whisperer for doctors.

As the above clearly shows, the inspiration from the Danish and Basque Good Practices in particular, but also the Catalan Good Practice, is great. The fact that they will continue to build and improve the system, as they are also pushed to do so by the need of the physicians themselves in their research work, positively influences sustainability in terms of management's willingness to continue the activities

The telemedicine programs\apps developed as a result of the intervention built in JADECARE are very good basis for further management of the software, for expansion or redesign in other areas of eHealth or also for linking to another interoperability programme across the EU, as the integration platform created is ready to meet the standards of various other systems.

JADECARE has contributed with new perspectives, networks and concrete inputs to give UHO a solid foundation for this work. They also believe that this is the type of knowledge and experience needed to increase the likelihood of obtaining the additional funding needed not only for sustainability but also for further development in this area. Although, the development of both the telemedicine application and the integration platform was not funded by JADECARE, oGP's experience greatly facilitated the development and direction of the pilot validations.

3.6   Croatian Institute of Public Health (CIPH)

As digital literacy is increasing, CIPH expects many more people, even in the older age groups, will be willing to use the web page and the Portal zdravlja app, which will help the disease management and make the GP-patient communication more efficient. Digital tools use is increasing in people of all ages. Also, European commission

focused its attention on the availability of their respective health data for the citizens, by establishing regulation to set up the European Health Data Space. Furthermore, a web page is a relatively low-cost, user-friendly way for patients with NCDs to obtain useful, evidence-based information on disease management.

In this regard, the questionnaire results showed a low proportion of the GPs consulted uses the Portal zdravlja app. Nevertheless, they identified GPs that have patients with Diabetes mellitus through the letter of invitation in which they described the project itself and explained their role. They established communication with those that are ready for cooperation willing to use educational materials on webpage. Interested GPs then identified patients with enough digital literacy and compliance. Health portal app was established for patients to have access to their health data, and it also developed tools for communication with the GPs. As the web page is not online yet, they do not have data on its usage. They believe that with time more GPs will be interested in this content and will encourage their patients to use webpage.

Furthermore, they prepared materials for webpage that will be uploaded and renewed periodically and in the future they will work on further promotion of digital literacy amongst general population. Content of the webpage will be expanded and they will include information on disease prevention, other health related topics such as pregnancy, vaccination, workplace disease management etc. The webpage is sustainable as it will be easy to maintain, and it will be even more relevant as they expect an increase in the number of people with NCDs.

3.7 Ministry of Health of the Republic of Serbia (MoHRS)

Aging and increase in prevalence of non-communicable diseases lead to a greater need for long-term care and optimization of the entire health care system. Introduction of digital communication between healthcare workers at all levels of health care should make the healthcare services more efficient and patients more satisfied. Improvements in coordination between health providers should contribute to continual health care and better quality of patient care. Deployment of relevant web based health -information and access to them can strengthen patient capacity to recognize disease and manage their own health

Regulation on introduction of new services in the nomenclature of health services financed by state budget, financial resources limitations, organizational issues in healthcare institutions, as well as established patient access to health care which are difficult to change can influence the implementation and expected outcomes.

In this framework, the MoHRS aimed at improving the integration of health information system; and patient empowerment in order to provide affordable, efficient, quality services, interventions and programmes with a sustainable continuity in their provision in the areas of prevention and treatment of persons suffering from chronic diseases, and in accordance with their needs.

The intervention achieved to integrated the module of of E-health record with local information system, to train the health saff on its access and use and integrate the module for e-consultations with local information system has been completed in the field of diabetes in 5 institutions.

In regard to patient empowerment activities, risk assessement on personal data protection was accomplished and a mobile E-health application (Google play, iOS) was released. Furthermore, a working team was set up for developing the contents relevant for patient empowerment through the E-health portal and E-Health portal was extended with introduction of 14 topics of relevant medical contents made by health proffessionals, publicly available. The instructions for the use of E-health portal were also publicated and partiatlly promoted in media. Finally, 200.000 authentications for personalized access to E-health portal were issued.

The main limitation in the process was the political circumstance as the Government constitution constrained the Adoption of Rulebook on nomenclature of health services (amendment on e-health consultation) on time. The mitigation actions implemented in this sense were to conduct the pilot project "E-diabetes" in order to implement the e-consultation between GPs and specialists, regardless the regulation obstacles on service financing.

3.8 Aristotle University of Thessaloniki (AUTH)

AUTH highlighted various key findings, like the fact that Greece is not ready for stratification methodologies and that policymakers need to work towards digital health and collection of high-quality medical data. Furthermore, patients find useful empowering methodologies, but will not look by themselves and somebody needs to present such application to them. Moreover, HCPs find empathy training useful but they prefer non-digital solutions and the hospital where JADECARE was implemented is finally trying to organize relevant empathy workshops thanks to the participation in the project.

On the other hand, they also noted several strengths, such as, this was the first attempt on analysis of large medical data in Greece. Even if not being successful, it implied medical professional getting in touch with the idea of stratification. The non-availability of high-quality medical data led to the creation of a set of policy recommendations and hopefully this will serve to disseminate the need for high quality digital medical data. On other range of issues, empathy training in medical professionals was well received even if the HCPs still prefer a more collaborative way in the real world. Thus, it will be implemented in more different ways in the future as patient empowerment is considered really useful. Precisely, the high acceptability of the patient empowerment mobile scenarios led to the search for funding for enriching the application with new scenarios and feedback regarding the empathy training led to the search of other, non-digital ways for empathy training organized by the hospital.

AUTH has planned some important next steps as the dissemination of the policy recommendations, trying to collect more hospital data through other funded projects and investigate the use of ACG grouper for patients' stratification in the future. On the other hand, they also plan to disseminate the mobile app to increase the number of downloads from the store and enrich the mobile app with more scenarios. Moreover, empathy training within hospital will be funded by other projects and they will investigate new ways for achieving patient empowerment.

3.9 General conclusions and key learnings

The Basque Good Practice on Health Strategy for ageing and chronicity: integrated care is a population model based on preventive interventions, patient empowerment and personalized medical care. It places particular emphasis on the continuity of care, patient safety, adherence and improving the patient experience. It includes the social and health coordination and the organizational design on integrated health organizations with joint governance bodies for primary care and hospital care, risk stratification and care plans based on the needs for a complex patient multidimensional assessment and action for people aged 70 or older (Care Plan for the Elderly), the development of new nursing roles (such as liaison nurses and case managers), actions to support safety in polypharmacy management, and also to foster patient empowerment and self-management of patients' illnesses. All of that, supported by a transversal eHealth strategy that resulted in the deployment of integrated communication and information systems that enable non-face to face care focused on prevention, monitoring and health advice.

Eight Next Adopters of seven EU countries have worked in the transfer of the Basque Good Practice in JADECARE, given that three of them have also transferred elements of other Good Practices. The latter have taken

advantage of synergies in the transferred areas, as in the case of RND and UHO that have learned from the use of data and risk stratification of different partners or CIPH that has learned on different approaches to improve communication channels between HCPs and promote patient empowerment.

The transfer of the Basque Good Practice has been focused mainly on the area of integrated care. The Next Adopters identified 27 strategic intervention areas in this field, 9 related to risk stratification and only two related to patient empowerment. According to it, six out of the eight NAs of the Basque Good Practice finally transferred elements of integrated care, while half of them transferred elements of risk stratification and also four transferred patient empowerment related features.

More specifically, the CF about care coordination and communication between health professionals was the most selected one to transfer, as it is shown in the figure below, and for the contrary, the creation of IHOs was not finally transferred by any NA, what totally aligns with the complexity of this feature and regulatory requirements.
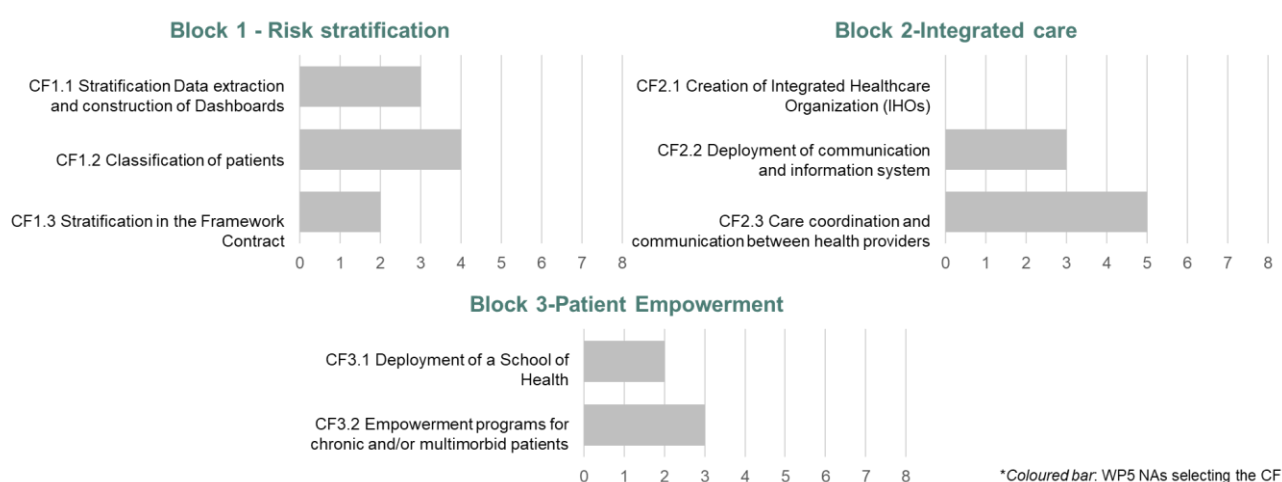

Figure 22: Core Features finally selected by the Basque oGP Next Adopters

JADECARE has contributed to settle the basis to implement integrated care at different levels of the adopting regions. ACSS has worked on a national level approach as after piloting phase started in JADECARE it aims to extend their implementation and achieve a national policy on risk stratification. It is also the case of CIPH that worked on a digital literacy and communication strategy by means of national level digital tools (education web page and app) and MoHRS. ARS Tuscany, USL Umbria 1, RND, UHO and AUTH have deployed their interventions at regional level, however, they also envision to extend them to other regions of their countries in future steps.

The transfer and implementation process has had impact on the Next Adopters' contexts by helping to change their model of care provision, as it can be clearly stated in the case of ARS Tuscany and their development and roll out of a viable model of taking care of complex patients. Similarly, USL Umbria 1 has improved the management of HF patients by directly connecting GPs and hospital specialists.

Furthermore, it has directly impacted on key target groups by promoting collaboration, networking and building trust among them. Partners from RND have been able to build a network where to discuss about strategic use of data, whereas ACSS enlightens the unexpected consequence of care pathway design that improved communication and coordination among hospital and PC teams.

In addition, JADECARE has contributed to the digital transformation of NAs, ranging from the development of data dashboards (RND), the enablement of interoperability between different application systems and the access of GPs to patients clinical information (USL Umbria1), the development of a risk stratification tool (ACSS),

the introduction of video-consultation in some specialities (UHO) or the to the development and roll out of scenarios promoting empathy using virtual reality equipment (AUTH).

Finally, the work done in JADECARE contributes towards achieving long-term effects and potential multiplier effects, such as replicable, transferable and sustainable activities. For example, AUTH have developed policy recommendations on the use of health data that will be disseminated among policy makers in Greece, while UHO will very likely extended video consultation to other clinical areas quite easily. All these, has had an impact not only in healthcare professionals but also on patients, carers and the general population.