



Department of Economics
Democritus University of Thrace

Interreg
Greece-Bulgaria
eHealth Monitoring
European Regional Development Fund



D4.3.2: Application/ Software Development

(Business analyst)

«Report on the Feasibility Study for the Healthcare Monitoring System»

Reporting period: 06/12/2018 – 05/05/2019

WP4: Joint Monitoring System

Project:

**IMPROVING HEALTHCARE ACCESS THROUGH A PERSONAL HEALTH
MONITORING SYSTEM**

Sotirios Serdenis

November 2019

The project is implemented in the framework of INTERREG V-A “Greece-Bulgaria 2014-2020” Cooperation Programme and is co-funded by the European Regional Development Fund (ERDF) and by national funds of the countries participating in the Programme

<http://www.ehealthmonitoring.eu/>

The contents of this publication are sole responsibility of project partners and can in no way be taken to reflect the views of the European Union, the participating countries, the Managing Authority and the Joint Secretariat

Summary

According to the contract (14/09/2018, Ref. No: 44957) the current report of the deliverable «Healthcare monitoring system design» that is being implemented within the frame of WP 4 Joint Monitoring System of the project IMPROVING HEALTHCARE ACCESS THROUGH A PERSONAL HEALTH MONITORING SYSTEM under the INTERREG V-A Greece – Bulgaria 2014-2020 Programme, describes the activities that have been carried out within the period 06/12/2018 – 05/05/2019.

The deliverable presents the results of the second phase of the feasibility study for the system under development and the required research. Following the first phase, which focused on the analysis of the expected benefits, as well as a thorough market analysis, this second phase involved identification and review of best practices with regard to the digitization of healthcare systems and services throughout Europe. The outcome of this study was a set of valuable lessons and guidelines that will form the design of the system and its application, both within the frame of the project's pilots, as well as for its potential commercial exploitation after the completion of the project.

Table of Contents

Summary	2
Table of Contents	3
1 Introduction.....	4
2 Digital Transformation in Healthcare	6
3 Overview of Best Practices	8
3.1 Definition	8
3.2 Scope.....	8
3.3 National agendas, policy and socio-economic evolution at the Member States level	8
3.3.1 France.....	8
3.3.2 Italy	13
3.4 New community involvement in eHealth	16
3.4.1 European Network of Living Labs.....	16
3.4.2 Spain	18
3.5 Healthcare regional development.....	19
3.5.1 Germany.....	19
3.6 New procurement models	21
3.6.1 Sweden.....	21
3.7 New business models and service models	23
3.7.1 Bulgaria.....	23
3.7.2 Italy	25
4 Conclusions.....	26

1 Introduction

The eHealth Monitoring project aims to provide a reference infrastructure for the provision of healthcare services to population groups that lacked access under the traditional systems, through the development and pilot implementation of a digital solution that enables remote health monitoring. The main objective of the provided services is to improve the quality of life of patients with chronic conditions, such as diabetes, hypertension, cardiovascular disease or COPD, and to enhance their well-being and ability of self-management. The ultimate goal is to create substantial benefits for society and the public healthcare system.

During the first phase of this study, an extensive analysis of the expected benefits of the Health Monitoring System for each of the relevant stakeholders (providers, patients, relatives, etc.), which can be summarised in the following:

- Improved quality of life for seniors and chronic patients, as well as people with special needs and impaired mobility, especially those residing in remote and rural areas.
- Prevention, timely diagnosis and support, as well as improved emergency management (e.g., falls, acute episodes, etc.).
- Reduction of hospitalisation rates and hospitalisation time, resulting in reduction of costs and burden on the healthcare system.
- Encouragement of patient adherence and comprehensive monitoring, improving results and creating a sense of safety for patients and their relatives.

To highlight the usefulness of the system under development and to properly design its future market placement, a thorough analysis of the market was conducted, reporting on the size of the market and the targeted user groups, as well as on existing competition. The size of the targeted groups is larger than 2.4 million potential users just in the Greek market. Furthermore, the unique value of the system lies in its design, which allows it to offer services that are currently not available in the Greek market.

The Health Monitoring System will be designed appropriately to ensure flexibility, so as to facilitate its implementation in both involved countries, but also other targeted European countries, as well as countries in the Middle East, without extensive modifications. For this reason, the use of well-established standards is an important parameter for the development of an interoperable solution, exploiting reliable technologies for sensor integration and medical data management, with the aim to create a new paradigm for health service provision.

Based on the aforementioned and in order to facilitate the system's potential implementation beyond the frame of the project, lessons learned for relevant best practices must be taken into account during the system's design. Best practices may include new business and financial models, national or regional incentive mechanisms, procurement and reimbursement regimes, feasible operation models and paradigms of new opportunities for community involvement in healthcare service provision.

To that end, the second phase of the Feasibility Study involved research of examples of best practices, mainly within Europe, with review of relevant literature and reports of similar research projects. The results of this study are presented in this deliverable.

2 Digital Transformation in Healthcare

Long-term care (LTC) is continuum of care and is referred to nursing homes, assisted living, and board-and-care homes, where different programmes and services are included: adult day service programs, meal programs, senior centres, home healthcare aides, and transportation services. According to the new Technavio report from 2017, the global LTC market is going to grow gradually (at a CAGR of 6.18%) during the period from 2017 to 2021¹. The growth is majorly attributed to the increase in demand due to society issues coming from proven tendencies of ageing population for the next 10 years². According to the report, another major driver for long-term care market is the increased healthcare budgets by governments. Globally, many countries have constantly been increasing their healthcare budget as a part of their social security measures.

Aiming to dissolve healthcare problem, new disruptive ICT solutions are already on the market affecting and changing the healthcare and service delivery. The integration of mobile devices into home healthcare systems is a key trend in healthcare nowadays. As a result, new ways of delivering care, as eHealth, have appeared with main functions to integrate and coordinate technology solutions and care services applying the power of innovative information and communication technologies.

eHealth is defined as an electronic health care solution that reduces the effort of caretaking by linking nursing facilities with each other³. The overall approach of eHealth is referred to as socio-technical innovation⁴. It a part of the technological and sociological revolutions that are going across all industries, leaded from digital transformation to Industry 4.0⁵. The emphasis is put integration - non-ICT supported care practices and eHealth are complement each other for the benefit of the patients, rather than trying to merely replace 'old' ways of delivering care with entirely new ones supported by ICT.

Digital transformation has made information a top value driver in the healthcare industry, leaving data-driven business models with the potential to re-shape the customer landscape. These new business models are based on collecting and connecting health-related data from all available sources,

¹ Technavio, Global Long-Term Care Market 2017-2021 URL: <https://www.technavio.com/report/global-long-term-ca>

² Jaspersen, Carmen (2014), Schluss mit Schwester!, URL: <http://www.zeit.de/2014/12/kopfgeld-pflegepersonal-klinik>

³ Franz, Barbara (2010), e-Care: mobile Informationssysteme im Gesundheitswesen, Krankenhaus-IT Journal, Vol. 4/2010, S. 60-61, URL: http://www.medizin-edv.de/ARCHIV/e-Care__mobile_Informationssysteme_im_Gesundheitswesen.pdf

⁴ Veli Stroetmann and Strahil Birov, Study on support to scaling-up of innovations in Active and Healthy Ageing, Final Report, A study prepared for the European Commission DG Communications, Networks Content & Technology by Empirica,2017

⁵ Morris Hosseini, (2015) What will the future look like under Industry 4.0 and digital transformation in the healthcare space?, Rolland Berger Strategy Consultants

extracting meaningful information from that data, and providing that information to other players. In this study, we present a data-based business model landscape in healthcare that incorporates over 290 existing business models and market approaches. Although leading players have already started to leverage this extra value for their business, the key to ongoing success will lie in knowing how to acquire and retain access to the required data, as well as how to interpret it and generate value from it - both now and in the future.

Industry 4.0 will have fundamental impacts on traditional ways of healthcare far beyond the product only. The digitalization boost healthcare offering closer to the users' individual demands, playing as an accelerator that upgrades the healthcare product and services by adding one more dimension – the information that creates value for the users. Because of those changes, new value-based care models appear including combination of digital technologies and existing care services. Therefore, changes in payments and contracting the organisation of services are ongoing and to allow providers to exploit this new set of improvement opportunities.⁶

Nevertheless, there are still a lot of challenges and barriers to be overcome in the eHealth market sectors and verticals. The analysis of current eHealth deployment levels done by our study shows that nowadays existing eHealth solutions are still some distance away from being mainstreamed in the sense of being widely available within and across the countries.

One of the main priorities of the European Commission is to scale up digital innovations in health and care services in Europe. The scaling-up strategy in Active and Healthy Ageing (AHA) by the European Commission defines five steps for setting up an effective European scaling-up strategy: building a database of innovative practices, their viability assessment regarding scaling-up potential, their classification for replication purposes, the facilitation of appropriate partnerships, and implementation of the innovative practices in other regions and countries. An online repository of innovative practices is available to the European Innovation Partnership on AHA (EIP on AHA) community⁷. Mobilising sufficient resources and expertise and combining them with collection of innovative practices can ensure implementation of innovative solutions for active and healthy ageing on a European scale⁸.

Highlighting best practices across Europe in the healthcare area, which is under continuous digital transformation (similar to “Industry 4.0”), is a way to learn about trends, possibilities and to plan future collaboration actions involving all kind of stakeholders in the field of eHealth. Fifteen cases as best practices for the future commercialization of the Health Monitoring System were identified, based on the partners' experience and described in the next chapters.

⁶ Ben Collins, New care models, The King's Fund 2016, URL: <https://www.kingsfund.org.uk/publica>

⁷ https://ec.europa.eu/eip/ageing/repository_en

⁸ European Commission, EIP on AHA portal, URL: https://ec.europa.eu/eip/ageing/home_en

3 Overview of Best Practices

3.1 Definition

A best practice is a technique or method that, through experience and research, has proven to reliably lead to a desired result. A commitment to using the best practices in any field is a commitment to using all the knowledge and technology at one's disposal to ensure success.⁹

3.2 Scope

This report aims to collect experiences and successful stories from care providers, technology providers, governmental and non-governmental organizations in healthcare and eHealth at European level. The selected examples are presented per country under the following categories:

- Chapter 3.3: National agendas, policy and socio-economic evolution at the Member States level
- Chapter 3.4: New community involvement in eHealth
- Chapter 3.5: Healthcare regional development
- Chapter 3.6: New procurement models
- Chapter 3.7: New business models and service models.

3.3 National agendas, policy and socio-economic evolution at the Member States level

3.3.1 France

Title	Health services delivery transformations
Clinical or policy priorities addressed	<ul style="list-style-type: none"> • Designing care; • Healthcare services; • Change management in primary care.
Challenges / problem identified	<ul style="list-style-type: none"> • Large proportion of population without coverage for basic health services under privatized insurance system; • Absence of guidelines and protocols for disease management in primary care; weak implementation of limited guidelines in place; • Majority of health providers salaried by privately owned health facilities, with the exception of rural practitioners who are individual fund holders; overabundance of physicians and acute shortage of nurses; weak gatekeeping ability of

⁹ Margaret Rouse, The essential guide to supply chain management best practices, <http://searchsoftwarequality.techtarget.com/definition/best-practice>

	<p>primary care providers; geographic access to providers is fair, but financial barriers exist;</p> <ul style="list-style-type: none"> • Ongoing investment in health infrastructure; private sector responsible for services delivery with only limited oversight and regulation from the government; • Lack of continuing education for providers; absence of monitoring and regulation threatens care quality and patient safety.
<p>Goals and activities</p>	<p>Growing concerns regarding the organization and availability of general practitioners, particularly in rural areas, triggered action to work towards a new model for the organization of primary care providers. Starting in 2007, regional and national government actions were taken to encourage the development of multiprofessional group practices, known in French as “maisons de santé pluriprofessionnelle” (MSPs). As a result of these efforts, approximately 700 MSPs are now operational across the country, with a target of reaching 1000 by 2017.</p> <p>In 2007, in response to anticipated declines and regional disparities in the number of general practitioners working in France, particularly in rural areas, a number of regional and national efforts have been directed towards supporting the reorganization of primary care providers into multiprofessional group practices (MSPs). MSPs are designed to co-locate a minimum of two general practitioners with at least one additional health professional in primary care. MSPs were positioned to contribute to the development of a new model for the delivery of primary care and increasingly awarded funding to support establishment in underserved areas.</p> <p>In 2009, to encourage the establishment of MSPs, Regional Health Agencies established to expand local authority over provision of care; Regional Health Agencies begin offering financial incentives to support MSPs.</p> <p>2010 – 2014, Regional successes stimulated a national government initiative to co-finance the start-up costs for MSPs and experiment with new methods of paying providers by payment-for-performance. Under direction from the Department of Social Security, Regional Health Agencies were responsible for managing the initiative and</p>

	<p>recruiting MSPs to participate.</p> <p>In 2015, the evaluation of national government initiative completed; results show increased access to care, increased productivity and delivery of better quality services, notably around diabetic monitoring, vaccination screenings and prescribing efficiency.</p> <p>Present time - MSPs continue to operate across the country and increase in popularity.</p>
<p>Best practice description</p>	<p>Description of transformations:</p> <p><i>Selecting services.</i> In addition to the comprehensive package of primary care services offered by all general practitioners in France, MSPs provide a wider scope of services through other health professionals co-located in the practice. Complementary services that could be offered include prenatal care, physiotherapy, mental health services and dental care.</p> <p><i>Designing care.</i> MSPs have been incentivized through government subsidies to develop protocols to improve the coordination of services. However, development and implementation of protocols is at the discretion of MSPs, which are free to organize care as they see fit.</p> <p><i>Organizing providers.</i> The majority of general practitioners now work in group practices, with MSPs being one form of these. MSPs are distinct from other group practices in that they collocate a minimum of two general practitioners with at least one other health professional such as a nurse, physiotherapist or dietician.</p> <p><i>Managing services.</i> As private practices, MSPs are primarily financed by primary care providers. However, unlike independent private practices, initial financial investments are divided among multiple partners, thus decreasing individual financial risk. Furthermore, MSPs have received considerable financial assistance with start-up costs through government channels, particularly in underserved areas. MSPs are each responsible for attracting professionals and organizing the services they provide. Health professionals within MSPs are individually contracted to provide services by Regional Health Agencies, but do so in cooperation with other providers working within the practice.</p> <p>On average, MSPs are open more days a week (5.5 days) for longer</p>

	<p>periods of time per day (11.5 hours) than other practices, increasing patients' access to care. Despite this, general practitioners in MSPs do not typically work more hours than peers in other practice settings, as scheduling flexibility allows sharing of patient rosters and distribution of work hours as needed. "The idea is that it is not only in the same place, but working together."</p> <p><i>Improving performance.</i> The initiative is monitored through claims data as reported to the national insurance fund. This information, in addition to a survey designed to report on the structure and organization of MSPs, formed the basis for the evaluation completed in 2015.</p> <p>New legislation approved by the National Assembly in April 2015 aims to restrain spending growth through reforms focused on three broad areas: improved preventative healthcare, a larger role for general practitioners and stronger patient rights. This new piece of legislation is based on three pillars:</p> <ol style="list-style-type: none"> 1. Anticipating loss of autonomy, which comprises financing action on prevention and combating isolation among elderly people (185 million euro according to the estimated budget, see Dossier de press of March 2015); 2. Adapting society to ageing, which includes the launch of a plan to adapt 80,000 private housing solutions by 2017; renovate residence accommodation, renamed "autonomy residences"; and create civil volunteering for seniors (these measures amount to 84 million euro); 3. Support for older people facing loss of autonomy, which focuses on home based care. Key to this support is a reform of the "personal allowance for autonomy" (Allocation personnalisée d'autonomie - APA), which was created in 2002 to finance home care services and residential care. The intention is to make it easier for elderly people to stay at home if they want to, by increasing the amount of the benefit, and by providing funding for introducing new technologies in their daily lives and for training social care workers. Furthermore, it includes measures in favour of informal carers. <p>Yet even though official policy is more focused on reducing costs, many elements of the VBHC agenda are represented. The French authorities are increasingly reviewing patient outcomes (in an effort</p>
--	--

	<p>to assess the utility of drugs compared with cheaper alternatives) and at rationalising the myriad providers (with a view to boosting efficiency), as well as experimenting with different pricing strategies. Despite the fact that there is no official government-led push towards VBHC, data-collection services by the authorities are effective and could potentially be harnessed if the authorities shifted to a more specific value-based agenda.</p>
<p>Impact/outcomes</p>	<ul style="list-style-type: none"> • Since their introduction, approximately 700 MSPs have been set up across France, predominantly in rural areas. These practices give a more comprehensive range of services and increased access to care for patients; • Entire population provided access to a basic package of services including primary and emergency medical care, elective surgery, oncology and obstetrics; increased emphasis on health promotion and disease prevention services; • New evidence-based guidelines, protocols, and tools for primary care in development; guidelines based on World Bank recommendations; • Initiative plans to strengthen gatekeeping by primary care providers and improve referral systems; reductions in physician numbers are planned with corresponding increases in the number of nurses; • Increased government oversight of services delivery; increased role for district-level public health centres in managing services delivery under discussion • Planned training for providers on new guidelines and protocols once finalized; planned implementation of monitoring systems with performance incentives.
<p>Results/Lessons learned</p>	<p>The French healthcare system is lauded as one of the best in the world. France's universal public-private system is characterised by high levels of user satisfaction and comparatively low costs as a share of GDP. The Agence national d'accréditation et d'évaluation en santé (ANAES) has a solid track record of collecting and testing evidence for this. Virtually the entire population is covered by public</p>

	<p>health insurance, which provides reimbursement for most medical costs. The level of reimbursement varies, depending on the drug or service, but most people also have supplemental private healthcare insurance policies that reimburse any costs not covered by public coverage. France has made no official push towards value-based healthcare. Instead, government policy is focused on containing costs and reducing the large healthcare deficit.</p> <p>Articulating a clear government vision ensured reforms had a strong foundation on which to build.</p> <p>Learning from earlier experiences and international partners helped avoid potential difficulties.</p> <p>Inclusion of stakeholders in the design process helped build local consensus for change.</p> <p>Following strategy development, detailed plans were drawn up to guide proposed reforms.</p>
Background information	<p>The French health care system is one of universal health care largely financed by government national health insurance. In its 2000 assessment of world health care systems, the World Health Organization found that France provided the "close to best overall health care" in the world.</p>
References	<ol style="list-style-type: none"> 1. WHO, Lessons from transforming health services delivery: compendium of initiatives in the WHO European Region, 2016 2. Country snapshot, Value-based healthcare: A global assessment, France, The Economist Intelligence Unit Limited 2016

3.3.2 Italy

Title	Health promotion and primary prevention – The Mattone Internazionale Programme
Clinical or policy priorities addressed	<ul style="list-style-type: none"> • Care and quality; • Health promotion; • Prevention.
Challenges	<ul style="list-style-type: none"> • Harmonising the national health system in line with the principles of the European Union; • Strengthen the cooperation at EU level in key sectors where there is an EU added value;

	<ul style="list-style-type: none"> • Ensure greater understanding of health at EU and international level; • Dedicate major attention to health affairs.
<p>Goals and activities</p>	<p>The general objective of the Progetto Mattone Internazionale” (PMI) consist of: “Bringing the health system and policies of the Italian regions in Europe and Europe in the health systems of the Italian Regions”.</p> <p>PMI has played a role in providing opportunities for networking and sharing good practices. Furthermore, the regions identified reference persons for internationalization, who are key figures in ensuring the connection between specific commitments and regional priorities/activities and the establishment of Italian RS.</p> <p>PMI supported the interactions between Italian partners of the European Innovation Partnership on Active and Healthy Ageing (EIP-AHA). Due to its interregional and national dimension, this initiative represents a horizontal good practice that spans the dimensions of ageing pursued by Italian applicants with their commitments, considering various aspects: frailty, cognitive decline, functional decline, dependency, nutrition, physical exercise, health and social care renewal.</p> <p>In this perspective, the good practices presented by Italian regions might be considered a read-out of how PMI worked to disseminate and foster Italian participation in the EIP-AHA initiatives, thus contributing to stimulate the coherence with EU planning.</p> <p>PMI provides a platform that supports networking activities (www.promisalute.it) Throughout its platform, PMI has been at the core of a system of partnerships and networks.</p> <p>In summary, PMI represented an innovative governance method for supra-regional interest, aimed at accessing the European direct and indirect funds. The impact analysis of the whole activities showed the positive influence on the internationalization of the National Healthcare System (SSN) policies.</p> <p>The project is now having a new governance and promotion through a new initiative called Pro.MIS (Programma Mattone Internazionale Salute). Starting from lesson learned from PMI, the following figure identifies the tasks that characterize the new model to ensure proper</p>

	<p>planning, the continuity and the response to the common needs.</p>
<p>Best practice description</p>	<p>To promote the internationalization of regional health systems, the MoH, in close cooperation with the State-Regions Conference, founded the Mattone Internazionale Project. This project aims to increase the role of the regional health systems and policies in Europe by strengthening their ability to investigate opportunities offered by the European Union and other international organisations. The project oversees the implementation of educational and information activities addressed to ministry organisations, Italian regions, local social health authorities, hospitals, as well as other stakeholders involved in health topics, in order to promote the dissemination of EU policies and opportunities to access EU financed programmes in the framework of health, research and innovation in the national territory. In addition, the project activates specific mechanisms for the promotion of qualified stakeholders to participate in European and international health policies.</p>
<p>Impact/outcomes</p>	<p>Italian regions joined forces through the “Progetto Mattone Internazionale” (PMI) of the Ministry of Health developing several national and international collaborations. Activities from all five Italian reference sites are presented with different good practices and scale-up approaches for improving health in ageing population. A database has been developed for the collection of good practices that the Italian regions and autonomous provinces have presented at the European level in the context of the European Innovation Partnership on Active and Healthy Ageing. The database is aimed at collecting regional good practices but does not intend to examine internal evaluation procedures and related validation as each Italian region has developed an internal evaluation system for good practices assessment.</p>
<p>Background information</p>	<p>Ageing population implies an increasing demand for health care services and resources, unsustainable according to current previsions. The European Commission is tackling this challenge throughout initiatives such as the EIP-AHA with three main purposes: to improve health and quality of life of older adults; to improve the efficiency and sustainability of health systems; to strengthen the competitiveness of European industry by investing in innovative</p>

	<p>products and services in the field of health and ageing.</p> <p>To promote the internationalization of regional health systems, the MoH, in close cooperation with the State-Regions Conference, founded the Mattone Internazionale Project. This project aims to increase the role of the regional health systems and policies in Europe by strengthening their ability to investigate opportunities offered by the European Union and other international organisations. Veneto Region, through the ULSS 10 Veneto Orientale – the regional health unit – coordinated all the operational activities.</p>
<p>References</p>	<ol style="list-style-type: none"> 1. The Ministry of Health and the Istituto Superiore di Sanità of Italy Joint Action Chrodis¹⁰ 2. Maddalena Illario, Vincenzo De Luca, Giovanni Tramontano, Enrica Menditto, Guido Iaccarino, Lorenzo Bertorello, Ernesto Palummeri, Valeria Romano, Giuliana Moda, Marcello Maggio, Mirca Barbolini, Lisa Leonardini and Antonio Addis for the Italian EIP-AHA Working Group, The Italian reference sites of the European innovation partnership on active and healthy ageing: Progetto Mattone Internazionale as an enabling factor, Ann Ist Super Sanità 2017 Vol. 53, No. 1: 60-69 3. Good practice in the field of health promotion and primary prevention, Italy Country Review, developed by EuroHealthNet, as part of Work Package 5, Task 1 of JACHRODIS¹¹

3.4 New community involvement in eHealth

3.4.1 European Network of Living Labs

<p>Title</p>	<p>Healthcare Living Labs</p>
<p>Clinical or policy priorities addressed</p>	<ul style="list-style-type: none"> • Care and quality; • Research; • Value generation.

¹⁰ The Ministry of Health and the Istituto Superiore di Sanità of Italy, Good practice in the field of health promotion and primary prevention, Italy Country Review, Joint Action Chrodis, URL: https://ec.europa.eu/eip/ageing/sites/eipaha/files/practices/italy_country_review_ja_chrodis.pdf

¹¹ Good practice in the field of health promotion and primary prevention, Italy Country Review, developed by EuroHealthNet, as part of Work Package 5, Task 1 of JACHRODIS, URL: http://chrodis.eu/wpcontent/uploads/2016/01/Dissemination_brochure_02_WEB.pdf

<p>Challenges</p>	<p>Through the user engagement methodologies and tools the aim is to deliver better health care to the ageing population, furthermore products and services validated in real life scenarios by the key user groups. The innovative holistic solutions address social and emotional goals enhancing the quality of life and wellbeing of the ageing population and enable independent living for longer.</p>
<p>Goals and activities</p>	<ul style="list-style-type: none"> • Active participation in Ambient and Assistive Living Programmes; • Working on Innovative, socio-technical systems and design solutions for health and wellbeing; • Pilot and interaction driven new Active and Healthy Aging products and services; • User driven innovation and evidence-based research in the AHA domain; • Collaborations with nursing homes, daily care centres, elderly homes etc.; • Active user validation of wearables on the health domain.
<p>Best practice description</p>	<p>Living Labs (LLs) are defined as user-centred, open innovation ecosystems based on systematic user co-creation approach, integrating research and innovation processes in real life communities and settings.</p> <p>LLs are both practice-driven organisations that facilitate and foster open, collaborative innovation, as well as real-life environments or arenas where both open innovation and user innovation processes can be studied and subject to experiments and where new solutions are developed.</p> <p>LLs operate as intermediaries among citizens, research organisations, companies, cities and regions for joint value cocreation, rapid prototyping or validation to scale up innovation and businesses. LLs have common elements but multiple different implementations.</p>
<p>Impact and outcomes</p>	<p>ENoLL counts today over 150 active Living Labs members worldwide (409 historically recognised over 11 years), including active members in 20 of the 28 EU Member States, 2 of the candidates and it is present in 5 continents in addition to Europe.</p>

	Directly, as well as through its active members, ENoLL provides co-creation, user engagement, test and experimentation facilities targeting innovation in many different domains such as energy, media, mobility, healthcare, agrifood, etc. As such, ENoLL is well placed to act as a platform for best practice exchange, learning and support, and Living Lab international project development.
References	http://www.openlivinglabs.eu/

3.4.2 Spain

Title	Healthcare management and strong regional collaboration – INTRAS Foundation
Clinical or policy priorities addressed	<ul style="list-style-type: none"> • Health and social-health; • Research and innovation projects; • Value generation.
Best practice description	<p>The INTRAS Foundation is working on five areas:</p> <ul style="list-style-type: none"> • Healthcare – achieving psychological recovery of patients through psychological treatment, rehabilitation and person’s empowerment; • Social care – providing social and social-health interventions to address the social and social-health needs of people in need through comprehensive social services network that encourages the user to develop a personal project of life and to be committed to it; • Work integration and training – vocational training, occupational activities, training for employment and self-employment for people in need; • Project management – national and international project development; • R&D – development of innovative products and services to support the quality of life of the people in need.
Impact and outcomes	<ul style="list-style-type: none"> • Teams of engineers, researchers and clinical psychologists are working together in development of ICT based solutions and evaluating its feasibility efficacy and effectiveness to improve the quality of life of people with mental health diseases, elderly, disabled and dependent people, caregivers, etc.;

	<ul style="list-style-type: none"> • Development of new technologies for cognitive rehabilitation, intervention and treatment; • IBIP-Lab, part of the facilities managed by INTRAS Foundation, is a member of the European Network of Living Labs (ENoLL), and has an “Innovation Open Space”, a memory clinic, four laboratories (eHealth, Virtual reality applied to psychosocial treatment, assistive technologies and a Snoezelen room), a Data managing area for clinical trials and training room; • Collaborates permanently with national and international research centres, health care centres, third sector organizations, universities and companies; • A unique organization for Spain and Europe was established so called CLUSTER SIVI Innovative Solutions for Independent living; • Research and innovation ecosystem was developed that is able to mobilize stakeholders from a wide number of disciplines and expertise.
References	http://www.intras.es/

3.5 Healthcare regional development

3.5.1 Germany

Title	High potential of eHealth
Goals	New ground to be developed that helps keep people healthy and make people happy.
Beneficial opportunities and good influence factors	<p>The health care industry as a whole offer some of the best prospects of any of the future-oriented industries - provision of health & fitness facilities, health tourism and eHealth; new and holistic health care services; medical technology and biotechnology.</p> <p>In Lübeck, it goes a step further - in this location’s is situated the strongest Healthcare industry cluster in Germany with more than 100 years of local history. It includes globally active, internationally renowned companies who owe a great deal of their success to their outstanding geographical location with its superb industrial and transport infrastructure, and they are actively shaping the future,</p>

	<p>today.</p> <p>There are three main branches and the essential resources. The health care industry in Lübeck encompasses medical technology from Dräger Medical to ESKA Implants; biotechnology and life sciences from BCP AG to EUROIMMUN; health care services from the doctor's practice and the University Hospital to the provision of housing and care for senior citizens. Over 1.1 billion euros is generated each year by Lübeck companies employing 16,000 people in these three branches of the health care industry. In addition, the trend is upward. In the fields of medical technology, biotechnology and health care services, this Hanseatic City is the number one location in North Germany's health care industry.</p> <p>A concentration of scientific and research facilities is a further and vital factor. The internationally renowned universities, institutes and clinics all actively underpin the health care industry in Lübeck. As do the numerous, well-qualified young career starters pouring into the jobs market every year.</p>
<p>Recommendations and lessons learned</p>	<p>The city of Lübeck is a great example of what a best practice should look like. The successful environment in the area is the result not only of the efforts of the municipality but also of the support of the private sector, many beneficial synergies, the international clusters and the reputable companies, which find place in Lübeck. However, the strategic geographic location of the city undoubtedly plays a key role in the development of the area, but it is not a vital prerequisite for success.</p> <p>It can easily be concluded that many factors should be taken into consideration when it comes to developing a successful healthcare-oriented region and to boosting the local economy, but what still is unchanged are the core principles. When every institution, private organisation and even the population have the same goal it is a matter of time to create such a success of national and international significance.</p>
<p>References</p>	<p>Technologies for Good Health, Gesundheitswirtschaft health care, URL: https://luebeck.org/file/branchenbroschuere_gesundheit.pdf</p>

3.6 New procurement models

3.6.1 Sweden

Title	Increased independence and functionality of elderly with a reablement service - Mottagningsteam
Policy priorities addressed	<ul style="list-style-type: none"> • Value based service design; • Quality of life; • Healthcare.
Goals and activities	<p>Sweden has experiences how good results the so called re-enablement service provides among elderly people after acute illness or hospital intervention in terms of fast recuperation and functional independence. The service model is based on the following principles:</p> <ul style="list-style-type: none"> • Detecting analytically at an early phase the elderly that might need the service. I.e. those elderly that are in need of intensified services after a hospital admission. Based on positive outcomes, the service has been extended to other home care clients too; • A multi-professional team is supporting the elderly person in a new manner with clear focus on the functional independence; • A time limited service (3-10 weeks), during which the fundamentals of independent living are built and incorporated; • A structured setting of objectives and monitoring from start to finish; • Outcome/value based reimbursement model is possible but not mandatory.
Best practice description	<p>Evaluation parameters</p> <ul style="list-style-type: none"> • Cost for care with Mottagningsteam. • Number of temporary housing beds available. • Number of temporary housing bed days. <p>Reimbursement structure and logic</p> <p>Daily reviews ensure that only value-creating activities are offered caretakers. Evaluation is used to obtain an understanding how the service is performing and determining whether the resources in the service are required and being well used and that the right target groups are included. The evaluation will also be the primary way to demonstrate outcome and economic viability.</p> <p>The evaluation of the effectiveness of Mottagningsteam for different target groups is of importance in order to ensure that the included target group's benefit from the service provided. With increasing experience from target groups selected, inclusion and exclusion criteria can be specified. With appropriate data collection,</p>

	<p>monitoring and evaluation, the activities needed for a particular target group profile during an episode with Mottagningsteamet can to some extent become predictable. This allows for efficient planning and organization of resources.</p> <p>Mottagningsteam is a separate service distinct from home care and health home care in Landskrona. The evaluation of the service showed that it can improve individuals' independent living. The service model creates recognized opportunities and structures for outcomes-based compensation models for the benefit of the individual, the municipality and the Regional County council.</p>
<p>Impact/outcomes</p>	<ul style="list-style-type: none"> • Increased independence defined by reduced care needs; • Speedy discharge from hospital; • Increased independence in daily activities defined by • increased cognitive and/or motoric functionality; • Increased perceived safety by the caretaker; • Increased trust by caretaker's relatives.
<p>Results/Lessons learned</p>	<ul style="list-style-type: none"> • The value objectives and metrics used were the feeling of safety and trust among elderly and their families. These in turn positively impacted how well the elderly felt they managed independently and how empowered they felt. • The client satisfaction and quality of life (subjective value) of the elderly and their family members -> 9, 5/10 out of then clients have been satisfied with the new service model. • The outcome objectives of the new service concept are to cut down the use and costs of health and elderly care among the target group. • The new service model has shortened the waiting times between services and short-term bed units have been closed down. • This has resulted in 22,4 % lower costs. • The number of elderly staying at bed units after a 3-month hospital stay has gone down from 24% to 3%. • The approach helps to direct the resources and the services to right clients based on the defined outcome/value objectives.
<p>References</p>	<p>Nordic Healthcare Group (Fi), EIPonAHA 1.2.1 - Case examples of value based service and procurements models Nordic Case Examples, 2016, URL: https://ec.europa.eu/eip/ageing/sites/eipaha/files/innovative_procurement_files/EIPonAHA-1.2.1-Case_examples_of_value_based_service_and_procurements_models-Nordic_Case_Examples_Final.pdf</p>

3.7 New business models and service models

3.7.1 Bulgaria

Title	Integrated medical grade monitoring and prevention - Checkpoint Cardio
Clinical/policy priorities addressed	<ul style="list-style-type: none"> • Care and quality; • Diagnostics; • Medication management; • High-grade prevention.
Goals and activities	<ul style="list-style-type: none"> • Creating a research network (open source) with as much as possible research institutes and university partners to reach fast deployments of scientific tools in a lifesaving decision support system; • Locate partners and deploy reference telemedical centres in most of the EU countries; • Establish strong telemedical network, which to become part of the healthcare system; • Start pilot sales through partner hospitals to end consumers; • Full deployment of reference tele medical centres in EU; • Strong and operating research environment with decision support system deployed and evolving; • Creating a patient portal, where the end consumers can choose among wide list of medical professionals throughout Europe where to get second and more opinions about their health files and records; • Reduce the identified risk by allowing all patients in need to be monitored and alerted; • Bring the healthcare service in every home; • Connect the patients from anywhere with dedicated medical team 24/7; • Provide affordable medical service for all patients in need everywhere at any time; • Change of therapy, to new conditions of ambulatory care and to life saving applying a disruptive healthcare workflow; • Supply with professional medical help instantly.
Best practice description	Considering the identified problem and its numbers, the company targets not only individuals but also medical facilities of all kind. Checkpoint Cardio is providing affordable medical service for hospitals and care homes as following:

	<ul style="list-style-type: none"> • 24 hours medical observation in real time; • Diagnoses and prescriptions; • Medical plan management; • Alert support – Call response; • Sophisticated decision support system in real time for the medical team following every heart beat and improving the efficiency and productivity. <p>In parallel, the company replace the old-fashioned Holter systems with innovative wearable medical devices: 3-12 lead ECG, SPO2, Respiration rate, Blood pressure, Body temperature, Activity, GPS positioning. They are highly accurate, online and with multiple parameters.</p> <p>CheckPoint Cardio produces the hardware, the software and provides medical service with highly motivated team. By providing 24/7 monitoring, they reduce the risk of fatal events and lower the number of premature deaths.</p>
Impact/outcomes	<p>Strong financial upside: proven business model generating rapid sales growth.</p> <p>Establishing a reference tele medical centres and strategic partnerships.</p> <p>Progress so far:</p> <ul style="list-style-type: none"> • University clinic Kepler Linz (negotiations) offer requested and approved, awaiting from management signature • Institute for Preventive and Rehabilitative Sports Medicine; • Sports Medicine of the Olympic Centre Salzburg; • University clinic in Innsbruck; • Cardiology rehabilitation hospital in Linz; • Cardiovascular surgery department in Kepler university clinic in Lin. <p>Checkpoint Cardio have implemented trial tests in 19 Bulgarian hospitals and have sold to customers in 4 different European countries.</p>
Recommendations and lessons learned	<p>The company's team consist of dedicated professionals within the health industry who, by working together, are able to develop a modern technology, responding to the latest needs of the market.</p> <p>Not only do they develop their own patented products, but they also target the solution of a disease of world significance.</p> <p>By responding to the specific needs of the patients and doctors, and developing unique solutions for identified global problems in healthcare, they bring value in the society and to every individual in need.</p>
References	<p>http://checkpointcardio.com</p>

3.7.2 Italy

Title	Cloud application for online ECG review - Cardioline ECG Cloud
Clinical or policy Priorities addressed	<ul style="list-style-type: none"> • Homecare; • Telemedicine; • Second opinion.
Goals and activities	<p>Implementation of a cloud application:</p> <ul style="list-style-type: none"> • Define a cloud provider • Implement the cloud application with the help of expert developers <p>Implementation of data protection and privacy requirements:</p> <ul style="list-style-type: none"> • Involvement of lawyers and experts in the privacy and data protection fields; • Define the requirements needed.
Best practice description	The collaboration with expert professionals at the University of Trento have been crucial for analysing and solving the issues related to data protection and privacy. Also, their help has been important for porting Cardioline ECG application to the Cloud.
Lessons learned	The interdisciplinary work team, including engineers, cloud experts and lawyers has been the key success factor in the project. Involving the different parties at different times would have been a big mistake.
Backup information	Cardioline is specialized in medical devices for Cardiology, both electro medical devices and software devices. The company is in charge of the whole processes from design and development, to manufacturing, to sales and service.
References	http:// www.cardioline.com

4 Conclusions

Following the described cases in this deliverable, lessons from the gained experiences have been learned. The reference case will only benefit the future market exploitation of the project's outcomes. It will also contribute to other eHealth actors to share experience and knowledge, thus contributing to the integrated healthcare activities and a value-orientated health services delivery.

Key lessons learned:

- Countries with successful healthcare services delivery reforms and restructured practice environment (France) are preferred for the initial market positioning of the Health Monitoring System as innovative technological solution as well as innovative service enabler.
- Working together with patient-oriented and value-oriented shared goals enhance the added support for the people in need of care. Moreover, the society shall benefit from this kind of collaboration. A new culture for co-creation of healthcare process enhances care on a new level, and as a result, more collaborative practices are developed that allow the people to benefit according their individual needs.
- Collaboration plays essential role for facilitating regular communication within the triangle relations patient-doctor-relatives (or caregivers), as well as between the different players along the value-chains in the relevant ecosystems.
- In many cases, combining and merging different disciplines encourage the creation of patient-oriented care. Therefore, patients and their needs should be on the first place forming the basis of the Health Monitoring System's value proposition to the market. This has to be considered in eHealth business planning accordingly.
- Establishing partnerships within the healthcare sector is an important activity for the future vendor of the Health Monitoring System, its products and services. Partnerships will leverage the value of the offered products and services and at the same time will decrease the "production costs" and time for delivery, thus increasing efficiency in eHealth delivery scenarios.
- The motivation and skills of the internal future vendor's team and future partners are key factors for success. Therefore, skills for network management and team management oriented to the human resources needs is essential for building the intellectual capital that will drive the innovative system on the market.
- Moreover, the national and the European decision makers are key factors to foster the development of innovative practices in eHealth, or just the opposite – can destroy the efforts. Therefore, strategically the commercial uptake of the Health Monitoring System should begin in one of the most stable and healthcare supportive countries: France, Germany, Italy, or in

the Nordic countries. Unstable political situation or not supportive policies are barriers for successful market positioning.