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niCE-life

REPORT ON NEEDS ASSESSMENT AT THE LOCAL LEVEL

Deliverable D.T1.1.2

Version 2

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Content

Introduction

Deliverable D.T.1.1.2 is consisting of reports of need on regional level in each partner region. The aim of this deliverable was to visit of selected health and care centres in partner regions, study of local conditions for patients and frail persons. Taking up contact with representatives of sectoral agencies, NGOs and local public authorities for further inputs.

The main goal of this part of the deliverable was to carry out individual visits of providers of health and social services. The individual elements of good practice from Bologna were discussed and how those can be used regarding the transferability of the newly emerging model for fragile elderly. The implementation of this output was influenced by the epidemiological situation and some of these outputs were carried out by telephone calls.

A structured template was created for processing the outputs, which was created by describing the individual health and social systems in order to be able to distinguish individual differences in the partner regions. The formulation of questions in the next part corresponds to the structure of the use of individual methodologies for the evaluation of good practices based on the methodologies Momentum, MAST and MAFEIP with a focus on integrated care. The output consists of a general description of the specifics of individual systems and focuses mainly on digital tools which were designated to the partners according to the responsibility matrix. These are the following issues:

Organization of health and social care

- Reimbursement system
- Integration and communication within the system
- Data sharing

- Strategies focused on eHealth
- Innovations in health and social care
- Health and social care assessment
- Needs/barriers for digital tools
- Safety
- Socio-cultural, ethical and legal aspects
- Technical readiness for digital tools etc.

Executive summary

The concept of integrated care is considered as one of the most promising solutions, if not the necessary way forward to assure the sustainability of the healthcare system, through reshaping and reinventing care delivery structures around the needs of the citizens/patients.

Integrated care is defined as:

“an approach to strengthen people-centred health systems through the promotion of the comprehensive delivery of quality services across the life-course, designed according to the multidimensional needs of the population and the individual and delivered by a coordinated multidisciplinary team of providers working across settings and levels of care.” (WHO, 2016)

In most European countries, the integrated care agenda is now a central element in the reform of health and care systems. Yet the delivery of integrated care is still proving to be challenging in many of the countries and their regions. Scaling-up of good practices within the integrated care therefore continues to be one of the main priorities across Europe.

To pursue the aim of scaling-up of integrated care based on good practices from another European countries, in 2012 the European Commission set up the B3 Action Group on Integrated Care in the frame of the European Innovation Partnership for Active and Healthy Ageing (EIPonAHA). The main objective of this action group was to make progress on “replicating and tutoring integrated care for chronic diseases, including remote monitoring at regional level” (EIPonAHA). Scaling-up in the context of the EIPonAHA is used primarily to describe the ambition or process of expanding the coverage of health interventions, but can also refer to increasing the financial, human and capital resources required to expand coverage.

Implementing a complex innovation, which is the case with most good practices in the EIPonAHA, needs an organic evolution, as well as responsiveness and adaptability to the local health and social care system. It must be driven by support from front-line staff and management. Scaling-up good practices or innovations requires changes in existing systems, which are not always easy to achieve. Therefore, it is vital to determine, and act on, precisely how to expand good practices in different contexts and regions and speed up adoption and the scaling-up of good practices in Europe.

The issue of healthy aging in modern society is a subject of interest both in the field of science and research and in the field of medicine, biology, social sciences and also technical sciences. However, the urgency of solutions in countries where the proportion of the population over the age of 65 has exceeded 20% of the population leads to the proposal of measures at a practical level that have specific impacts on the lives of seniors and their surroundings.

The introduction of innovations is thus associated with the good practices, which can cover a very wide range of issues, from partial and inexpensive improvements to reform steps in health and social systems. Such a development can also be expected in the Czech Republic, where the issue of an aging population is known, but has not yet been as urgent as we know it in other EU countries and overseas (especially Japan, Canada and the USA).

The age development of the population, as shown in Figure 1, clearly shows that the issue of population aging is an important concept within the whole EU and the predictions clearly show a rapid growth of the population over the age of 65 in all EU countries.

The aging of the population alone does not have to be associated with issues that would have a negative impact on the quality of life of seniors and the sustainability of health and social systems. The increasing numbers of seniors lead to the creation of so-called silver economy, which includes a wide range of economic and social activities, such as employment, education, culture and tourism. Innovations and good practices are also being introduced as part of the silver economy, but the focus of our work in this project is on areas where the health conditions of an elderly individuals are already beginning to limit them, either due to a long-term condition caused by a chronic disease or a fragility, which can be fatal for the elderly at any time; in each of these cases, the quality of life of the seniors deteriorates.

The average life expectancy in Western Europe was 79 years for males and 84 years for females in mid-2020. The difference in life expectancy seen between men and women across all European regions is in line with the global trends of women outliving men, on average.

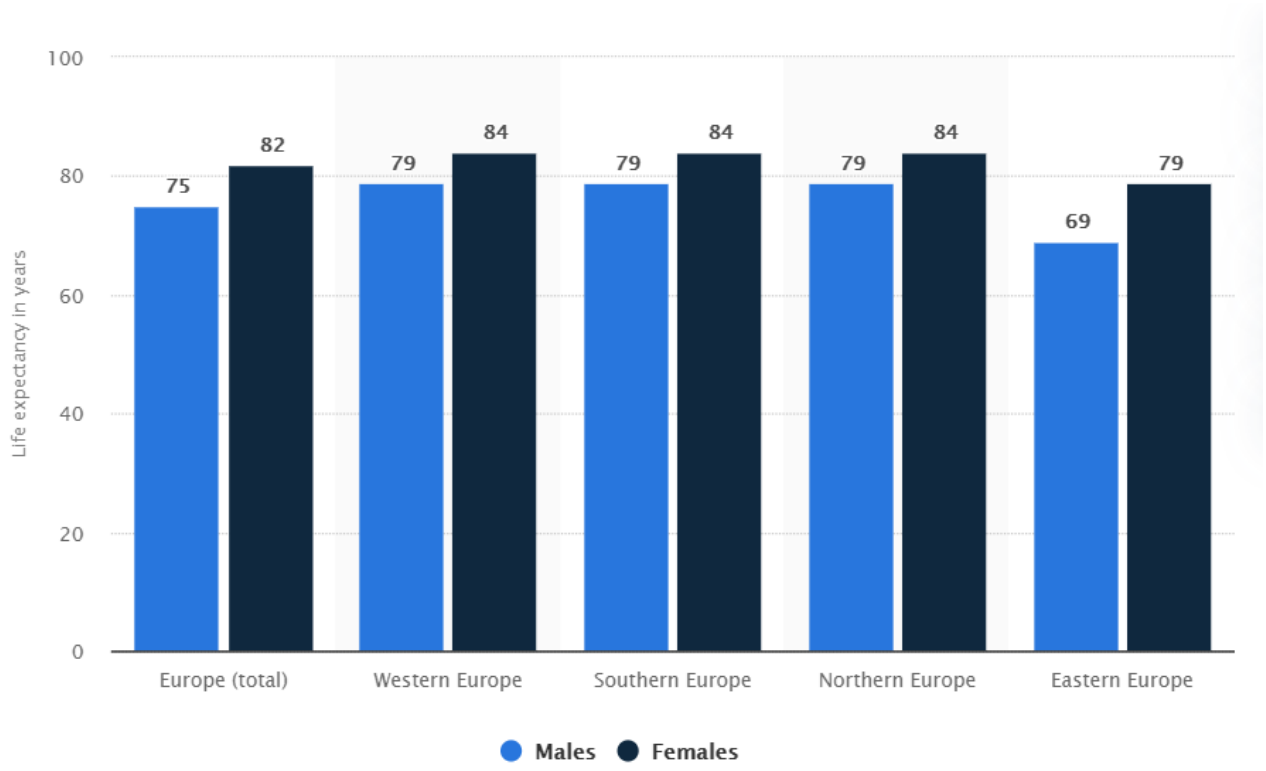


Fig.1: The average life expectancy in Western Europe (statista.com)

Fig.1. Average life expectancy of a new-born according to the current mortality rate. (According to the source the data from the above statistic originates from official statistical yearbooks and bulletins of the particular country. Moreover, publications of the United Nations, the Department of Economic and Social Affairs (Population Division) of the UN and the U.S. Census Bureau serve as data sources. Further sources are recent demographic studies, special studies and direct interviews with demographers and inquiries at statistical offices of the U.S. and other countries.)

In 2016, 19.2% of the EU population was aged 65 or over. The share of the elderly in the population differs considerably between Member States. In 2016, the highest share was recorded in Italy (22.0%) and the lowest in Ireland (13.2%). The population of the EU-27 on 1 January 2019 was estimated at 446.8 million.

https://ec.europa.eu/eurostat/cache/infographs/elderly/index.html

Increase in the share of the population aged 65 years or over between 2009 and 2019

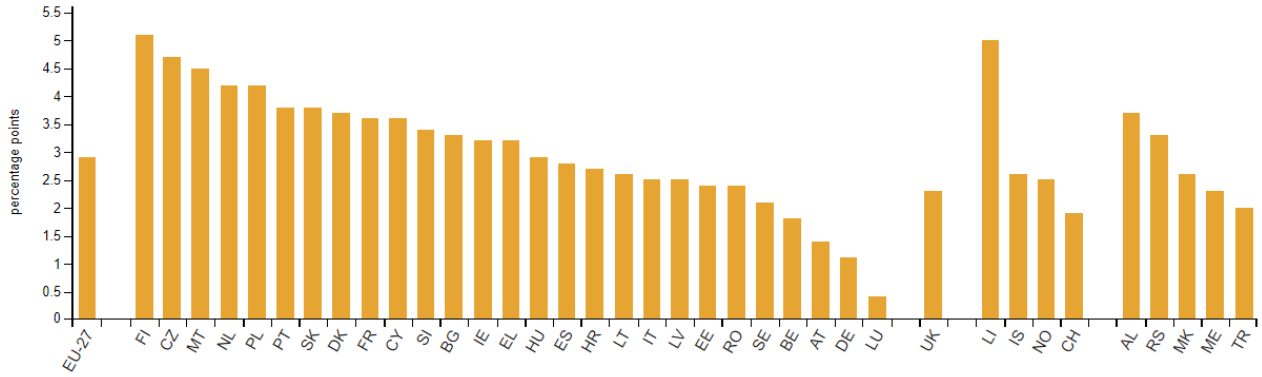


Fig.2: Increase in the share of the population aged 65 years or over between 2009 and 2019

In 2019, more than one fifth (20.3 %) of the EU-27 population was aged 65 and over. The share of people aged 80 years or above in the EU-27's population is projected to have a two a half fold increase between 2019 and 2100, from 5.8 % to 14.6 %.

The World Intellectual Property Organization (WIPO) has released its 2019 Global Innovation Index. It evaluated innovation levels across 126 economies focusing on a long list of criteria such as business sophistication and levels of creative output. The 2019 index has found that innovation is still blossoming despite the global economic slowdown, especially in Asia. This can be seen by India which jumped five places in the rankings since 2018 and rose the most out of any country in 2018. It is now the world's 52nd most innovative nation in the index. Last year, China broke into the top-20 for the first time, coming 17th.his year, it improved even more, moving up to 14th.

Switzerland topped the rankings this year with a score of 67.24 out of 100, the ninth time it has been named the world leader in innovation. Sweden comes second while the United States rounds off the top three. WIPO Director General Francis Curry said that "the rise in the GII by economic powerhouses like China and India has transformed the geography of innovation, and this reflects deliberate policy action to promote innovation". In some parts of the world, high levels of innovation are simply impossible due to political instability or conflict. The lowest ranked countries in 2019 were Niger, Burundi and Yemen.

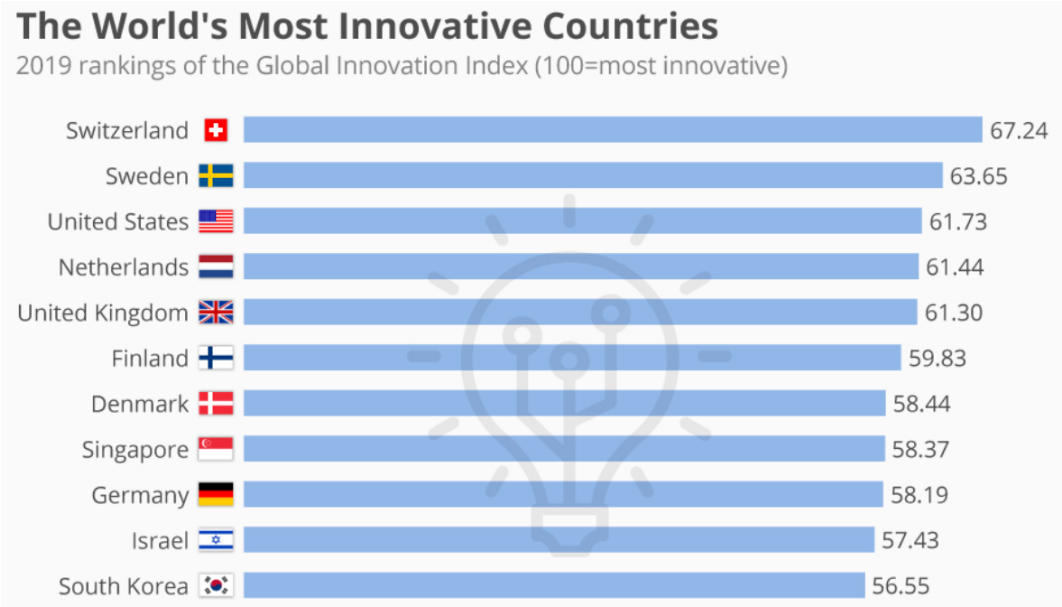


Fig.3 The World´s Most Innovative Countries

The following text is a summary of information from individual partner countries in terms of the above-mentioned aspects of providing health and social care using ICT tools regarding the use of innovation.

Czech Republic

General description

The healthcare system in the Czech Republic (CR) is derived from Bismarckian model and based on universal health insurance. With respect to care integration the concrete actions are care medically driven and focuses still more on institutional care. The system has been achieving some acceptable results but similarly as in other European countries, sustainability becomes a challenge and there is a need for a change and reform in the way the care is currently delivered, particularly in case chronically ill patients. There are three key stakeholders in the healthcare system: government, insurance companies and healthcare providers. However, the activities of these stakeholders are not coordinated and aligned to one particular strategy addressing the challenges of ageing population, which often causes fragmentation. In addition, most of the proposed changes are politically sensitive and there has been a lack of political willingness to address them. The healthcare system is also underfinanced which results in the lack of healthcare professionals. The role of ICT as an enabler of service redesign is not well recognised and digital healthcare services are not developed. However, the need for change becomes apparent in the form of poorer quality and accessibility of healthcare services.

Please shortly describe your social and health system?

Who organizes care? Region/Ministry/municipality etc.

Framework for health care organization is given nationally by law and it is homogenous all over the country. Healthcare system and its reforms are within the scope of responsibilities of national administration – Ministry of Health of the Czech Rep.

How much do you spend for health and social care? (related to the Gross domestic product – GDP)

Approx. 7,5 %

What kind of system/model of healthcare is in your country?

Bismarck model – modified over decades

Reimbursement system

Mandatory health insurance for all citizens. Joint health fund is distributed to 7 health insurance companies, their services in public health do not differ by law.

Who decide in your region about provided care?

Health insurance companies have responsibility to assure access to health services of citizens, supervised by the Ministry of Health. Primary care practices are supported by local municipalities. Local self-government has responsibility over the healthcare services. Some of the hospitals and emergencies are part of the government ownership.

Is your system free of access?

Yes, it is provided by the law. There are Co-payments for specific interventions in several branches of medicine and dentistry and for medications as well. Health services outside of public healthcare are paid.

How the private companies are involved into the system?

There are 7 types of healthcare providers ownerships, the health service infrastructure is fragmented in terms of ownership type. Most of the primary care providers are private, many of them esp. in larger cities also owned by the chain/franchise (larger companies).

Reimbursements of telemedicine services – still marginal, negotiation of systematic approach to reimbursement of selected TM services is in progress in 2020.

How the social and healthcare services are integrated?

The country has non-integrated infrastructure of health and social care services. Social care is organized and paid by entirely different legislation than healthcare. Initial negotiations between the two systems authorities (ministries) about integration in most urgent cases are still ongoing, with only modest results.

How the providers communicate – data sharing?

How the data are shared?

Data are typically shared only if the both providers are owned by the same body. Sharing in all other cases is not common in the CR. Strategy and implementation plans are set to make shared EHR available, initially between hospitals.

Sharing between primary, secondary care, GP´s (General practitioner), ambulatory care and with social and community care

Only if the service providers have common owner - in such a case there is usually some form of of health documentation sharing. In all other, very frequent cases, only paper document or other partial solutions are possible, which are case specific. Citizens have access to their health documentation but typically only to their extracts and in paper form only. Health documentation sharing planned for the future in the CR envisage the use of decentralized databases.

How cooperate each of the providers (hospitals, care providers, GP´s) with region?

Most of effective collaborations is built under professional medical co-operations, with many bottlenecks, cause also by low degree of law-based requirements and lack of funding for such cooperation (e.g. so-called case conferences between primary carer and specialists and designed but not implemented in the CR.

Do you have EHR?

Majority of the health providers are using some level of health records, however, they are not shared and most of all they do not comply to any standardization. Databases, protocols. - There is a set of national standards called DASTA. Use of IHE profiles and HL7 is currently being negotiated.

Dou you have a national strategy for eHealth?

Yes, national, since 2016.

Does the strategy include law for eHealth?

The new law is in advanced development stage as of June 2020.

How are the innovations applied into the system?

Still only regulated by medical devices law (derived from MDD, with EU wide application). Innovations are applied mostly by initiatives of healthcare providers. Exceptionally, central (national, regional, medical branche-related) programs for innovation scaling up are possible, esp. in cases with significant positive impact to public health.

Do you have an assessment model for frailty people? (e.g. Frailty index etc.)

On academic level, there are studies available but not yet systematically implemented in practice.

- How do you calculate risk of frailty? N/A see above
- Predict the death risk N/A see above
- How do you assess frailty? N/A see above
- Do you have risk stratification for frail people? no

Please shortly describe your needs/barriers in each domain related to your digital tool:

In general, implementation of MAST model is part of ongoing negotiations with insurances and other stakeholders conducted with the aim to introduce systematic approach to digital innovations (esp. telemedicine). However, currently in 2020, only ad hoc approach in applied in innovation is to be included in public health system with some reimbursement. Also, theoretical studies of economic aspects of innovations are under way.

1) Health problem and characteristics of the application

This domain is about availability of solutions that can address given health problems. In chronic diseases, this is a global issue rather than national. The number of various solutions is growing though their degree of maturity of capabilities to act effectively in practice and demonstrate benefits in medical problems often vary from solution to solution and also one concrete solution used in different care process instances can show great benefits but also disappointment. Specific bearer with respect of this dimension is usually techno-driven approach with lack of medical background, which create uncertainty as there is lack of confidence at medical professionals in new unproven technologies and services.

2) Safety

Important barrier – to support only safe (incl. cyber, product, medical safety) solution need significant effort and costs. Not everything that looks functional is safe. Safety provisions make the ICT solutions more expensive with longer way to the market and still are regarded as source of potential issues. Particularly cybersecurity is an issue in the CR, where there have been serious cyber-attacks in 2019 and 2020, which then were followed by stricter security regulations in hospitals. GDPR introduces potentially another complexity that is not yet sufficiently addressed by some simple solutions (e.g. with transparent identification of patients) and inclusion of e.g. telemedicine system in the GDPR-compliant set of systems and services in hospitals.

3) Clinical effectiveness

This is an important „barrier “, as any solution that is not clinically effective is logically regarded useless by healthcare professionals. Global resources proving effectiveness of a given concept or a system are recommended to share even in the CR in order not to repeat all the studies that have already been performed with the same concept or even solution. No medical guidelines for ICT based innovations exist in the CR. The issue how to reflects clinical evidences in the reimbursement schemes for ICT based innovations is not yet clearly resolved in the CR.

4) Patient perspectives

Though patients have mostly no experience with ICT based innovations in care, they are normally quite comfortable with new solutions but exceptions exist. The reason for such reluctance is usually caused rather by lower capability to manage the systems at home and fear of some damage and additional costs. Only rare cases of refusals can be explained as specific case of protection of patients' privacy. So significant effort should be devoted to user interface, user friendliness of new solutions. Specific conditions of Czech market do not allow simple relying on global (user) experience with a given solution; one solution cannot be considered as fully and simply transferable to the CR, starting with language that the solutions speak to the patients, but also as to the service that the solution provides in the view of existing healthcare services.

5) Economic aspects

This is very important barrier in the CR as there are many aspects of ICT based solutions that require financing and until 2020 not any mechanism has been established to enable development, operation and sustainability of such innovations. HTA (MAST) is not yet part of reimbursement mechanisms in the CR. Moreover, Czech healthcare system has such characteristic that does not give too much space for co-financing of clinical ICT based solutions

by patients and they consider healthcare is effectively provided for free. Economic interest of healthcare providers should also be considered.

6) Organisational aspects

This is important aspect and e.g. 18 MOMENTUM critical success factors are recommended to use as proper organization design is critical even for the beginning of any new ICT based services not to speak about longer period of their operation. Lack of guidelines for major stakeholders in development and operation of ICT based innovations in the CR can also be considered as a barrier because the actors must learn all steps in such activities on their own again and again. Lack of national standardization (selection of existing EU/global standards) even of the basic infrastructure for eHealth in the CR creates a kind of barrier that influences proliferation of ICT based solutions into clinical practice.

7) Socio-cultural, ethical and legal aspects

Culture on the side of healthcare providers is rather conservative in the CR, in contrast to ICT technology suppliers, which cases frequent misunderstandings. Low experience with innovations at healthcare professionals leads often to slower acceptance of new solutions. There are not too many ethical issues associated with the new technologies and services and there are established mechanisms how to deal with ethic on the side of healthcare providers. Current (2020) Czech legislations definitely needs amendment to create more friendly environments for ICT based solutions in care.

Safety

Do you have safety assessment tool? Do you have specific methodology like FMEA (Failure mode and effects analysis)? N/A

Do you have contact (call) centres for frailty people?

Not systematically implemented. Some initiatives exist.

If yes, who provide the service?

Private or public, non-profit initiatives.

Do you have strategy for prevention and for support of frailty people? Please shortly describe N/A

Technical readiness for digital tools

TECHNICAL-LEVEL BARRIERS

Low degree of nationwide coordination such as standard assuring interoperability

PUBLIC POLICY BARRIERS

Fragmented health care provides, with still no law-supported guidance related to eHealth and digital tools

HIGH-LEVEL POLITICAL/ECONOMIC BARRIERS

Underestimated, under dimensioned professional capacities dealing with digital innovations in care in the CR.

Does your institution/region provide services using digital tools for frail people?

No

Did you realize some international project focusing on eHealth solutions?

Yes, several EU projects.

How do you procure innovations?

Public procurement /classical, non-innovative/

Do you have your own development of digital tools or do you cooperate with companies?

Various models for the development of tools exist.

How do you choose technologies?

Case by case, there is no systematic (research) support available nationally. Initial attempts are focused on using Competence centres also for such purpose.

Do you use only technologies available on the market or do you cooperate with R&D companies?

Both approaches, non-coordinated centrally exist.

How do you test technologies before and during implementation?

Case by case, methodology for it is designed usually ad hoc.

How do you define use cases where the digitals solutions are needed?

Case by case, with involvement of clinical specialists.

How do you choose end user?

Methodology for it is designed prior the study in question

- Stratification of end users (patients, seniors)

  Case by case, but these kinds of stratifications are not yet common in the CR.

How do you train staff?

Quite extensive infrastructure for education of pre and post graduates exists in the CR. Both academic or dedicated institutions develop large spectrum of educational programs.

How do you finance new digital solutions and what are the barriers?

Case by case: national, regional, municipality, company, EU funds and programmes are used.

What kind of digital tool are used in your country related to your topic from WP T2? Please choose

1) Intelligent monitoring – pilots and post pilot operations
2) AP nurse - no
3) GPS tracking - only pilots, in social care, there are several services in operation
4) App for frail – no
5) Monitoring grid - no
6) **Care for frail - pilots**

Who provide them?

UHO with social care providers

Where the data are stored?

Usually at healthcare provider (managed by IT staff) or in a cloud

Who provides technical support?

UHO

What are the benefits?

More intensive focus on real benefits is implemented in the design of many recent and ongoing pilots. Various kinds of benefits are observed: economical, clinical, time saving, quality of care, quality of life, safety, less errors, satisfaction, capacity usage, human resources oriented; for patients, employees of care providers, healthcare service providers (e.g. hospitals), the healthcare system.

Data sharing?

Usually restricted to one healthcare provider (one owner) and even there is sharing not always common. There are restrictions also by law (e.g. sharing health data with social care) and mainly there is nationwide lack of infrastructure for health data sharing and clear set of standards to be used for it.

Who evaluates the data?

Dedicated specialists

Patient empowerment and patient acceptance/satisfaction

These aspects are for some time subjects of studies in pilots

Reimbursement - Who covers the costs?

Typically, health services provider

Insurance/direct payments etc. In negotiation in 2020, there is preliminary tendency to reimburse concrete actions of healthcare providers associated with digital tools but not so investment and operational costs.

Personnel demands of the application (does the application solve the lack of medical staff?)

New pilots are focused even on this aspect.

What kind of professionals are needed and how many in total are involved?

More advanced / skilled, digitally educated personnel, such as nurses are needed

Compliance with the legislation including requirements for safety and data protection (GDPR), Strict implementation of GDPR by law in the CR.

Technical readiness for application - compatibility with existing ICT infrastructure

This aspect gains more attention and support by architects of digital solutions in new projects in the CR. Interoperability is one of the major focus of authorities and nationwide projects in implementation of Czech National eHealth Strategy (since 2016).

Italy

General description

Please shortly describe your social and health care system?

Which authority is responsible for and administration of health care and social care?

Emilia-Romagna Region defines the main elements connected to the regional health system: resources, budget, rules. Municipalities decide on social resources and investments. Specifically, municipalities and local health districts, together, decide the level of investments for disabilities and frail seniors, not self-sufficient people for home care assistance, residences, caregiver. 3 different funds are involved.

Which body is responsible for organization of healthcare services in your region/country, including availability of healthcare and social care (time and location)?

The Local Health Authority is responsible for healthcare, the Bologna municipality is responsible for social care (caring disadvantaged people). A Commission (board) composed by experts from LHA and Municipality decided for socio-health investments.

Which body is responsible for reimbursement/payment for the health and care services?

Administration office of LHA

What percentage of GDP (Gross domestic product) does your country spend for health and social care?

Between 6.5 and 7% of GDP.

Is there a national/regional strategy for integrated care (either within healthcare domain – effective and patient oriented collaboration of various levels of services and various providers, and/or between health and social care)

Since 2007 Emilia-Romagna has had a specific law for the integration between social and health assistance addressed to persons with disabilities and elderly. The Regional Government established taxes with the aim to create a fund. This integration promotes the involvement of private organisations accredited by the public for the provision of services.

What kind of system/model of healthcare is implemented in your country?

Beveridge model

The Italian National Health Service makes the right to health accessible to all citizens, without discrimination based on income, gender or age.

What are basic characteristics of payment for healthcare services from citizen point of view?

Tax system guarantees the health system sustainability, paying taxes is a duty

Is there apparent support of innovations that may bring savings in healthcare budget in mid or even long-term perspective in your country/region?

LHA BO has got a specific unit for Technology Assessment

Do you feel that there is growing support by authorities to various preventive measures for citizens to maintain their health and wellbeing in your country/region?

To improve health literacy is necessary, we need to invest on health communication and prevention. After the COVID emergency increasing resources will be addressed to the health sector.

How primary care is organized (basic characteristics, such as family doctors, individual, private GPs or community healthcare centres, integrated care centres, other)

A General practitioner (who is paid by the regional health system) assists about 1500 adult people, a paediatrician about 800 children (until 14 years old). They prescribe exams, specialized visits, hospitalizations, medications, home care assistance. Citizens have to pay tickets depending on their earnings. Some citizens have a private insurance and they can have reimbursement if they decide to go to private physicians or hospitals or ambulatory. General practitioners are organized in groups of 4-5 and they guarantee assistance in the working days. During holidays there is a public medical service in centres named Houses of Health (HoH). During the week HoH guarantee nursing ambulatory for chronic diseases, obstetric services, specialized visits, blood exams.

Does your primary care function as gate keeper to specialists, hospitals or patients may access many of these services at their own decision?

No the patients access is filtered by the GPs.

Can patients choose their doctors (GP- General Practitioner, specialists, dentists, hospital) at their choice?

YES. Dentists are not in the NHS, you have to pay for the care and you can freely choose

Does your country have strategy for population approach to health (enabling both planning services and capacities on national/regional level, and focus in most complex patients and services provided to them?

Yes we have national and regional agencies to establish indicators of performance, budgets, goals, subjects to invest, range to surgery, number of beds in hospital and in residences

Is there clear legal framework for eHealth and specifically for telemedicine in your country?

The personal Electronic Health Record (namely FSE in Italy) is established by the Italian Law for all citizens within the Digital Agenda (AGID) and the Italian Government. The FSE contains the clinical data of the assisted citizens produced by every present and past event.

The FSE was established by the Regions and Autonomous Provinces, in accordance with the law for the protection of personal data, with the following aims:

1. prevention, diagnosis, cure and rehabilitation;
2. scientific research on the clinical, biomedical and epidemiological fields;
3. health planning, quality and assessment of care

The Italian Digital Agenda has included: the digitalized medical file; the digitalized medical prescription.

For what concerns telemedicine the Ministry of Health has issued over the years guidelines for telemedicine.

Is there any national/regional strategy for eHealth?

- See above

Is there established organizational framework for telemedicine services and mechanism to evaluate impact of innovations in healthcare, possibly associated with methods for reimbursement for telemedicine interventions in your country/region?

Not yet, there are national guidelines and a series of experimentation at different levels.

Is there ongoing process for creation of framework for mHealth (clinical mobile applications, used in health services) in your country/region?

Agency for Digital Italy (AgID) is the technical agency of the Presidency of the Council of Ministers. The Strategy for digital growth and the Three-year Plan for Information Technology in Public Administration have defined the interventions dedicated to the digital healthcare ecosystem and the main solutions aimed at improving healthcare services, limiting waste and inefficiencies, improving the cost-quality ratio of healthcare services and reducing the differences among regions.

What is the degree of digitalization of information exchange between various healthcare providers, do they share health data or at least some documents such as discharge reports? Is there shared Electronic Health Record (EHR)and if so, is it centralized or decentralized (e.g. just shared reports, images, lab results and other health date located at various healthcare providers); is the sharing data and access to EHR common “mandatory” feature of all providers/doctors in public healthcare?

Sharing specifically structured health data between primary (GPs), outpatient depts (secondary care) is there personal healthcare record purposely maintained, e.g. for the chronically ill, with possibly also other information about the care plan?

Is there concept of sharing health date with social care in your county/region?

The level of integration between health and social care is still weak from a political and organizational point of view, even if under specific circumstances, such as the services for the IHCA (Integrated Home

Care Assistance), both Health and Social Policies General Directorates have made a significant joint effort to reach an ICT integration of the service.

Is there central (or regional) database of vaccinations of citizens?

Yes the certificate for vaccinations is provided to all citizens through personal EHR (fascicolo sanitario elettronico).

Do patients have access to their health data (PHR)? If so, is the PHR filled systematically with data of various healthcare providers or only one by one (hospitals), and can patients add their own heat-treated data to PHR?

All citizens of Emilia Romagna have access to their personal EHR

If available, pls provide some technical characteristic of the infrastructure (EHR, PHR) and technical standards, patient identification methods.

- Five criteria have guided the regional deployment of e-health.

1. Regional management of ICT project
2. stakeholder engagement (doctors, citizens,suppliers)
3. technology assets development through software integration
4. use of standards for medical contents, HL7, XDS/IHE
5. sharing clinical digital documents

Implementation of eHealth projects

2002-2003

- ICT model planning , Governance model planning
- Development of the infrastructural platform of a computerized network that connects health care companies and general practitioners (MMG/PLS)

2004-2006

- Selection of international and Europeans standards for medical contents, (methodology defined jointly by CEN/TC251 and HL7, XDS/IHE)
- Electronic health record architecture model planning
- Deployment of the network SOLE Health Care Online
- Activation of online services – booking and payment of health services

2007-2009

- Complete deployment of family physicians (MMG/PLS) and system integration with public health companies

- Start of the deployment of electronic health record
- Activation of online services – booking and payment of health services

2010-2012

- Deployment of electronic medical prescription and electronic disease certification as required at national level
- Electronic health record full availability to the whole population in the Emilia Romagna Region

2013-2020

- The amount and quality of data included in the FSE represented an opportunity to develop analysis according to the «big data» concepts
- New functionalities for the improvement of the process of communication with citizens and healthcare providers.

How do you briefly characterize cooperation of various healthcare providers (hospitals, care providers, GPs) within the region, e.g. in case of complex patients?

Please refer to the above description of FSE

Is there (independent, public) institution or entity dealing systematically with development/verification/evaluation/testing of innovations intended for healthcare or providing expertise in them to authorities or healthcare providers in your country/region?

Please refer to the above description of FSE

Is there any assessment model for frailty people implemented in your country/region? (e.g. Frailty index etc.)

Our Region applies a frailty index based only on health indicators: hospitalizations, medications, diagnoses, requests of ambulatory visits. From 2011 LHA of Bologna has a different frailty index for seniors (over than 65 years old). This LHA algorithm also considers social variables, like range of salaries, characteristics of the neighbourhoods where people live, loneliness, and so on.

How is the risk of frailty calculated?

Predict the death risk and the hospitalization for the year after

How is the frailty assessed?

Linking social and health data set through a British math algorithm studied at King's hospital

Is there any methodology used for risk stratification for frail people?

The main indicator is the percentage of risk to die or have an access to an Emergency Room during next year. Seniors are divided in 5 classes. No risks from 0 to 15%, very high risk over than 80%. 99% of Seniors with very high risk are protected by social or health services.

Is there in your country/region satisfactory resolved the issue of patients who need also social care or support, e.g. after discharge from hospital or on long term care? Similar question relates to older citizens in social care settings (houses) who need regular healthcare services, often specialized, and cannot easily move on their own to the healthcare providers.

Inside the hospital we have social assistants, so relatives or patients can ask help for the discharge. Social assistant sends requests to nursing centre which organizes long term care of home nurse services, or rehabilitation.

Please shortly describe your needs/barriers in each domain related to your digital tool:

1) **Health problem and characteristics of the application**

eCare is built to answer the needs of frail old people. Frailty is defined as a difficult condition and it affects many aspects of people's health and social environment. In the Italian welfare system, municipalities organize social services and social operators decide which kind of support they can provide to citizens with low income. In Italy, National Health System is of free access for everyone and General Practitioners decide therapies, examinations and hospitalizations. Frail people have both conditions of weakness (social and health issues) and frailty does not only depend on poverty or low education but above all it depends on loneliness. Social services and medical care assistance are not well integrated. Operators of each system do not communicate with each other.

Since 2011 LHA BO has studied a math algorithm to combine data from social and clinical reports, public databases and repositories. The crossing of existing social and health databases allowed to build the social and health history of the patient, and to calculate his/her risk of frailty. The algorithm provides a Frailty Index in a percentage scale in order to predict the death risk of seniors for the next 12 months. The Municipality of Bologna and LHA BO share data coming from the application of the index with Lepida and social operators, especially to protect elderly people during summer heat waves or in winter.

2) **Safety**

Every year in May, Mayors write a letter to senior citizens who have a frail index over than 80%. Mayors share the plans to fight heat waves with eCare services. Then eCare operators call seniors and inform services in order to obtain a privacy consent form. Subscription and consensus to the plan programme are provided verbally. The specific methodology FMEA and similar approaches cannot be applied to eCare GP as it is not a product or a productive process but a model of caring people in need with the cooperation of a multiplicity of actors.

3) Clinical effectiveness

Frailty depends on many factors which affect senior people in many different ways, eCare service's goals are prevention and support. In 2009 LHA BO run a study on elderly in order to assess initiatives aimed at preventing inappropriate access to emergency rooms. At the first evaluation stage, they have found that e-Care users accessed the ER in the same percentage as non e-Care users, because of the complexity of frailty conditions under evaluation. But at a further stage, when LHA BO considered elderly patients by only single disease, for example cardiovascular or orthopedic disease, e-Care users resulted advantaged. The study showed that whole monitoring of frail seniors makes the difference in the care process, as every single medical specialty has its own appropriateness, but the health outcomes for a patient are poor without integration of the the different care interventions.

4) Patient perspectives

Senior citizens could be categorized in 3 groups depending on ICT skills.

1. Most people older than 80 years are affected by digital divide. When they have a disability they stay at home alone or with a caregiver (senior too). They often live in buildings without lifts and with steps and staircases. So, they can be reached by phone only and their main activity is watching television.
2. People aged between 70 to 80 years can use ICT but they are not experts. They have a smartphone or a tablet but they are unable to surf the Internet. They use e-mails, sometimes skype with their grandchildren, messages like whatsapp, sometimes facebook. The Internet is not accessible everywhere. Internet connection is weak in the mountains (Appennins) and also in the peripheral areas of the towns. They often attend libraries, cinemas, theatres and social entertainments like courses and laboratories.
3. People aged between 65 to 75 years, retired from work and employed in voluntary associations are our active partners in the eCare system.

eCare reaches and monitors the first group through the operators of the contact centre once a week (or every 10 days). This group is composed of females for about 86% of the population over 80, and females alone for about 82% of them. Males are alone for about 59%. 25% of e-care users live with self-sufficient people, caregivers. Often caregivers are old people or working adults. During the day 88% of them watch television, 69% cook their meals, 54% listen to the radio. Home and, at last, garden is the center of daily life. They only go out for grocery shopping or ambulatory visits. In 2009 Lepida tested customers' satisfaction and the results showed that there were improvements in the following feelings: 72% safety, 78% friendness, 66% health, 62% trust in services, 35% knowledge about the surrounding environment (territory and services).

The second group is involved in 40 projects per year funded by LHA BO. The Third sector leads projects which aim at re-building socialization and relationships. Every team, while showing its own project, has to disclose how customer satisfaction is evaluated. Before providing any payment, LHA BO verifies the customer evaluation and satisfaction of participants.

The third group is involved in voluntary associations. In Italy volunteers are always part of Associations because these groups protect people with insurance policies. Associations often have headquarters in a public building where they pay utilities like electric consumptions but location is for free as a reward for their commitment. Associations have a governance committee who has to report expenses to the management yearly.

Once a year, LHA and Lepida ScpA organize a course for volunteers to learn about frailty conditions.

There is a thin line between the second and the third groups. Volunteers often become frail because of a disease or a fall or a loss (for example grief or divorce). Sometimes, frail people become active if they find a good group and friends.

5) Economic aspects

In order to understand the costs, it is important to distinguish the role of the actors involved in the eCare GP.

1) Contact centre is the bridge between senior users and the world outside their homes (projects, health and social services, associations). Six operators call more than 1500 senior users; a manager leads these operators and translates the needs from users to into social and nursing services; a psychologist supports the group, chooses and checks the contents of the portal www.bolognasolidale.it, interviews senior users at the first contact; a computer technician works to adapt and solve problems on the portal or on the users' files when needed.
2) The contact centre manager and the psychologist are involved to organize, manage and monitor projects. This activity also involves social operators of municipalities because Associations are strictly connected with them.

Two supervisors coordinate all eCare services, one from LHA and one from Lepida, but they do not work full time on this activity.

Regional Government allocates specific funds for disabled and not self-sufficient people. The fund is called FRNA and is managed by a local Board called Conferenza Territoriale Sociale e Sanitaria Metropolitana di Bologna (CTSS). Associations' projects can receive an amount of 50.000€ per year and all eCare service is provided with an amount of 370.000€ per year. Additionally, at the beginning in the period 2005-2007, a further amount of about 300.000€ per year was requested for the development of the software platform for the call center operators and the implementation of the monitoring grid/dossier to assess and monitor the senior frailty periodically.

6) Organisational aspects

The most important issue before starting is related to the social operators' involvement. eCare is aiming at cooperating with them not at dismissing their job. The limited resources available in the social services sector do not allow to provide real and frequent contacts with people. Social assistants have to allocate the appropriate resources. eCare can contribute to improve home life and social activities.

Volunteers need guidelines and training to learn which are the institutional goals. Municipalities and LHA BO have to trust them and, at the same time, frailty support must not be taken for granted. Volunteers are often seniors and they often refuse to consider problems regarding their old age. But this is the strategy to allow them to promote their active and healthy aging. Associations' payment is provided to encourage and incentivize them toward these goals.

7) **Socio-cultural, ethical and legal aspects**

Dealing with personal data is of utmost importance, thus LHA BO and Lepida put in place all the necessary actions to be compliant with GDPR. According to the different situations in eCare the data controller would be the different municipalities of the Province of Bologna or LHA BO, Lepida is the external data processor and put in place all technical and organisational procedures for the security of data.

Safety

Do you use a safety assessment tool? Is there specific methodology for it, like FMEA (Failure mode and effects analysis)?

Not yet

Are there contact (call) centres for frail people?

Yes, there is, and it is reachable through a free dedicated number. Actually 1500 frail senior, it has been increasing to about 2000 persons during COVID pandemia

If so, which entity provide such service?

LHA BO together with Lepida

Is there any strategy for prevention and for support of frail people? Please describe briefly.

Yes, there is. Nursing services and social workers recommend seniors to e-Care service. Seniors selected usually live alone, are over 75 years old, have a frail index between 50 to 80%. They could have light mental diseases and/or several physical chronic diseases but seniors with dementia or deaf are excluded. They can also be older caregivers. Prevention consists in monitoring the health conditions and any social problems or difficulties of these frail elderly every week. Each indicator of deterioration is immediately reported either to the Health Service or to the Social Workers of the Municipalities participating in the project, in order to prevent serious health or social events.

Technical readiness for digital tools

TECHNICAL-LEVEL BARRIERS

PUBLIC POLICY BARRIERS

HIGH-LEVEL POLITICAL/ECONOMIC BARRIERS

Does your institution/region provide services using digital tools for frail people? If so, please briefly describe their scope and how the services are provided. Is there institution-wide strategy to support using or development of such tools?

The use of specific digital tools, for instance the use of the Personal Electronic Health record (https://www.fascicolo-sanitario.it) is particularly promoted among elderly through specific actions. Since 2009 Emilia-Romagna Region with the collaboration of Lepida has organised a programme of digital literacy, named Pane&Internet). The programme intends to fill the gap in terms of digital knowledge. P&I aims at creating "digital citizens" - people at ease with technologies to find information, services and all opportunities that the digital sphere makes available. With no discrimination in terms of age, gender, education Pane & Internet is developed all over Emilia-Romagna, thanks to a widespread network of PeI points. 2019-2021 programme is focused on: digital competence (basic know-how); digital culture (access to online services); digital life (online purchasing, privacy, safety, opportunities). Another important service is SPID, the digital identity, for which Lepida has become identity provider from the beginning of 2019. Lepida is developing, together with the Region and other bodies, numerous initiatives to support and raise awareness of citizens on the advantages of digital SPID identities, starting with the activation of the Electronic Health Record (FSE), access to national services such as those of INPS and the Revenue Agency, in addition to the services of local authorities

Have you participated in some international projects focusing on eHealth solutions, particularly if the project lead to implementation new technologies?

- H2020 ACTIVAGE: Build a world-wide reference of the evidence based values that standard-secure-intraoperative IoT ecosystems enable new sustainable business models and solutions for Active & Healthy Living.
- FP7 Fistar: develops and experiments innovative cloud platforms for healthcare, using latest technologies based on the vision of the Future Internet Public-Private Partnership (FI-PPP. The objective consists in managing efficiently and effectively data and health pathways, in compliance with privacy and confidentiality constraints.
- FP7 Confidence: has designed a technological tool for the prevention and monitoring of falls among the elderly at home, by also considering the system for an outside use.
- AAL MOTION: develops ICT solutions supporting the seniors to manage autonomously and at home their daily physical activities. In particular the project implements and pilots a system to manage and support exercising in the elderly.
- ALL HOPES: has promoted the socialization of the elderly through the use of the Internet and social networks in order to generate experiences and positive behaviors in the population, also through the enhancement of local resources and users' associations.

- FP6 OLDES: has developed innovative technological solutions for the creation of a new social care network for needy elderly, by providing services of tele-companionship and tele-medicine.
- Central Eu SPES: has supported home care and promotes the use of tele-medicine through the monitoring of vital signs linked to different pathologies. The project is being tested in Ferrara where the Local Health Authority has involved patients with respiratory disorders.

How innovations are procured in your country/region? Are there any activities in the framework of Public Procurement of Innovative solutions (PPI) or Pre-Commercial Procurement (PCP)?

Experiences of PCP and PPI are not well used even if AGID the Italian Digital Agency has financed some experiences at national level in the recent past. At public level innovations are financed by the public bodies when included in the strategic plans (regional and national calls for projects). Furthermore, Lepida is the technical arm of the initiative and responsible for the development of the ICT infrastructure underpinning the services of SOLE/FSE. It is also in charge of the definition of the projects, the bidding process for ICT providers´ selection, as well as for the management and monitoring of the funded projects. The Regional Government acts as promoter and catalyst of the initiatives of the Local Health Units. Furthermore, the development of the SOLE/FSE infrastructure itself, the deployment of Integrated Care services that use SOLE/FSE infrastructure and the budget needed to deploy the projects are provided by the Regional Government on the basis of an investment plan that is periodically updated (the Informatics and Telecommunication Plan of Emilia-Romagna Region - PITER). According to the strategic guidelines of the plan, Lepida and the Local Health Units, together with representatives of local hospitals and municipalities, present project ideas to be funded by the regional government. A yearly plan of funded projects is agreed among the actors involved in the SOLE/FSE governance.

Is the design and development of various digital tools directed to in-house solutions (e.g. by hospital IT dept.) or there is some kind of cooperation with companies and or other stakeholders (university's, local authorities, society – quadruple helix)?

Lepida is an in-house company of the Emilia Romagna region and among other members all Local Health Authorities (including LHA BO). It provides the professional services needed for the development of the initiative and it gives assistance to the user on the application of the system, also through coaching and training activities. More particularly, it provides the professional services to develop, maintain and improve the system, and also to develop, together with the regional health actors, eHealth services and applications . It also manages the purchase of technological products from the external suppliers. Lepida has been involved in the technological development trajectory of the eHealth in the Emilia Romagna since its start. SOLE ("Sanità On LinE" – "Health Care On Line") is the integrated network of local health units, hospitals, GPs and paediatricians of the Emilia-Romagna region while FSE ("Fascicolo Sanitario Elettronico" – Electronic Personal Health Record) is the software application which organizes, retrieves and manages the health record of every citizen of the region. Together they form the physical and virtual infrastructure of all health services provided by the

regional health actors to the citizens of Emilia-Romagna. SOLE/FSE started in 2002 under the Information and Telecommunication Plan of the Emilia-Romagna region and aimed to develop and sustain an integrated network amongst local health Units, GPs and paediatricians, allowing them to share clinical and administrative data and allowing citizens to access their clinical history by means of the FSE. SOLE/FSE project started at October 2002. From 2002 to 2004 the efforts were dedicated to analysis and design the platform after which one year and half was spent in piloting. The real deployment of the initiative started at July 2006 and it was completed at January 2010 when SOLE infrastructure became fully operational and started delivering services to health care professionals, health organizations and citizens of the region. Jointly, SOLE and FSE constitute the logical and physical infrastructure enabling health and social care regional services development and provisioning. They also form the basis for the development of integrated health and social care services for the citizens of Emilia-Romagna. The SOLE/FSE case study focuses on Integrated Care practices that combine the logical and physical infrastructure of SOLE and FSE with specific health and social care applications in various forms. It is worth mentioning that even though the examples of SOLE/FSE application services are limited to specific territorial ambits of the Emilia-Romagna region and some of them are just pilots tests, the wide diffusion of the SOLE/FSE network to the whole Emilia-Romagna region will enable the short and mid-term upscale of the Integrated Care initiatives to serve the entire Emilia Romagna population and to integrate all health and social care services.

How the technologies are selected (some criteria are applied, such as open source, common APIs, EU, global standards)? If the solutions are considered medical device (in the sense of Medical Device Regulation - MDR), in which phase of the solution implementation do you pursue CE certification?

Open source is used if it represents an added value. Compliance to the EU main standards is applied. The legislation on medical devices is still an open issue.

Are the technologies used taken from offerings on the market or is there focused cooperation with R&D companies and potential suppliers? How the technologies are tested before and during implementation?

It depends case by case. Very often the solutions are designed, developed and tested by LEPIDA, by means of its Software&Platforms Division, in collaboration with Digital Health and Digital Welfare Divisions.

Is there some system in development of new solutions in your institution, e.g. designed to formulation of use case and its intended location (e.g. clinic, disease or health status) first, followed by the development of technologies?

As it has been said, in Lepida, these topics are mainly in charge to Software&Platforms Division, Digital Health and Digital Welfare Divisions

How end users are selected?

In Bologna the final users refer to different categories and therefore they are selected by following different methodologies.

- The seniors who are part of the eCare service, active all year round, are usually identified by the social workers of the municipalities of the network, or by the Volunteer organisation. In parallel with their activity in the communities, they identify seniors who are particularly frail.
- Another source of identification is represented by the hospitals of LHA BO: every week eCare receives the list of people discharged from hospitals who are over 75 years old and live alone.
- On the occasion of possible climate emergencies (summer heat/winter frost waves) the LHA Public Health Department provides to eCare a list of about 5,000 elderly people, selected on the base of the highest scores of the Frailty Index. This index, calculated on the basis of scientifically validated algorithms, allows to classify seniors on the basis of greater or lower risk of suffering harmful effects, for instance, of summer heat waves.

Stratification of end users (patients, seniors, informal carers)

- In consumer-focused innovation
- In technology-based innovation
- In business model innovation

How the staff is trained? Nurses, doctors, carers, family members, etc

Many actions facilitate access through information and assistance for the use of regional online services, primarily Electronic Health Records (Fascicolo Sanitario Elettronico) and booking facilities, online payments and a specific APP, named ER-SALUTE (https://support.fascicolo-sanitario.it/guida/accesso-mobile/app-er-salute). Lastly, many actions for the elimination of the cash payments at the physical access points desks are in place. Over the years training sessions for the use of online services have been addressed to GPs and Paediatricians, medical specialists, frail citizens like elderly through “Pane & Internet” regional programme, high school students.

How new digital solutions are financed and what are the typical barriers associated with cost and large-scale deployment of the new solution?

See above answers

What kind of digital tool are used in your country related to your topic from WP T2?

Please choose:

1) Intelligent monitoring
2) AP nurse

3) GPS tracking

4) **Digital tool for frail (to be designed and developed in Nicelife)**

5) **Monitoring grid (part of the eCare solution in Bologna)**

6) Care for frail

Which entity provides the solution?

PP5 in collaboration with PP2, PP4 and PP6 (especially for testing)

Further questions related to the digital tools: Any remark to education (personnel, patients, carers)?

Lepida and LHA BO are planning to provide an ambitious training program with persons coming from volunteer associations who, in their turn, will help frails to connect and use the digital tools. The training schedule is already operative for a set of functionalities and services which has been produced in emergency to support isolation during this COVID emergency. Furthermore, the contents and services will be provided using different social media platforms (YouBOS and integration with Youtube and Facebook for instance) and the persons acting as animators will be trained. The call center eCare is in contact with about 2000 seniors for whom eCare can map their current digital competence, the availability of personal computers, smartphone and tablets. There are in place training activities of the volunteers and the promotion of new projects through the launch of a "Contest for new ideas" that is going to be issued (June-September 2020) addressing digital literacy through online courses. The trained participants will support in their turn groups of 10-15 seniors to investigate and deal with the world of digital tools.

Informed consent signed prior the tool is provided to the patient?

Compliance with the GDPR

Where the data from the tool are stored (in-house, public cloud, in the country, abroad)?

LHA BO would be the data controller and Lepida would be the data processor. Data will be collected, stored and back-upped in "in-house" Data Centers, managed by Lepida and located in several parts of Emilia Romagna Regional territory.

Which entity provides technical support?

Lepida

What are the major benefits of the solutions?

Digital tool for the monitoring of frail elderly (YouBOS platform)

- Grounded into the local context and based on the steady eCare network
- Based on one of the elements of the eCare network which represents a support for delivering some of the activities addressed to the frail elderly and their caregivers: the "Bologna Solidale" ("Bologna, supportive and inclusive city") Platform
- The aim is to reduce the digital divide and social isolation

- It represents an innovation of the platform in terms of new functionalities and module components that will be designed and developed
- Involvement of all identified stakeholders in all stages of the process (social and health professionals, associations and volunteers, policy makers)

Are the data from the digital tools shared with some other IT systems, EHR, PHR?

Not yet directly, anyway seniors involved have their own personal EHR managed by Lepida and their General Practitioners might report on the Patient Summary outcome in terms of the improvement of their quality of life.

Is there any evaluation of the data and if so, which entity does it?

Surveys and questionnaires to measure the acceptance, usability and level of usage of the You BOS solution carried out by Lepida and LHA BO with the involvement of local communities of volunteers.

Do you cultivate Patient empowerment with the solution? Do you evaluate patient acceptance/satisfaction?

Caregivers' and seniors' empowerment is an important element to increase the effectiveness of the health systems and to engage frail seniors in their health. Good practice can contribute to this reinforcement. Communities are milestones, without them health and care systems would collapse. In addition, people who cure and care seniors learn how to prevent their own health problems. The web portal www.bolognasolidale.it (BOS) contains information of about 500 associations which work with elderly. About 100 of them are involved in eCare support projects. They change every year, in this way the Bologna Team has been involving about 3.500 volunteers. Involvement consists in a persuasive partnership with volunteers in order to define positive and appropriate messages, choose communication styles, adapt medical language to current speech, adopt correct ways to cook, walk and play sports, read newspapers and books, debate and socialize. Volunteers have to promote and to adopt good lifestyles for themselves but above all for their users. Bologna team trusts on peer to peer education, because seniors do not change lifestyles easily. We encourage volunteers to learn and teach the right ways of taking care of themselves and the other seniors. This policy gives high results in emergency situations, as it happened during last earthquake, flood, attack, heat waves. In all these difficult situations, personal relationships are the most important protection against fears and worries. When eCare operators are overwhelmed for emergency status, volunteers come in support and call in their turn people registered under their projects or associations. This special engagement of volunteers took place especially during the last 4 years (2016.2019). Thus, the empowerment has been increasing not only for a single citizen but for the whole community.

Insurance/direct payments etc.

In 2007 Emilia-Romagna Region introduced a tax for a specific purpose, i.e. to sustain frail people and disabled ones, in order to create a fund, the Regional Fund of Not self sufficiency (FRNA). Every municipality can obtain resources according to the age of its population. LHAs spend this fund to pay for

beds in retired homes, daily hospitalities, home services, and prevention. eCare is under the prevention's chapter.

- Lepida publishes once a year its List of Tariffs. Costs are related to the level of complexity of the different seniors' users situations:
- 170€/year for senior with no severe condition (a call a week or 10 days);
- 300€/year for senior with complex situation (psychiatric problems);
- 16€ Patient Approval from hospitalization
- 8€ emergency monitoring for an unspecific frail senior
- 1450€ for single socializing project
- At the beginning of every year LHA BO establishes an agreement to define a budget with municipalities and Lepida. Lepida is an "in house society" where LHA BO and Municipalities are its public Shareholders. This amount usually is about 370.000€ per year.
- The amount for the project includes the building of the associations' network, the coordination amongst volunteer Association's projects, the monitoring of the projects, software maintenance of the web portal addressed to citizens and associations.
- Out of this budget there is an amount of 50.000€ for the associations which manage projects. The grant is from 500 to 2500€ per project per year.
- The governance of the allocation of this funding is guaranteed by politicians. LHA of Bologna includes 45 municipalities, their mayors' board take strategic decisions about social and health subjects. This board is named CTSS (social and Health territorial conference).

Personnel – related questions of the application (does the application need new staff or does it solve the lack of medical staff?)

What kind of professionals are needed and how many in total are involved?

To design, develop and deliver the You Bos platform we are engaging

- 2 analysts
- 1 developer and 1 system engineer
- 1 community animator + experts from different domains (health, food, culture, sport & exercise)
- 1 editorial board (persons skilled in communication, psychologist, nutritionist, IT experts, animators, sport associations)
- eCare staff (mainly contact centres operators, 1 contact center manager, 2 supervisors who coordinate all eCare services, one from LHA BO and one from Lepida

Compliance with the legislation including requirements for (cyber) safety and data protection (GDPR)

Yes, all solutions provided are compliant with GDPR

Technical readiness for application - compatibility with existing ICT infrastructure.

Integrated with the eCare existing infrastructure.

Slovenia

General description

Please shortly describe your social and health care system?

Which authority is responsible for and administration of health care and social care? Region/Ministry(ies)/municipality etc.

Government/municipality.

Which body is responsible for organization of healthcare services in your region/country, including availability of healthcare and social care (time and location)?

Ministry of Health, Ministry of Labour, Family, Social Affairs and Equal Opportunities.

Which body is responsible for reimbursement/payment for the health and care services?

The Health Insurance Institute of Slovenia is responsible for compulsory health insurance payments. Additionally, three health insurance companies offer voluntary health insurance (Vzajemna, Triglav Health Insurance Company and Generali).

What percentage of GDP (Gross domestic product) does your country spend for health and social care?

For health 8,2 %, For social care 22,6 %

Is there a national/regional strategy for integrated care (either within healthcare domain – effective and patient oriented collaboration of various levels of services and various providers, and/or between health and social care)

Strategy for a long-lived society, The Resolution of the National Mental Health Programme

What kind of system/model of healthcare is implemented in your country?

Bismarck model with the addition of commercial insurance.

What are basic characteristics of payment for healthcare services from citizen point of view?

Compulsory health care insurance is mandatory. It covers general and urgent health care services and examinations. Supplementary health insurance is a voluntary insurance, which you pay additionally. It covers all types of additional payments in all healthcare institutions including primary health care, specialist examinations, diagnostics, laboratory tests, physical therapy, dental services, hospital treatment and prescribed medication. Some services may also be payed out-of-pocket, either because they are not included in voluntary insurance (especially dental services) or to skip lines.

Is there apparent support of innovations that may bring savings in healthcare budget in mid or even long-term perspective in your country/region? N/A

Do you feel that there is growing support by authorities to various preventive measures for citizens to maintain their health and wellbeing in your country/region?

In Slovenia there are a lot of health promotion centres, mental health centres for children and adults and cancer prevention and early detection centres of breast, cervix and colon cancer. We also have National program of primary prevention of cardiovascular diseases. Vaccination programs are expanding and more affordable for specific groups (KME, influenca, pertussis).

How primary care is organized (basic characteristics, such as family doctors, individual, private GPs or community healthcare centres, integrated care centres, other)

Primary care is under the jurisdiction of municipalities. Patients are entitled to select their own physician (in the framework of cummunity healthcare centre, healthcare station or a private physician with concession). Personal physicians for the adult population are GPs, and for children and youth they are paediatricians or school medicine specialists. Patients need a referral from their personal physician to be treated by a specialist.

Does your primary care function as gate keeper to specialists, hospitals or patients may access many of these services at their own decision?

Yes, it does.

Can patients choose their doctors (GP- General Practitioner, specialists, dentists, hospital) at their choice?

Yes, they can.

Does your country have strategy for population approach to health (enabling both planning services and capacities on national/regional level, and focus in most complex patients and services provided to them?
N/A

Is there clear legal framework for eHealth and specifically for telemedicine in your country?

The Law on data collections in the field of health care is in charge of E-Health.

The Law on amendments to the law of health activity is in charge of Telemedicine.

Is there any national/regional strategy for eHealth?

Yes, in Slovenia there is the national strategy of eHealth.

Is there established organizational framework for telemedicine services and mechanism to evaluate impact of innovations in healthcare, possibly associated with methods for reimbursement for telemedicine interventions in your country/region?

Teletransfusion, implemented by the Blood Transfusion Centre of Slovenia, is the largest telemedicine project in Slovenia. It is a nation-wide system that covers all blood transfusion institutions involved in the supply of Slovene hospitals. Teleradiological systems for analysis of X-ray images are developed (General Hospital Izola). However, they are not interconnected on national level. Telekap (TeleStroke) network is used for fast and efficient management of stroke patients. All hospitals in the country are connected in

this network, which provides continuous access to the data and connections with consulting specialists in the tertiary centre.

Is there ongoing process for creation of framework for mHealth (clinical mobile applications, used in health services) in your country/region? N/A

What is the degree of digitalization of information exchange between various healthcare providers, do they share health data or at least some documents such as discharge reports? N/A

Is there shared Electronic Health Record (EHR)and if so, is it centralized or decentralized (e.g. just shared reports, images, lab results and other health date located at various healthcare providers); is the sharing data and access to EHR common "mandatory" feature of all providers/doctors in public healthcare?

No, there isn't.

Sharing specifically structured health data between primary (GPs), outpatient depts (secondary care) is there personal healthcare record purposely maintained, e.g. for the chronically ill, with possibly also other information about the care plan?

No, there isn't.

Is there concept of sharing health date with social care in your county/region?

No, there isn't.

Is there central (or regional) database of vaccinations of citizens?

Yes, there is (ERCO).

Do patients have access to their health data (PHR)?

No, they don't.

How do you briefly characterize cooperation of various healthcare providers (hospitals, care providers, GPs) within the region, e.g. in case of complex patients?

Cooperation between different levels of health care is not systematically regulated and mostly takes place at the individual level.

Is there (independent, public) institution or entity dealing systematically with development/verification/evaluation/testing of innovations intended for healthcare or providing expertise in them to authorities or healthcare providers in your country/region?

Agency for Medicinal Products and Medical Devices of the Republic of Slovenia is in charge of checking quality, safety and efficacy of the medical product. It also collects and evaluates reports on adverse reactions reported in the pharmacovigilance system, further it carries out risk assessments and adopt measures for the safe use of medicinal products.

Is there any assessment model for frailty people implemented in your country/region? (e.g. Frailty index etc.)

- How is the risk of frailty calculated?

  Death risk prediction

- How is the frailty assessed? N/A
- Is there any methodology used for risk stratification for frail people? N/A
- Is there in your country/region satisfactory resolved the issue of patients who need also social care or support, e.g. after discharge from hospital or on long term care? Similar question relates to older citizens in social care settings (houses) who need regular healthcare services, often specialized, and cannot easily move on their own to the healthcare providers. V/A
- Please shortly describe your needs/barriers in each domain related to your digital tool:

Health problem and characteristics of the application

The iHELP SOS mobile app allows users to send quickly and easily an SOS alarm to members of the iHELP community (ICE contacts, first responders, rescuers and iHELP users) in the nearby area. iHELP collects real time data including user location, personal information's, medical data and rescuer responses to incidents.

Provides information on providing first aid (reviving, bleeding, amputation…).

Enables input of the data on user's medical condition (diseases, medications, allergies, blood type, and medical history). Provides various reminders (medication, water intake, food intake, physical activity).

Safety

The provider of the service is the owner of the collected data. As such, the owner of the personal and health/medical data is obliged to legal requirements on data protection GDPR and on national legislation concerning medical data. However, there are no information available concerning these safety issues.

It uses global SMS system. There are also no technical information available concerning storage and safety of the collected data.

Clinical effectiveness

No data available concerning clinical effectiveness.

Patient perspectives

It is explicitly stated.

Economic aspects

The basic package of mobile application which enables collection of 6 basic health information is for free, all other upgraded packages and services offered are payable.

Organisational aspects

iHELP is the company which establishes connections with private persons-individual users, and organisations or companies-buyer of services. The result is the network of interconnected users of services.

Socio-cultural, ethical and legal aspects:

The digital literacy aspect is not addressed, as a prerequisite for iHELP is the use of a smartphone and / or computer. Aspects of low digital literacy of older or less educated people are not addressed, GDPR legislation and medical data legislation are not sufficiently documented and limited access due to paid services is not addressed.

Safety

Do you use a safety assessment tool?

In Slovenia health technology assessment is implemented (HTA). HTA is the systematic evaluation of properties, effects and/or impacts of health technologies and interventions. It covers both the direct, intended consequences of technologies and interventions and their indirect, unintended consequences.

Is there specific methodology for it, like FMEA (Failure mode and effects analysis)?

Are there contact (call) centres for frailty people?

iHELP SOS ASISTENCA enables an activation of your emergency contacts (ICE) that you have entered in your iHELP user profile, professional paramedics (112) and first responders within a radius of 500 meters of you in order to reach urgent medical help. HELP SOS alarm works on all mobile phones and via a landline phone. iHELP SOS Assistance is intended for people who are deaf, for people who have health problems and who are mostly home alone, and for them who are older than 60 years.

The purpose of the AHA.SI project is to help the elderly in extended employment and deferred retirement, active and healthy aging for active and healthy aging and to offer support for independent living in the home environment and long-term care and nursing. They are available via contact email or phone number. The project is under the auspices of National Institute of Public Health.

Is there any strategy for prevention and for support of frailty people? Please describe briefly.

In Slovenia there are The Strategy for a long-lived society and The Resolution of the National Mental Health Programme.

The strategy of a long-lived society defines the main goals in preparing responses to the challenges due to the changed age structure of the population in Slovenia, and provides strategic orientations and goals for operations in next areas: employment, work activity, independent, healthy and safe life of all generations and inclusion in society.

The Resolution of the National Mental Health Programme has an aim to secure the right to optimal mental and physical well-being otherwise with reducing mental health problems and disorders, with raising literacy in the field of mental health and destigmatization and with creating a network of mental health centres in the local environment to facilitate support for people who need mental care.

Technical readiness for digital tools

TECHNICAL-LEVEL BARRIERS

PUBLIC POLICY BARRIERS

HIGH-LEVEL POLITICAL/ECONOMIC BARRIERS

Does your institution/region provide services using digital tools for frail people? If so, please briefly describe their scope and how the services are provided. Is there institution-wide strategy to support using or development of such tools?

E-care Service is a telecare social service which enables active, independent and safe living at home for elderly, patients with chronic diseases, and to disabled persons. E-Care service is provided by Telekom Slovenia. Equipment is installed at the user´s residence which enables triggering an SOS call when needed. Sensors detect unusual behaviour at the user´s residence and alert caregivers and the assistance centre.

Have you participated in some international projects focusing on eHealth solutions, particularly if the project lead to implementation new technologies? N/A

How innovations are procured in your country/region? Are there any activities in the framework of Public Procurement of Innovative solutions (PPI) or Pre-Commercial Procurement (PCP)?

In our country there is The Law of research and development, which sets out the principles and objectives and regulates the manner of implementing research and development policy, which is financed from the state budget and other sources (from European programs and funds, local communities and the economy).

Is the design and development of various digital tools directed to in-house solutions (e.g. by hospital IT dept.) or there is some kind of cooperation with companies and or other stakeholders (university's, local authorities, society – quadruple helix)?

E-care Service unites different stakeholders: assistance centre, older adults and patients with chronic diseases, supports caregivers and family members, emergency services, Telekom Slovenia.

How the technologies are selected (some criteria are applied, such as open source, common APIs, EU, global standards)? If the solutions are considered medical device (in the sense of Medical Device Regulation - MDR), in which phase of the solution implementation do you pursue CE certification?

The Ministry of Health is the regulator for medicinal products, medical devices and pharmacy services. Relevant provisions are set out in the Medicinal Products Act, the Medical Devices Act and the Pharmacies Act. Agency for Medicinal Products and Medical Devices of the republic of Slovenia (ARSZMP) is the competent authority for medicinal products and medical devices. It oversees tasks pertaining to marketing authorization, distribution, post-marketing evaluation and vigilance for pharmaceuticals and medical devices. To be placed onto the market, medical devices must obtain a CE mark from a notified body, in line with the requirements of regulations of the Republic of Slovenia and EU Council Directive 93/42/EEC.

Are the technologies used taken from offerings on the market or is there focused cooperation with R&D companies and potential suppliers? How the technologies are tested before and during implementation?

All public tenders for major pieces of medical technology are prepared and conducted by the Ministry of Health. Minor investments are funded by providers themselves.

The area of pharmacovigilance for human use is governed by the Medicinal Products Act and the "Rules on pharmacovigilance of medicinal products for human use". Pharmacovigilance involves monitoring the safety of medicinal products after marketing authorization has been granted and includes all activities relating to the detection, assessment, understanding and prevention of adverse reactions and other possibly associated complications. In Slovenia, it is among ARSZMP's responsibilities to collect and evaluate reports on adverse reactions reported in the pharmacovigilance system as well as in the periodic safety update reports submitted by manufacturers.

Is there some system in development of new solutions in your institution, e.g. designed to formulation of use case and its intended location (e.g. clinic, disease or health status) first, followed by the development of technologies?

How end users are selected?

- Stratification of end users (patients, seniors, informal carers)
    - **In consumer-focused innovation**
    - In technology-based innovation
    - In business model innovation

How the staff is trained? - Nurses, doctors, carers, family members, etc

The training programme includes: variety of subjects related to care e.g. communication skills, promoting independence, security in the home, adult protection, dementia care, Training in Health and safety, Fire safety, First Aid and Food Hygiene, Medication training and competency

assessment, Practical training in Moving & Handling techniques and Catheter care and Infection Control Training.

How new digital solutions are financed and what are the typical barriers associated with cost and large-scale deployment of the new solution?

New innovations finance from the state budget and other sources (from European programs and funds, local communities and the economy).

The typical barriers are shortage of financial resources, poor access to information and data and poor communication between patient and health care providers.

What kind of digital tool are used in your country related to your topic from WP T2?

Please choose:

1) Intelligent monitoring
2) AP nurse
3) GPS tracking
4) App for frail
5) Monitoring grid
6) **Care for frail**

Which entity provides the solution?

Telekom Slovenia.

Further questions related to the digital tools:

- Any remark to education (personnel, patients, carers)?
- Informed consent signed prior the tool is provided to the patient?

Obtaining personal consent is necessary for the processing of personal data.

- Where the data from the tool are stored (in-house, public cloud, in the country, abroad)?

Data is securely stored in the cloud with the advanced protection.

- Which entity provides technical support?
- What are the major benefits of the solutions?
- Are the data from the digital tools shared with some other IT systems, EHR, PHR?
- Is there any evaluation of the data and if so, which entity does it?
- Do you cultivate Patient empowerment with the solution? Do you evaluate patient acceptance/satisfaction?

- Payment, reimbursement

How the various costs are covered (investment – devices, SW, operation, support telecommunication fees, consumables, training, consumables if appropriate)?

In designing and implementing technologies, the Ministry of Science and Technology cooperates with the Ministry of Economic Affairs and with the Development and Technology Fund of the Republic of Slovenia, the Development Fund of the Republic of Slovenia, the Chamber of Commerce and Industry of Slovenia. The all participants decide on the subsidizing of the costs of the research and development, the salaries of research staff and research or technological infrastructure for the needs of technology centers and parks and development cores of user organizations.

Compliance with the legislation including requirements for (cyber) safety and data protection (GDPR)

General Data Protection Regulation (GDPR) and The Personal data protection law enable protection personal data with a Personal consent of an individual which is a voluntary statement of the will of an individual that his personal data may be processed for a specific purpose.

Austria

General description

Please shortly describe your social and health care system?

Which authority is responsible for and administration of health care and social care? Region/Ministry(ies)/municipality etc

Health administration is largely carried out by the federal states or municipalities.

Which body is responsible for organization of healthcare services in your region/country, including availability of healthcare and social care (time and location)?

The responsibilities for organization of healthcare services are divided between federal government, federal state, municipalities and social insurance as a self-managing body.

Responsibilities of the **federal government** are for example:

- Legislation for health professions
- Legislation for public drug regulatory and health affairs and
- Legislation for consumer health
- Other supraregional health system issues.

Federal States issues are for example

- Implementing Legislation
- Ensuring hospital care
- Health administration (is also carried out by the **municipalities**)

Social insurance regulates for example the supply of resident doctors together with Medical Chamber.

The distribution of responsibilities in the health system requires that responsible persons coordinate important decisions with each other. For this purpose, agreements and contracts are concluded - e.g. the agreement according to Art. 15a B-VG on the organization and financing of the healthcare system. This is a temporary domestic contract between the federal government and the nine federal states, in which important framework conditions are laid down.

Which body is responsible for reimbursement/payment for the health and care services?

Payment is also divided between social insurance as well as federal government, federal state and municipalities.

What percentage of GDP (Gross domestic product) does your country spend for health and social care?

In 2018, the current health expenditure calculated according to SHA in Austria was EUR 39.791 million or

10.3% of the gross domestic product (GDP). In addition, investments in the health sector accounted for EUR 2.781 million. Between 2004 and 2018, current health care expenditure (at current prices) rose by an average of 3.8%.

Is there a national/regional strategy for integrated care (either within healthcare domain – effective and patient oriented collaboration of various levels of services and various providers, and/or between health and social care)

1) Integrated care within the health system: The federation, federal states and social security authorities have agreed to set up a partnership-based target management system for planning, organizing and financing Austrian health care (target management health). The scope of the contracts covers the entire Austrian healthcare system (intra- and extramural area) as well as affected interfaces to the care area.

2.) Integrated care between health and social services: There is no separate agreement on integrated care between the health and social services, but the above-mentioned target management system also provides guidelines for integrated care between the health and social services.

What kind of system/model of healthcare is implemented in your country?

Bismarck model

What are basic characteristics of payment for healthcare services from citizen point of view?

Health Insurance: Membership in health insurance is based on professional affiliation, so there is no health insurance competition. The contribution rate for workers and salaried employees is currently 7.65 percent. The employee pays 3.87 percent of the total, the employer pays the remaining 3.78 percent of the costs. Pensioners and pensioners pay a contribution rate of 5.1 percent. If required, all social health insurers are entitled to a wide range of benefits in kind and cash. However, the use is often accompanied by additional payments. Relatives who are not themselves subject to compulsory insurance can also be insured under family insurance.

Statutory insured persons can extend their insurance cover individually by taking out **private supplementary insurance.**

These allow, for example, better accommodation for inpatient treatments. Hospitals are also financed by **taxes.**

This does not apply to nursing and social services, which are currently purely tax-financed.

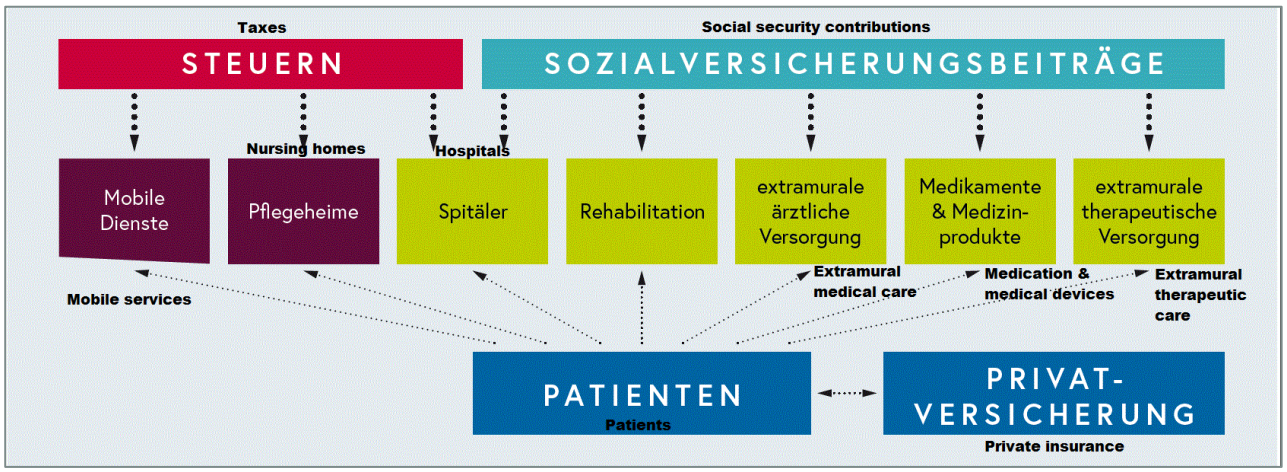


Figure 1: Financing of health care from "The Austrian health system. Numbers, data, facts. Updated edition 2019. Federal Ministry Republic of Austria – Social Affairs, Health, Care and Consumer Protection.

Is there apparent support of innovations that may bring savings in healthcare budget in mid or even long-term perspective in your country/region?

Yes, for example: If you take out private or additional insurance, you get a subsidy or you can deduct the costs of the conclusion from the tax.

Do you feel that there is growing support by authorities to various preventive measures for citizens to maintain their health and wellbeing in your country/region?

Current spending on preventive measures is around 1% of total spending. The current government program is more focused on curative measures. However, this should be revised and adapted in the future.

How primary care is organized (basic characteristics, such as family doctors, individual, private GPs or community healthcare centres, integrated care centres, other)

Access to primary care is very low-threshold. It is very easy to reach for the Austrians. Anyone can go to the family doctor, specialists or hospital themselves.

The development of **integrated care centers** is in the initial stage.

A health care reform was launched in 2013, which for the first time brought movement into the areas of primary care. Politicians have recognized the need for action and the first political steps have been taken.

In 2017 the primary care law was passed. The development of primary care should be promoted through the creation of legal security.

However, the transition phase will still take some time, even if acceptance is already very high in many areas.

Does your primary care function as gate keeper to specialists, hospitals or patients may access many of these services at their own decision?

Yes, partially. But there is also the possibility to visit the specialists without a referral from primary care. The primary care as a gate keeper to specialists or hospitals is predefined, but not mandatory.

Can patients choose their doctors (GP- General Practitioner, specialists, dentists, hospital) at their choice?

Yes -> see previous question.

- Does your country have strategy for population approach to health (enabling both planning services and capacities on national/regional level, and focus in most complex patients and services provided to them?

The Austrian Structure Plan (Österreichische Strukturplan Gesundheit – ÖSG) contains planning statements for selected areas of outpatient and acute inpatient care, for outpatient and inpatient rehabilitation and for large medical-technical devices. The quality criteria in the Structure Plan aim to achieve the same care standards in the various care structures across Austria. The Structure Plan ensures that health care is distributed throughout Austria in a balanced manner, is easily accessible and is offered in a comparable quality at a high level.

The Austrian Structure Plan was first agreed in 2006. The fifth revision, the Structure Plan 2017, was approved by the Federal Target Steering Committee on June 30, 2017 and came into force on this date. The planning statements and the implementation of the quality criteria of the Structure Plan 2017 refer to the year 2020. In addition, orientation values for planning at the state level are given for the year 2025.

Is there clear legal framework for eHealth and specifically for telemedicine in your country?

Health Telematics Act 2012: In order to make the rapid technical progress usable for the healthcare system, open questions from telemedical services, above all regarding financing, quality standards as well as data protection and ethical requirements, have to be answered.

For this reason, recommendations were drawn up in 2013 that includes the introduction of specific telemedical services in regular care in Austria. The main focus was on areas of application for the care of chronically ill people.

In May 2015, a catalogue with 14 recommendations was developed, which should be groundbreaking for the further telemonitoring development in Austria. In addition to the recommendations, the IT architecture is an essential product. For this purpose, a binding, compressed framework directive has been drawn up, which specifies the technical standards.

Is there any national/regional strategy for eHealth?

1.) eHealth strategy of the city of Vienna: From the City of Vienna's perspective, eHealth's primary goal is to increase the quality and efficiency of health and social services through the coordinated use of ICT. A key point is the achievement of integrated care based on interoperable information systems. The focus is on the conception for the establishment of a population-centered or patient-

centered digital documentation, communication, storage and processing of health-related and administrative data.

2.) eHealth strategy of Styria "Digital Health System Styria" = framework and initiator for a systematic and future-oriented further development of the use of information and communication technology in the Styrian health and care system. The eHealth strategy of Styria matches the applications with the possibilities and requirements of the ELGA as Austria's basic eHealth infrastructure

Is there established organizational framework for telemedicine services and mechanism to evaluate impact of innovations in healthcare, possibly associated with methods for reimbursement for telemedicine interventions in your country/region?

At the moment not.

Is there ongoing process for creation of framework for mHealth (clinical mobile applications, used in health services) in your country/region?

No. There is no collected platform. There are only individual projects from individual providers.

What is the degree of digitalization of information exchange between various healthcare providers, do they share health data or at least some documents such as discharge reports?

In Austria, the "ELGA – elektronische Gesundheitsakte" was developed between 2006 and 2010 and is to be introduced in stages from 2015 to around 2022. Access is administered and controlled via the e-card system. The HL7 standardization standard forms the basis for data access. Patients have the option of opting out to restrict or prevent usage. With ELGA, stationary facilities such as e.g. Hospitals, general practitioners as well as pharmacies and care facilities, i.e. the ELGA health service providers, are networked across the board.

Is there shared Electronic Health Record (EHR) and if so, is it centralized or decentralized (e.g. just shared reports, images, lab results and other health date located at various healthcare providers); is the sharing data and access to EHR common "mandatory" feature of all providers/doctors in public healthcare?

ELGA GmbH Ja, Implementierungsphase, zentral, Ja, OpT out,

Is there concept of sharing health date with social care in your county/region?

A country strategy in this regard exists. In the future, it will be possible for social services to also have access to health data. It is part of ELGA.

Is there central (or regional) database of vaccinations of citizens?

No, there is no vaccination requirement in Austria, which is why there is no registry

Do patients have access to their health data (PHR)? If so, is the PHR filled systematically with data of various healthcare providers or only one by one (hospitals), and can patients add their own heat-treated data to PHR?

Yes, patients do have access to ELGA and it is filled systematically with data of various healthcare providers like hospitals, general practitioners as well as pharmacies and care facilities.

If available, pls provide some technical characteristic of the infrastructure (EHR, PHR) and technical standards, patient identification methods. ELGA GmbH

How do you briefly characterize cooperation of various healthcare providers (hospitals, care providers, GPs) within the region, e.g. in case of complex patients?

There are guidelines in Austria, but cooperation depends heavily on the person treating them. For example: A patient who had to go through dialysis regularly. In the hospital, it is determined whether a person needs dialysis. If this is the case, the person concerned must agree to dialysis. In a further procedure, the family doctor, rescue and hospital must coordinate the treatment. In addition, it must be coordinated with the Austrian health insurance company. The health insurance company also finances the treatment. The patient must subsequently be accompanied regularly and cared for at home.

Is there (independent, public) institution or entity dealing systematically with development/verification/evaluation/testing of innovations intended for healthcare or providing expertise in them to authorities or healthcare providers in your country/region?

There is no institution, which is dealing with development/verification/evaluation/testing of innovations systematically.

It is possible to submit innovations and have them approved. There are also individual companies that can be added as experts. However, this is not governed by the state and it is not systematic.

Is there any assessment model for frailty people implemented in your country/region? (e.g. Frailty index etc.)

The so-called **care level model** has been used in Austria since 1993.

There are 7 levels of care. In addition to other prerequisites, these are measured based on the time spent on care. The amount of care allowance depends on the level of care. The first level of care requires a care requirement of more than 65 hours per month.

The following table shows the number of long-term care recipients in Burgenland in May 2020:

Care level	Required nursing hours per month	Men and Women	Men and women older than 75 years
1	more than 65 h	4.948	2.906
2	more than 95 h	3.920	2.610
3	more than 120 h	3.593	2.531
4	more than 160 h	3.512	2.756
5	more than 180 h + extraordinary nursing needs	2.304	1.897
6	more than 180 h + 24 h care is necessary	696	449
7	more than 180 h + no targeted movement is possible	345	207
Total		19.318	13.356

Figure 2: Number of long-term care recipients in Burgenland in May 2020.

How is the risk of frailty calculated?

There is no calculation of the risk of frailty available.

How is the frailty assessed?

Frailty is assessed with the help of the care level model. Doctors and registered nurses estimate the time spent on nursing. The level of care depends on how many hours are required for care.

Is there any methodology used for risk stratification for frail people?

Yes, but these are not generally applied. In some nursing homes, for example, the Norton scale is used. The Norton scale is a step-by-step scheme for classifying the risk of developing a pressure ulcer. It is based primarily on the general condition of the patient.

Is there in your country/region satisfactory resolved the issue of patients who need also social care or support, e.g. after discharge from hospital or on long term care? Similar question relates to older citizens in social care settings (houses) who need regular healthcare services, often specialized, and cannot easily move on their own to the healthcare providers.

Case management is used in Austria. Different providers are available in extramural care, e.g. Social services, medical HKP, home help, psychosocial or psychogerontological services; likewise in Austria 80% of the home care is provided by relatives who are supported by various organizations; in addition, there are young carers, mobile intensive care, Neighborhood care, Family doctors who make house calls and preventive home visits;

Please shortly describe your needs/barriers in each domain related to your digital tool:

1) Health problem and characteristics of the application

The demographic development in Austria, which is fundamentally expressed in an increasing proportion of the older generation and a decreasing proportion of the younger generation, has very important effects on the health and social system.

If current policies are maintained, the ageing population will put increasing pressure on public spending. The Monitoring Grid is one of the new technologies, which addresses the future challenges posed by a growing elderly population. This methodology allows to detect early signs of deterioration of the health or social conditions of the elderly by verifying the state of the user's psycho-physiological health.

2) Safety

The Monitoring Grid can be seen as safe. Two matters should be considered:

- Data protection: The processing of the data will be based solely on the legal provisions. This will also be part of the informed consent, which has to be signed by the resident, when they are included to the Monitoring Grid.
- The regular calls of the residential area manager could be seen as an attack on privacy by the residents. Therefore, from the beginning it is important to explain the tool to them and add this explanation to the informed consent.

1) Clinical effectiveness

The Monitoring Grid is one of the tools of eCare Network in Bologna. In 2009 LHA BO run a study on elderly in order to assess initiatives aimed at preventing inappropriate access to emergency rooms. At the first evaluation stage, they have found that e-Care users accessed the ER in the same percentage as non e-Care users, because of the complexity of frailty conditions under evaluation. But at a further stage, when LHA BO considered elderly patients by only single disease, for example cardiovascular or orthopedic disease, e-Care users resulted advantaged. The study showed that whole monitoring of frail seniors makes the difference in the care process, as every single medical specialty has its own appropriateness, but the health outcomes for a patient are poor without integration of the different care interventions.

In Austria/ Burgenland the Monitoring Grid is implemented for the first time.

2) Patient perspectives

The Monitoring Grid focuses elderly from care level 1 living in assisted living homes. One challenge for them could be the use of ICT. In order to make the use of ICT as easy as possible for the residents, training is planned before participation in the Monitoring Grid.

Another issue which is important is respect for privacy. It is possible that some residents see the monitoring grid as an invasion of privacy. It is impossible to clearly and simply communicate the purpose of Monitoring Grid right from the start.

On the other side there will be residents, who approve this digital tool, because there is somebody who cares for them and imparts them an objective and subjective feeling of security. Furthermore, the Monitoring Grid could alleviate social isolation

3) **Economic aspects**

As explained under 1) Health Problem and characteristics of the application the demographic development in Austria has very important effects on the health and social system. The Monitoring Grid can help older people to live longer at home instead of having to go to hospital or nursing home and this in turn helps to save money.

4) **Organisational aspects**

The limited resources available in the social services sector do not allow to provide real and frequent contacts with people. Therefore, the regular phone calls are a good alternative to assess the health condition. In order to guarantee efficient calls, it is very important that guidelines are formulated and the staff is trained.

5) **Socio-cultural, ethical and legal aspects**

Regular calls of the residential area manager could be seen as an attack on privacy by the residents. Therefore from the beginning it is important to explain the tool to them and add this explanation to the informed consent.

A second point is data protection. The processing of the data will be based solely on the legal provisions. This will also be part of the informed consent.

Safety

Do you use a safety assessment tool? Is there specific methodology for it, like FMEA (Failure mode and effects analysis)?

Death risk prediction

Are there contact (call) centres for frailty people? If so, which entity provide such service?

No, at the moments there are no (call) centers for frailty people. It is possible to call a nursing hotline independently. In addition to this nursing hotline, the Federal Ministry of Health provides a hotline for information about the Care Level Model. A separate number was also set up during Corona.

Is there any strategy for prevention and for support of frailty people? Please describe briefly.

- Health Promotion Strategy Austria: Framework for strengthening targeted and coordinated health promotion as well as for primary prevention in Austria. The central goal of the health promotion strategy is to contribute to a longer, self-determined life in good health for all people in Austria.

- Austrian Dementia Strategy „Live a good life with dementia“ = It shall improve the life situation of people with dementia and their relatives. Therefore, impact goals and recommendations for action were developed in a process together with those affected, decision-makers, implementers and experts. The precise recommendations for action enable decision-makers to plan and implement concrete measures in their respective spheres of activity in order to achieve the defined objectives together.
- Austrian Diabetes Strategy “Counter Diabetes together” = Framework for all activities on the topic of diabetes, which should enable future-oriented, strategic action.

Technical readiness for digital tools

TECHNICAL-LEVEL BARRIERS

PUBLIC POLICY BARRIERS

HIGH-LEVEL POLITICAL/ECONOMIC BARRIERS

Does your institution/region provide services using digital tools for frail people?

N/A

If so, please briefly describe their scope and how the services are provided. Is there institution-wide strategy to support using or development of such tools?

N/A

Have you participated in some international projects focusing on eHealth solutions, particularly if the project lead to implementation new technologies?

From 2012 until 2015 Samariterbund Burgenland was part of the project “moduLAAr - A modular, scalable AAL system as a lifestyle element for silver agers up to assisted living”.

In the course of the “moduLAAr” project, 50 residential units were equipped with modular, standard-compliant AAL technology. The services offered come from the areas of comfort, safety, health and social interaction and should take into account the entire social environment of the residents.

The technologies used were scientifically evaluated, especially with regard to user acceptance, usability and the benefit or acceptance of the public service provider.

How innovations are procured in your country/region? Are there any activities in the framework of Public Procurement of Innovative solutions (PPI) or Pre-Commercial Procurement (PCP)?

No, activities are only singular and strongly demarcated. It is very difficult to get beyond the project statute, because everything is very heavily regulated and it is very difficult to get funding.

Design and development of various digital tools directed to in-house solutions (e.g. by hospital IT dept.) or there is some kind of cooperation with companies and or other stakeholders (university's, local authorities, society – quadruple helix)?

Samariterbund Burgenland offers the „Home Emergency call" for elderly and the "AAL – Ambient Assisted Living" is piloting. In addition there is a project of the „Health and Social Services" with a university, which focuses the monitoring and analysis of falls.

How the technologies are selected (some criteria are applied, such as open source, common APIs, EU, global standards)? If the solutions are considered medical device (in the sense of Medical Device Regulation - MDR), in which phase of the solution implementation do you pursue CE certification?

Technologies are selected with regard to interface compatibility and manufacturer support as well as options for process adaptation

Are the technologies used taken from offerings on the market or is there focused cooperation with R&D companies and potential suppliers? How the technologies are tested before and during implementation?

We have technologies that are available on the market and there are also projects that are developed in cooperation with specialized companies. At the moment the care documentation project is currently running in the health and social area.

Is there some system in development of new solutions in your institution, e.g. designed to formulation of use case and its intended location (e.g. clinic, disease or health status) first, followed by the development of technologies?

No. The Samariterbund has a "Department of the Future", whose task it is to evaluate which developments exist nationally and internationally. However, no new solutions or innovations are developed independently.

How end users are selected?

This depends on the criteria that are desired and are accordingly defined.

For example: Both inclusion and exclusion criteria were defined for assisted living.

- Stratification of end users (patients, seniors, informal carers)
  - In consumer-focused innovation
  - In technology-based innovation
  - In business model innovation

How the staff is trained? - Nurses, doctors, carers, family members, etc

Face to Face. Training person creates a training guide with which the training is carried out. It is also important that the training person is available to the participants after the training has ended.

How new digital solutions are financed and what are the typical barriers associated with cost and large-scale deployment of the new solution?

Sometimes the organization finances its activities itself, sometimes the activities are carried out through projects.

What kind of digital tool are used in your country related to your topic from WP T2?

Please choose:

1) Intelligent monitoring
2) AP nurse
3) GPS tracking
4) App for frail
5) **Monitoring grid will be implemented in the framework of the present project.**
6) Care for frail

Which entity provides the solution?

Monitoring grid is one tool of the eCare Network of Bologna.

Further questions related to the digital tools:

- Any remark to education (personnel, patients, carers)?

Both the staff and the residents have to be trained in order to be able to use the monitoring grid faultlessly.

The staff above all need training in how the program works. The residents need training to be able to use the technical devices (mobile phone, home emergency call) properly.

Informed consent signed prior the tool is provided to the patient?

It is planned that the residents have to sign an informed consent.

Where the data from the tool are stored (in-house, public cloud, in the country, abroad)?

In-house

Which entity provides technical support?

IT Department of Samaritan Department Burgenland.

What are the major benefits of the solutions? N/A

Are the data from the digital tools shared with some other IT systems, EHR, PHR?

No, at the moment not

Is there any evaluation of the data and if so, which entity does it? N/A

Do you cultivate Patient empowerment with the solution? Do you evaluate patient acceptance/satisfaction?

It is important that the resident works actively. Because only with the information of the resident a database can be built. Afterwards, of course, acceptance and satisfaction should be evaluated.

Payment, reimbursement - How the various costs are covered (investment – devices, SW, operation, support telecommunication fees, consumables, training, consumables if appropriate,)?

Insurance/direct payments etc.

Personnel – related questions of the application (does the application need new staff or does it solve the lack of medical staff?)

What kind of professionals are needed and how many in total are involved?

In a first step the home residential area manager will conduct the regularly calls. In course of the project 10 residents are engaged.

Compliance with the legislation including requirements for (cyber) safety and data protection (GDPR)

The project will of course be implemented in accordance with current legislation.

Technical readiness for application - compatibility with existing ICT infrastructure.

It is planned to expand the already available home emergency call and to implement the Monitoring Grid into the available Care Center.

Slovakia

General description

Please shortly describe your social and health system?

Who organizes care? Region/Ministry/municipality etc.

Health care and social services in the Slovak Republic are two separate systems with minimal coordination and interconnection. Each of these systems is governed by its own legislation and standards. Despite the fact that in Slovakia there is not a unified system of long-term integrated care, the services that are traditionally part of it are provided fragmented in three areas of support. These are the area of social services, the area of health care and informal care (within the system of compensation of severe health disabilities). The provision of long-term care is perceived primarily in the system of social services and in informal care in the form of a care allowance. In the field of healthcare, long-term care is focused primarily on chronic patients.

- *Healthcare*: In Slovakia, there is a pluralistic system of health insurance companies, which must accept every insured person, who in turn can change the insurance company once a year. Health insurance companies are obliged to contract every provider of general outpatient healthcare, every pharmacy and provider of emergency medical services, as well as all healthcare providers that are part of the minimum network. As free pricing applies in principle, insurance companies use selective contracting and their own evaluation criteria using quality indicators. There are three health insurance companies operating in Slovakia since 2010, of which two are private (Dôvera and Union) and one dominant - the state VšZP. The Office for Health Care Supervision (ÚDZS) is responsible for monitoring the implementation of public health insurance, the provision of health care and its purchase. The Office oversees the redistribution of financial resources between health insurance companies. Institutional care facilities are primarily financed from public sources, through the state budget, but mainly through payments by health insurance companies from public health insurance.
- *Social care*: The system of social services in Slovakia is aimed at preventing, addressing or mitigating the unfavorable social situation of a natural person, his family or community. Long-term care is partly provided within the structures of the health system. Here, it is aimed primarily at patients with chronic diseases and the elderly who need geriatric care. In the health care system, it is provided mainly through home nursing agencies; outpatient care (geriatric outpatient clinics); institutional care (long-term care wards, geriatric and palliative wards in hospitals), but also in specialized medical facilities, especially in long-term care hospitals, psychiatric hospitals, nursing homes, hospices. Informal care in long-term care is provided in the home environment, it is supported by a care allowance.

Which authority is responsible for and administration of health care and social care?

Ministry of Health of the Slovak Republic is responsible for the health care, and the Ministry of Labor, Social Affairs and Family of the Slovak Republic is in charge of social care.

Which body is responsible for organization of healthcare services in your region/country, including availability of healthcare and social care (time and location)?

- *Health care*: The Ministry of Health of the Slovak Republic is the central body of state administration, which is responsible for elaboration of health policy and legislation, regulation of health care provision, management of state health programs, participation in health education management, management of national health registries, determination of scope of basic health care package paid from public insurance, defining health indicators and setting minimum quality criteria for health care services. In 2003, competencies in the area of price regulation were transferred to the Ministry of Health. In addition, the state owns university hospitals, teaching hospitals, specialized national institutes, sanatoriums and the largest health insurance company. This leads to a conflict of interest, as the state determines and regulates the legal framework in which several institutions owned by the state (eg. one health insurance company and several health care providers) operate.

- *Social care*: The Ministry of Labor, Social Affairs and Family of the Slovak Republic is responsible for the organization and financing of the social care system. The social care system and the health care system have developed separately, as a result of which their organization and funding system differ, although many of the services they provide are practically identical.

- *The role of self-governing regions*: As part of the decentralization of state administration, some local competencies and responsibilities were transferred to eight self-governing regions of Slovakia. The responsibility of self-governing regions includes issuing permits for the operation of medical facilities, appointing ethics commissions, approving biomedical research in outpatient clinics, storing medical records after the provider's termination and ensuring representation during the temporary suspension of the provider's permit or license. The Ministry of Health of the Slovak Republic decides on appeals against decisions of self-governing regions. Self-governing regions also help to supplement the network of providers if they find a deteriorating availability of health care in the region, for example by appointing a doctor in case patients have problems getting or finding appropriate treatment.

Which body is responsible for reimbursement/payment for the health and care services?

Health insurance companies that provide public health insurance have the status of payers in the Slovak healthcare system. Health insurance companies are responsible for the collection of health contributions and the purchase of health care. Permits for health insurance companies are issued by the Office for Health Care Supervision.

In the case of social services, fundings are provided by the Ministry of Labor, Social Affairs and Family of the Slovak Republic.

What percentage of GDP (Gross domestic product) does your country spend for health and social care?

In 2018, total expenditures on health care in Slovakia reached 6.7 % of GDP, public expenditures account for 5.4 % of GDP and the rest are direct payments by households. Slovakia spends on healthcare a comparable part of GDP as the average of the V3 countries - the Visegrad Four countries without the Slovak Republic (6.8 %), and less than the average of the EU15 countries (9.4 %).

Is there a national/regional strategy for integrated care (either within healthcare domain – effective and patient oriented collaboration of various levels of services and various providers, and/or between health and social care)

In December 2013, the Government of the Slovak Republic approved the Strategic Framework for Health Care for the period 2014-2030 prepared by the Ministry of Health of the Slovak Republic. It is a basic document that determines the direction of health policy in the medium and long term. The primary motivating factor of its creation is the effort to implement measures to increase the quality and efficiency of health care provided and improve the health status of the population.

Another strategic material is the Strategy of Long-Term Social and Health Care in the Slovak Republic, prepared by the Association for the Protection of Patients' Rights of the Slovak Republic under the supervision of the Office of the Slovak Government Office for Civil Society Development and in cooperation with the Ministry of Health and the Ministry of Labor, Social Affairs and Family. The ambition of the strategy is to initiate a public debate to reach a society-wide consensus on the setting and implementation of measures that will be the mainstays of systemic long-term care for all citizens.

Within social care (at the national level), the Ministry of Labor, Social Affairs and Family of the Slovak Republic prepared the Strategy for the Deinstitutionalisation of the System of Social Services and Substitute Care in the Slovak Republic and the document National Priorities for the Development of Social Services for 2015–2020.

The following strategic documents have been developed at regional / local level:

- The concept of the development of social services in the competence of the Bratislava self-governing region for the years 2018 – 2023;

- Community plan for the development of social services in the Bratislava – Petržalka city district, 2018-2022.

What kind of system/model of healthcare is implemented in your country?

Bismarck mode – The model of social health insurance, which is financed from compulsory premiums from the income of policyholders and transferred by self-governing health insurance companies, is also dominant in Slovakia.

What are basic characteristics of payment for healthcare services from citizen point of view?

Health care for the patient is free of charge and provided on reimbursed base.

If the health care is provided at the request of the insured patient, he pays for it by himself.

Is there apparent support of innovations that may bring savings in healthcare budget in mid or even long-term perspective in your country/region?

The Institute of Research and Development at the Ministry of Health of the Slovak Republic develops activities in this area.

Do you feel that there is growing support by authorities to various preventive measures for citizens to maintain their health and wellbeing in your country/region?

The Ministry of Health of the Slovak Republic provides prevention including primary prevention (preventive health care, vaccinations) and secondary prevention (screening, disease monitoring). Health support by the Ministry of Health of the Slovak Republic represents measures aimed at improving lifestyle (reduction of alcohol consumption, smoking, insufficient physical activity, unhealthy eating) and addressing risk factors in the environment (environmental, socio-economic factors, family environment). Mental disorders, which are currently a serious problem, are not currently receiving enough attention in Slovakia.

In Slovakia, there are several national programs related to disease prevention, but according to the Ministry of Health of the Slovak Republic, coordination and monitoring of programs is failing. Examples of programs are the National Program for the Prevention of Obesity, the National Program for the Prevention of Cardiovascular Diseases, the National Program for the Prevention of HIV / AIDS, or the National Mental Health Program.

How primary care is organized (basic characteristics, such as family doctors, individual, private GPs or community healthcare centres, integrated care centres, other)

Primary health care is organized in outpatient clinics (network of primary health care outpatient clinics) in the field of general medicine as a general practitioner for adults, in the field of pediatrics (or adolescent medicine) as a general practitioner for children and adolescents, in the field of gynecology and obstetrics and in field of dentistry.

Does your primary care function as gate keeper to specialists, hospitals or patients may access many of these services at their own decision?

As part of primary outpatient care, doctors act as so-called “gatekeepers”, who also aim to dampen patients' exaggerated demand for institutional health care. Since April 2013, a system of mandatory recommendations (so-called exchange cards) has been reintroduced in Slovakia, which GPs issue to patients before they visit specialists.

Can patients choose their doctors (GP- General Practitioner, specialists, dentists, hospital) at their choice?

Every citizen and patient in Slovakia has the right to freely choose a doctor, i.e. a health care provider. This follows from the patient's rights in the provision of healthcare. The choice of doctor according to the medical district (place of permanent residence of the patient) is therefore not obligatory. The patient can also have a doctor from another circuit. However, if the patient does not have a specific health care

provider, it is possible to register with a doctor according to the so-called health district to which the patient belongs. It is possible to find out which doctor the patient belongs to through the relevant self-governing region or through the electronic service Informing citizens about their affiliation to the health district.

Does your country have strategy for population approach to health (enabling both planning services and capacities on national/regional level, and focus in most complex patients and services provided to them?

- Strategic Framework for Health Care for the period 2014-2030
- Strategy of Long-Term Social and Health Care in the Slovak Republic
- Strategy for the Deinstitutionalisation of the System of Social Services and Substitute Care in the Slovak Republic
- National Priorities for the Development of Social Services for 2015–2020

Is there clear legal framework for eHealth and specifically for telemedicine in your country?

- *eHealth*: The Ministry of Health of the Slovak Republic established the National Center for Health Information (NCZI) of the Slovak Republic as a state subsidized organization responsible for health informatisation (e-Health), standardization of health information systems and collection, processing and provision of health statistical information, as well as for library information services from medical sciences and healthcare. NCZI operates national health registries. The center is also responsible for the administration of the National Health Portal, which includes the functions of electronic prescription and medication, the electronic health book of the citizen and the system of electronic ordering from health care service providers. The main priority is the integration of these individual functions into one functional unit with a high level of safety. Fundings of 0.41 % of health contributions collected by health insurance companies are dedicated for financing the national health information system.
- *Telemedicine:* In February 2020, the National Center for Health Information (NCZI) launched a project to support telemedicine in the Slovak healthcare system.

Is there any national/regional strategy for eHealth?

The eHealth implementation program is a strategy of electronic services in the Slovak health care system and is implemented through several projects co-financed by EU.

Is there established organizational framework for telemedicine services and mechanism to evaluate impact of innovations in healthcare, possibly associated with methods for reimbursement for telemedicine interventions in your country/region?

No.

Is there ongoing process for creation of framework for mHealth (clinical mobile applications, used in health services) in your country/region?

No.

What is the degree of digitalization of information exchange between various healthcare providers, do they share health data or at least some documents such as discharge reports?

The eHealth system is a central repository of the patient's medical records and is a source of important information about the patient's health condition, which can save his life. The system also includes:

a) *Electronic health record book* (EZK) - this contains records created by health care professionals, while each record also contains the identification data of the healthcare professional who created it and his electronic signature. Insured account data and patient records are also available here;

b) *Patient summary* (PS) - a document that contains a basic overview of the patient's clinical data, i.e. a selection from medical records. It is of crucial importance especially in the event of sudden and unexpected changes in health status. The patient summary contains the contact and clinical data of the patient - they are stored in the system on the basis of records of doctors, pharmacies or hospitals, as well as on the basis of the patient's own records.

Is there (independent, public) institution or entity dealing systematically with development/verification/evaluation/testing of innovations intended for healthcare or providing expertise in them to authorities or healthcare providers in your country/region?

The National Center for Health Information (NCZI) of the Slovak Republic established by the Ministry of Health of the Slovak Republic

Is there any assessment model for frailty people implemented in your country/region? (e.g. Frailty index etc.)

The categorization of clients / users of social services is used for defining the scope and type of required social services. The evaluation is carried out according to the so-called degree of dependence on social services, which determines the dependence of a natural person on the assistance of another natural person in individual activities. The number of degrees of dependency is 6, while the first level includes those who do not need physical assistance, and the sixth level includes the most severe cases that require care for more than 12 hours a day, respectively more than 360 hours a year. The extent of dependency is decisive, age alone does not play a primary role.

Is there any methodology used for risk stratification for frail people?

No.

Is there in your country/region satisfactory resolved the issue of patients who need also social care or support, e.g. after discharge from hospital or on long term care?

The procedure for classification into degrees of dependency in the conditions of the Petržalka Municipality is as follows:

1. The potential client contacts the Petržalka Municipality Ofiice with a request and a medical finding (specifically, the Department of Social Affairs);

2. The Petržalka Municipality Ofiice requests the elaboration of a medical report of the contracted medical assessor / doctor, who shall propose the degree of the client's dependency;
3. The social worker of the Department of Social Affairs of the Petržalka Municipality Ofiice, with the participation of the client, will prepare a social report with a proposal for the degree of dependency;
4. On the basis of the health and social assessment, an opinion on the dependence on the social service shall be prepared, which is the basis for the issuance of the decision on the dependence on the social service. It follows from the law that clients with the degree of dependency 2-6 may be admitted to care facilities, clients with the degree of dependency 2-6 to nursing service, clients with the degree of dependency 2-6 to daily hospital and clients with the degree of dependency 4-6 to facilities for seniors.

Please shortly describe your needs/barriers in each domain related to your digital tool:

1) Health problem and characteristics of the application
2) Safety
3) Clinical effectiveness
4) Patient perspectives
5) Economic aspects
6) Organisational aspects
7) Socio-cultural, ethical and legal aspects

Factors influencing the identification and prioritization of target groups in connection with the planned use of the digital tool AP-Nurse are as follows:

a) *Age* - the primary orientation should be to the oldest age groups, as up to 90% of people with 75+ feel health restrictions on daily activities. Prioritization increases with age. The age group 75+ years was chosen precisely because of the relatively high prevalence of health restrictions, which tend to increase with age. At the same time, it turns out that this is the age zone where placement in residential facilities is most common;

b) *Loneliness* - primary orientation to persons living alone without daily contact with family members (i.e. persons without spouse, persons without children or with children living at a greater distance) with lower priority persons living in a household with persons engaged in gainful activity outside the residence, i.e. they are employed and outside working place during working hours. Loneliness alone does not usually justify the provision of a service in a residential facility, but we often encounter pressure from relatives to place an older family member in a residential facility in addition to economic motives, so to speak, "for sure";

c) *Reception of social services* - the combination of the simultaneous provision of social services with the provision of social services of the AP-Nurse digital tool proves to be appropriate for several reasons:

removing barriers to the use of technological equipment through trained caregivers or day workers. At the same time, in individual cases, the need / necessity of providing e.g. care services on weekends and at night, and the level of satisfaction of needs in the home environment is increasing. E.g. degree of dependency 3-4 where it is already possible to consider the suitability of providing a service in a residential facility, it is possible under individually favorable conditions to be compensated by several field / outpatient and additional services in accordance with the law. In the case of care services, it is also possible to consider the establishment of emergency services for caregivers who would provide services on the basis of a dispatch initiative outside the standard hours of providing care services (e.g. at night, on weekends);

d) *Financial need* - primary prioritization of persons whose income limits them in receiving social services. This is one of the main barriers, in addition to concerns about technology (its operation, its functions - unwanted surveillance / eavesdropping), financial inaccessibility. The free provision of such a service to all persons, which can be proved by a certificate from the attending physician, is currently not realistic in any municipality or city.

The highest weight in the evaluation should be the age factor (with a progressive increase in points depending on the age reached) and the loneliness factor.

Safety

Do you use a safety assessment tool?

No.

Is there specific methodology for it, like FMEA (Failure mode and effects analysis)?

No.

Are there contact (call) centres for frailty people? If so, which entity provide such service?

No, at the moments there are no specific (call) centers for frailty people. It is possible to call a nursing hotline independently or a contracted service provider like "Association of Samaritans of Slovakia".

Is there any strategy for prevention and for support of frailty people? Please describe briefly.

No.

Technical readiness for digital tools

TECHNICAL-LEVEL BARRIERS - technical infrastructure is satisfactory.

PUBLIC POLICY BARRIERS

HIGH-LEVEL POLITICAL/ECONOMIC BARRIERS - significant shortages in the budget of a single unit make it impossible to generate funds for the task.

Does your institution/region provide services using digital tools for frail people?

No.

Have you participated in some international projects focusing on eHealth solutions, particularly if the project lead to implementation new technologies?

Associated partner in HELPS project.

How innovations are procured in your country/region? Are there any activities in the framework of Public Procurement of Innovative solutions (PPI) or Pre-Commercial Procurement (PCP)?

N/A

Is the design and development of various digital tools directed to in-house solutions (e.g. by hospital IT dept.) or there is some kind of cooperation with companies and or other stakeholders (university's, local authorities, society – quadruple helix)?

N/A

How the technologies are selected (some criteria are applied, such as open source, common APIs, EU, global standards)? If the solutions are considered medical device (in the sense of Medical Device Regulation - MDR), in which phase of the solution implementation do you pursue CE certification?

N/A

Are the technologies used taken from offerings on the market or is there focused cooperation with R&D companies and potential suppliers? How the technologies are tested before and during implementation?
N/A

Is there some system in development of new solutions in your institution, e.g. designed to formulation of use case and its intended location (e.g. clinic, disease or health status) first, followed by the development of technologies?

N/A

How end users are selected?

N/A

Stratification of end users (patients, seniors, informal carers)

- In consumer-focused innovation
- In technology-based innovation
- In business model innovation

How the staff is trained? Nurses, doctors, carers, family members, etc

N/A

How new digital solutions are financed and what are the typical barriers associated with cost and large-scale deployment of the new solution?

N/A

What kind of digital tool are used in your country related to your topic from WP T2?

Please choose:

1) Intelligent monitoring
2) **AP nurse**
3) GPS tracking
4) App for frail
5) Monitoring grid
6) Care for frail

Which entity provides the solution?

Slovak University of Technology, Bratislava, SK

Further questions related to the digital tools?

No.

Any remark to education (personnel, patients, carers)?

Necessary training of caregivers.

Informed consent signed prior the tool is provided to the patient?

No data.

Where the data from the tool are stored (in-house, public cloud, in the country, abroad)?

In-house server

Which entity provides technical support?

Slovak Technical University, Bratislava

What are the major benefits of the solutions?

The main objective is to improve the quality of care services for frailty people.

The priority is to minimize harmful events and optimize the work of caregivers.

Are the data from the digital tools shared with some other IT systems, EHR, PHR?

No.

Is there any evaluation of the data and if so, which entity does it?

No.

Do you cultivate Patient empowerment with the solution? Do you evaluate patient acceptance/satisfaction?

No data.

How the various costs are covered (investment – devices, SW, operation, support telecommunication fees, consumables, training, consumables if appropriate,)? Insurance/direct payments etc.

N/A

Personnel – related questions of the application (does the application need new staff or does it solve the lack of medical staff?) What kind of professionals are needed and how many in total are involved?

It solves the problem of the lack of medical staff. It helps the staff to take care of more patients at once.

Compliance with the legislation including requirements for (cyber) safety and data protection (GDPR)

Security of personal data storage.

Technical readiness for application - compatibility with existing ICT infrastructure.

N/A

Poland

General description

Please shortly describe your social and health care system?

Which authority is responsible for and administration of health care and social care?

As a rule, the three tier local government in Poland is the social welfare contractor. The government administration performs mainly control functions, defines the standards of provided services and designates funds for tasks delegated to local governments.

Care tasks in the form of care services and specialist care services are carried out in a stationary, semi-stationary (daily) mode and the environment mode (in the place of residence). They are mainly carried out by the poviat and commune self-government which carries out its tasks through social welfare organisational units or commissions them to specialised non-governmental organisations, religious associations, as well as commercial subcompanies.

In the field of health protection, the Ministry of Health plays a key role in determining health policy.

Which body is responsible for organization of healthcare services in your region/country, including availability of healthcare and social care (time and location)?

The health care system in Poland are institutions and people who are part of the team and provide health care to the population. It is based on an insurance model - every insured person has the right to health care. This is independent of the material situation.

In special cases, health care services financed from public funds are available to non-insured persons. This includes people under 18 years of age, pregnant women, alcohol and drug addicted - for treatment of addiction and those with mental disorders - for psychiatric health care.

The scope of the benefits provided, as well as the conditions for granting them, shall be determined by the relevant acts:

- the Act on Medical Activity,
- the Act on healthcare services financed from public funds,
- Public Health Act.
- The health care supervisory authorities in Poland are:
- National Health Fund,
- State Pharmaceutical Inspectorate,
- Ministry of Health and national consultants in particular medical specialties,
- Chief Sanitary Inspectorate,

- the voivode and the provincial public health centre,
- Patient Ombudsman,
- Professional chambers of health care workers.

The primary link in the healthcare system is the doctor (usually a family medicine specialist). It is he/she who primarily provides health services. His or her relationship is to carry out health prophylaxis and treatment of the patients registered with him or her. Sometimes, in justified cases, he or she makes referrals to a specialist outpatient clinic (for example, a psychiatric or oncological clinic) or to a hospital.

Eligible persons (e.g. from another Member State) who are temporarily staying in the Polish territory may benefit from basic health care, hospital or dental treatment, outpatient specialist care, rescue services and medical transport. This is possible upon presentation of the European Health Insurance Card (EHIC) or a replacement certificate.

Health care providers are public and non-public health care providers . These teams of people, assets created and maintained to provide health services and health promotion can be e.g. a hospital, a therapeutic rehabilitation centre, a clinic, a medical diagnostic laboratory, a dental prosthetics and orthodontics laboratory or a sanitary and epidemiological station.

The right to care services is determined by the President of the City of Warsaw in the form of administrative decisions, based on a community interview conducted by a social worker of a social welfare centre under whose jurisdiction the place of residence of a specific person in need of help remains.

Which body is responsible for reimbursement/payment for the health and care services?

The main source of financing for the system is health insurance in the NFZ. Citizens are charged a compulsory insurance premium of 9% of their personal income (7.75% is deducted from income tax, and 1.25% is covered by insurance), which is paid to the health insurance institution (NFZ).

Some highly specialized benefits are financed directly from the budget of the Ministry of Health, and not from the NHF. Local government units may also pay guaranteed benefits.

Since 1 January 2007, the state budget also finances the prehospital medical rescue (ambulance) in full.

The payment of medical costs in the commercial entity is covered by the insurer. The reimbursement amounts are determined by the value of the voluntary insurance and may cover 100% or less of the actual treatment costs.

At the Alzheimer Centre, all residents benefit from basic health care, i.e. the family doctor and the primary care and rehabilitation nurse, in cooperation with the Capital City's Alzheimer's Centre for Care and Treatment, financed by the NFZ.

The payment for day care services and community care services depends on the amount of income and is of participatory nature. Free access or the level of payment depends on the applicant's income. For people with low incomes, the assistance is free of charge. The higher the income, the higher the

percentage of the payment, up to full payment - the level of payment is determined by national regulations and local law adopted by the Warsaw City Council.

The participation of private entities is significant, social welfare homes operate in accordance with the standards of the above mentioned regulation, on the principles set out in the provisions on economic activity.

What percentage of GDP (Gross domestic product) does your country spend for health and social care?

Health - about 6.3% (data from 2019), social spending about 16%.

Is there a national/regional strategy for integrated care (either within healthcare domain – effective and patient oriented collaboration of various levels of services and various providers, and/or between health and social care)

National Health Programme 2016-2020

National Development Strategy 2020

Warsaw's Social Strategy - Strategy for Solving Social Problems for 2009-2020

Development Strategy of the Capital City of Warsaw until 2030

There is no systemic integration of services, within the framework of the Alzheimer Centre there has been an integration with the treatment unit of the Capital Care and Medical Centre on the basis of a civil-law agreement, which defines the principles of cooperation.

What kind of system/model of healthcare is implemented in your country?

Beveridge model - The Constitution of the Republic of Poland defines the model as a social market economy. The key feature of the Polish social welfare model is its decentralized character based on local government structures. The idea of decentralization, local democracy and civil society in the axiological sphere is positive. However, one should agree with the opinion that the decentralization process in Poland is carried out without sufficient critical analysis of its assumptions and effects.

What are basic characteristics of payment for healthcare services from citizen point of view?

Medical care for the patient is free of charge in the basket of reimbursed services.

Is there apparent support of innovations that may bring savings in healthcare budget in mid or even long-term perspective in your country/region?

Computerization of the health care system.

Do you feel that there is growing support by authorities to various preventive measures for citizens to maintain their health and wellbeing in your country/region?

Among other things, through the implementation of programmes as below (nationwide programmes available and implemented in Poland under the NFZ):

- Breast cancer prevention program (mammography)

- Cervical Cancer Prevention Programme (cytology)
- Tuberculosis prevention programme
- Programme of prenatal tests
- Cardiovascular disease prevention programme
- Toxic-to-disease prevention programme (including COPD)
- Colorectal cancer prevention program

In Poland, in many provinces, local governments allocate funds for free influenza vaccinations for people over 50 - 65 years of age, who are often in a high-risk group.

The age range at which free influenza vaccinations are offered depends on the decision of the health and social affairs department of a given city office and varies from one province to another.

The City of Warsaw (as a territorial self-government unit) increases its expenditure on prevention and health promotion from year to year.

How primary care is organized (basic characteristics, such as family doctors, individual, private GPs or community healthcare centres, integrated care centres, other)

Primary health care (POZ) is a part of the health care system, which provides all persons residing in Poland's terytorium entitled to benefits with comprehensive and coordinated health care services in their place of residence. The benefits are provided in outpatient conditions (in a surgery, clinic or outpatient clinic), and in cases medically justified also in the patient's home (and in a social welfare home as well). Remote consultations are also available. They also include preventive care for children and young people by a nurse/hygienist in the teaching and educational environment. The functioning of POZ (with the exception of preventive care services for children and adolescents in the teaching and upbringing environment and night and holiday health care services in POZ) is based on the right to a named doctor, nurse, midwife of primary health care.

Does your primary care function as gate keeper to specialists, hospitals or patients may access many of these services at their own decision?

The POZ doctor issues referrals to specialist doctors, except for specialist doctors (to whom the patient goes without a referral) such as: oncologist, gynaecologist and obstetrician, psychiatrist, venereologist and dentist.

Can patients choose their doctors (GP- General Practitioner, specialists, dentists, hospital) at their choice?

Yes, they can.

Does your country have strategy for population approach to health (enabling both planning services and capacities on national/regional level, and focus in most complex patients and services provided to them?

National Health Programme 2016-2020

Is there clear legal framework for eHealth and specifically for telemedicine in your country?

There is no single legal act dedicated to telemedicine. The regulations are scattered across different health care system laws. Opinion: existing legislation is insufficient.

Is there any national/regional strategy for eHealth?

No. The "Strategy for Development of eHealth in Poland" is being prepared.

Is there established organizational framework for telemedicine services and mechanism to evaluate impact of innovations in healthcare, possibly associated with methods for reimbursement for telemedicine interventions in your country/region?

No.

Is there ongoing process for creation of framework for mHealth (clinical mobile applications, used in health services) in your country/region?

No.

What is the degree of digitalization of information exchange between various healthcare providers, do they share health data or at least some documents such as discharge reports?

IKP (Patient's Individual Account), provided if the patient sets up a trusted profile.

Is there shared Electronic Health Record (EHR) and if so, is it centralized or decentralized (e.g. just shared reports, images, lab results and other health date located at various healthcare providers); is the sharing data and access to EHR common "mandatory" feature of all providers/doctors in public healthcare?

There is no EHR on a national level. Such systems operate only at regional level - in some voivodships and to a rather limited extent (e.g. access to it is only available to public institutions, subject to the same entity).

Sharing specifically structured health data between primary (GPs), outpatient depts (secondary care) is there personal healthcare record purposely maintained, e.g. for the chronically ill, with possibly also other information about the care plan?

The data are not shared.

Is there concept of sharing health date with social care in your county/region?

There is no information flow system. Discussions and plans for data transfer have been underway for many years, mainly in terms of e-capacity. Data transfer only in individual cases on the basis of RODO rules.

Is there central (or regional) database of vaccinations of citizens?

Providers who keep immunization cards and carry out vaccinations are obliged to send reports to the state district sanitary inspector, which are then forwarded to the state voivodeship sanitary inspectors:

- annual report on preventive vaccination,

- quarterly reports (report on the use of vaccines, report on the implementation of preventive vaccination, supervision of immunisation cards),

- reports on the size of the stock of individual vaccine preparations.

The reports, after verification in the provincial sanitary and epidemiological stations, are submitted in accordance with the competence to the Chief Sanitary Inspectorate and the National Institute of Public Health of the National Institute of Hygiene in Warsaw. The National Institute of Public Health, Department of Epidemiology of the National Institute of Hygiene, on the basis of the received annual reports, prepares an annual vaccination bureau, which is the official source of information on the implementation of vaccination in Poland.

Do patients have access to their health data (PHR)? If so, is the PHR filled systematically with data of various healthcare providers or only one by one (hospitals), and can patients add their own heat-treated data to PHR?

KP (Patient's Individual Account)

If available, pls provide some technical characteristic of the infrastructure (EHR, PHR) and technical standards, patient identification methods.

No data.

How do you briefly characterize cooperation of various healthcare providers (hospitals, care providers, GPs) within the region, e.g. in case of complex patients?

No cooperation in the region. At the level of poviats and communes interdisciplinary teams are created.

Is there (independent, public) institution or entity dealing systematically with development/verification/evaluation/testing of innovations intended for healthcare or providing expertise in them to authorities or healthcare providers in your country/region?

Centre of Health Information Systems, Agency for Health Technology Assessment and Evaluation

Is there any assessment model for frailty people implemented in your country/region? (e.g. Frailty index etc.)

- Disability case-law.

- ZUS (social security system) - adjudication on ability to work or not.

- Municipal and County Disability Assessment Boards for the purposes of reliefs and entitlements (issuing disability status certificates)

- departmental, such as the army, the police.

How is the risk of frailty calculated?

Predict the death risk

How is the frailty assessed? Is there any methodology used for risk stratification for frail people?

In Alzheimer Centre (AC) we use the Barthel scale, it is one of the ADL (Activities of Daily Living) scale. In Poland, the Barthel scale is used as a tool to determine the availability of long-term care (inpatient and home-based). People whose score does not exceed 40 points can count on qualifying for long-term care. We perform it twice a year in accordance with the applicable standards for all nursing homes.

In addition, AC uses the Norton scale, which is used to assess the risk of decubitus ul-cers (bedsores), in accordance with current procedure. The Norton Scale assesses from 1 to 4 variables: physical condition, state of consciousness, activity, ability to change one's position, and rectal and urethral sphincter function. The maximum number of points that can be obtained is 20. At 14 - we observe an increased risk of bedsores, below this figure the risk increases. The NORTON scale requires knowledge of assessing the patient's physical condition.

Psychologists working in AC use the Mini-Mental State Examination (MMSE) tool - a short screening tool used to examine cognitive dysfunctions (mainly in dementia) and monitor the course of the disease, a clinical scale used to examine cognitive dysfunctions of the patient.

Description: The MMSE consists of 30 questions/tasks to quantify different aspects of cognitive functioning. The areas to be assessed include: Orientation in time, Orientation in place, Memorizing, Attention and Counting, Reminder, Calling, Repeating, Understanding, Reading, Writing and Drawing. The Polish manual contains a description and results of standardisation and validation studies collected during the work on the Polish adaptation of MMSE. Clinical studies were conducted on patients with diagnoses of: dementia, mild cognitive disorders, Parkinson's disease, depression, organic mood disorders, schizophrenia, epilepsy and diabetes.

In the Day Care Home of CA there is an Individual Support Plan created by psychologists. It is supplemented by information from all employees creating classes for the charges. It is based on the assessment of the patient's condition based mainly on the following:

- Short Scale of Cognitive Activity Assessment - MMSE test,
- Drawing Clock Test - CDT,
- Katz - the scale for evaluating Basic Activities of Daily Life,
- Lawton's Comprehensive Life Assessment Scale,
- psychological interview,
- the individual opinion of therapists.

The Individual Support Plan aims to examine the state of the mentee's functioning, which may change from year to year. It also allows for the definition of therapeutic goals and patient needs. An important objective in the diagnosis is the opinion of each therapist, describing the behaviour and possibilities of the client in his or her classes. The ISP allows for the creation of information about the current status of the

mentee's activities. Every year the psychological history, MMSE test, family history and assessment of the patient's current condition are renewed.

The MMSE test is a scale of examination of cognitive functioning disorders of the examined person. It is conducted by psychologists by means of questions allowing to assess the level of functioning of the patient.

Conducting the IPW makes it possible to modify the approach to the client in order to main-tain his cognitive functions at a good level.

There are four groups of patients in the facility, which are divided according to the severity of the disease. The therapists' meetings discuss the health status of the mentees and then make a decision on how to fit the person into the group. With each group the activities are different. The therapist's plans of work are created with the appropriate adjustment to the severity of the group, for the purpose of the appropriate therapeutic work. The grouping of the patients is used to adjust the appropriate therapeutic tools to their needs.

Is there in your country/region satisfactory resolved the issue of patients who need also social care or support, e.g. after discharge from hospital or on long term care? Similar question relates to older citizens in social care settings (houses) who need regular healthcare services, often specialized, and cannot easily move on their own to the healthcare providers.

At the moment, the care of chronically ill people after a hospital stay is not satisfactorily solved.

In Poland, such a person, after meeting certain criteria and procedures, may be taken care of:

Community care in outpatient settings (specialist gap care services in the place of residence, doctor, POZ nurse, community care worker, long-term care nurse, doctor and hospice care nurse)

In-patient care (Nursing homes, Care and Treatment Centres, Hospice, Long-term Care Centres).

Please shortly describe your needs/barriers in each domain related to your digital tool:

1) Health problem and characteristics of the application
2) Safety
3) Clinical effectiveness
4) Patient perspectives
5) Economic aspects
6) Organisational aspects
7) Socio-cultural, ethical and legal aspects

The recipients of IT solutions at the Alzheimer's Centre are people with significant cognitive disorders and care and therapeutic staff with limited digital competences (at the level of the ordinary user without technical preparation).

Regarding to the patient, these solutions should function without the patient's awareness. The solutions should focus on the aspect of physical safety and monitoring of vital functions.

Physical safety: location, falls signalling, signal of departure from the place of residence without the knowledge of the guardians.

Monitoring of vital functions - reaction to a parameter imbalance leading to a health incident, e.g. increase of body temperature, pressure, stroke, infarction, vital signs, prevention.

On the staff side, ease of operation and data reading.

These devices must be easy to use, resistant to devastation and loss, with a durable and long-term power source. Low price and operating costs.

Safety

Do you use a safety assessment tool?

No.

Is there specific methodology for it, like FMEA (Failure mode and effects analysis)? N/A

Are there contact (call) centres for frailty people? If so, which entity provide such service?

Care services are granted by an administrative decision of the director of a social welfare centre in the district where the person in need of support lives. The person in need of support or someone on his/her behalf reports the need for support to the centre. Care services are guaranteed by an entity the Social Services Centre “Social Warsaw”, which contracts services for the whole Warsaw and employs carers of dependent persons and assistants for persons with disabilities.

Is there any strategy for prevention and for support of frailty people? Please describe briefly. N/A

Technical readiness for digital tools

TECHNICAL-LEVEL BARRIERS - technical infrastructure is satisfactory.

PUBLIC POLICY BARRIERS

HIGH-LEVEL POLITICAL/ECONOMIC BARRIERS - significant shortages in the budget of a single unit make it impossible to generate funds for the task.

Does your institution/region provide services using digital tools for frail people?

No.

Have you participated in some international projects focusing on eHealth solutions, particularly if the project lead to implementation new technologies? N/A

How innovations are procured in your country/region? Are there any activities in the framework of Public Procurement of Innovative solutions (PPI) or Pre-Commercial Procurement (PCP)? N/A

Is the design and development of various digital tools directed to in-house solutions (e.g. by hospital IT dept.) or there is some kind of cooperation with companies and or other stakeholders (university's, local authorities, society – quadruple helix)? N/A

How the technologies are selected (some criteria are applied, such as open source, common APIs, EU, global standards)? If the solutions are considered medical device (in the sense of Medical Device Regulation - MDR), in which phase of the solution implementation do you pursue CE certification? N/A

Are the technologies used taken from offerings on the market or is there focused cooperation with R&D companies and potential suppliers? How the technologies are tested before and during implementation? N/A

Is there some system in development of new solutions in your institution, e.g. designed to formulation of use case and its intended location (e.g. clinic, disease or health status) first, followed by the development of technologies? N/A

How end users are selected? N/A

Stratification of end users (patients, seniors, informal carers)

- In consumer-focused innovation
- In technology-based innovation
- In business model innovation

How the staff is trained? Nurses, doctors, carers, family members, etc

How new digital solutions are financed and what are the typical barriers associated with cost and large-scale deployment of the new solution? N/A

What kind of digital tool are used in your country related to your topic from WP T2?

Please choose:

7) Intelligent monitoring
8) **AP nurse**
9) GPS tracking
10) App for frail
11) Monitoring grid
12) Care for frail

Which entity provides the solution?

Slovak University of Technology, Bratislava, SK

Further questions related to the digital tools:

Any remark to education (personnel, patients, carers)?

Necessary training of caregivers.

Informed consent signed prior the tool is provided to the patient?

No data.

Where the data from the tool are stored (in-house, public cloud, in the country, abroad)?

In-house server

Which entity provides technical support?

Slovak Technical University, Bratislava

What are the major benefits of the solutions?

The main objective is to improve the quality of care services. The priority is to minimize harmful events and optimize the work of caregivers.

Are the data from the digital tools shared with some other IT systems, EHR, PHR?

No.

Is there any evaluation of the data and if so, which entity does it?

No.

Do you cultivate Patient empowerment with the solution? Do you evaluate patient acceptance/satisfaction?

No data.

Payment, reimbursement

How the various costs are covered (investment – devices, SW, operation, support telecommunication fees, consumables, training, consumables if appropriate,)? Insurance/direct payments etc.

Personnel – related questions of the application (does the application need new staff or does it solve the lack of medical staff?) What kind of professionals are needed and how many in total are involved?

It solves the problem of the lack of medical staff. It helps the staff to take care of more patients at once.

Compliance with the legislation including requirements for (cyber) safety and data protection (GDPR)

Security of personal data storage.

Technical readiness for application - compatibility with existing ICT infrastructure. N/A

Executive Summary

General description

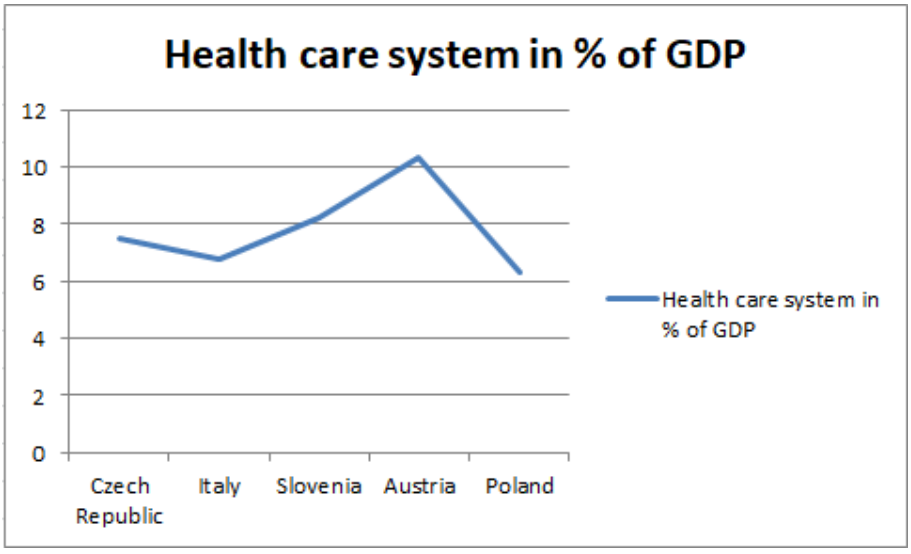
Who organizes care?

The summary shows that the care is organized by framework of health or social care system. Almost all partners are mentioning government role in their system (meaning "ministry of health" like), local government and municipalities. The government has mainly legislative function in every country, differ is in some terms of the organization of care, such as Italy is organized more regionally, so the Austria and Poland (municipality and districts/federal states). Anyway most of the planning and controlling is made by government.

The result is that system of health and social care in partner regions is comparable.

How much do you spend for health and social care? (related to the Gross domestic product – GDP)?

The percentage of GDP set for health care system does not report big differences and it is approximately from 6,3 to 10,3 % as we can see below.



System/model of healthcare

There are several models of healthcare and we can say that it is mostly form close to Bismarck model – modified by commercial offers, or supplementary insurance possibilities in some countries, such Poland (mentioning "social market economy" and decentralization of health care), Slovenia (primary care is under the jurisdiction of municipalities) and Austria.

Generally we can say that in all countries the health insurance (tax system) is mandatory. Some exceptions exist but at least some basic health care or defined amount of care is for free of charge for every citizen. It is "primary health care" that we are talking about not additional health services, above standard care, dentist care, etc. In other words, a medical service, outside the public health care, is paid.

It is important to focus on this topic. Elements of telemedicine, introduction of electronic care, etc. do not have to be understood as part of public health care, but as something extra, which can economically burden the organization providing services or their clients. This can potentially jeopardize all further development due to the reluctance to contribute financially.

There is also opportunity in countries where supplementary insurance is possible, this could be an additional offer that could attract more policyholders so it can by an interesting "commercial" product for insurance companies.

Basic common statements:

- All partners have established health insurance system and the availability of a public health service.
- Social care and health care should work together more, but in reality it is not working very well. With exceptions we can agree with situation in Czech Republic and in Slovakia. Social care is organized and paid by entirely different legislation than healthcare. Initial negotiations between the two systems authorities (ministries). Only Italy has a specific law for the integration between social and health assistance addressed to persons with disabilities and elderly. In Slovenia cooperation between different levels of health care is not systematically regulated and mostly takes place at the individual level. which is not a good start for cooperation with social care. Also Austria mentioned: "There is no separate agreement on integrated care between the health and social services, but the above-mentioned target management system also provides guidelines for integrated care between the health and social services."
- Existing possibility to choose general practitioner.
- The private sector is involved in the provision of health care.

Data sharing:

We can find different reactions in the answers about sharing data, e-communication, etc. Data sharing is an important part of providing services to citizens and coordinating them, which applies to both social and health care.

- There is a big barrier in the Czech Republic about sharing data. Data are typically shared only if the both providers are owned by the same body. Sharing in all other cases is not common in the CR. Strategy and implementation plans are set to make shared EHR available, initially between hospitals. For example a lot of health agencies or social care providers think that sharing data between primary, secondary care, GP´s (General practitioner), ambulatory care and with social and community care would be helpful.
- Even Italy, which has a relatively high level of electronic communication and support in government organizations and laws, admits that "the level of integration between health and social care is still weak from a political and organizational point of view."

- Austria has country strategy. In the future, it will be possible for social services to also have access to health data. It is part of ELGA – SW for sharing EHR in healthcare system.

Available software, ways of working with EHR, vaccination database, etc.:

Czech Republic

- Some level of health records, however, they are not shared and most of all they do not comply with any standardization. There is a set of national standards called DASTA. Use of IHE profiles and HL7 is currently being negotiated.

Italy

- Certificate for vaccinations is provided to all citizens through personal EHR (fascicolo sanitario elettronico).
- All citizens of Emilia Romagna have access to their personal HER.
- Five criteria have guided the regional deployment of e-health.
    1. Regional management of ICT project
    2. stakeholder engagement (doctors, citizens, suppliers)
    3. technology assets development through software integration
    4. use of standards for medical contents, HL7, XDS/IHE
    5. sharing clinical digital documents
- Use of specific digital tools, for instance the use of the Personal Electronic Health record.
- They participated in several international projects focusing on eHealth solutions.
    - H2020 ACTIVAGE: Build a world-wide reference of the evidence based values that standard-secure-intraoperative IoT ecosystems enable new sustainable business models and solutions for Active & Healthy Living.
    - FP7 Fistar: develops and experiments innovative cloud platforms for healthcare, using latest technologies based on the vision of the Future Internet Public-Private Partnership (FI-PPP. The objective consists in managing efficiently and effectively data and health pathways, in compliance with privacy and confidentiality constraints.
    - FP7 Confidence: has designed a technological tool for the prevention and monitoring of falls among the elderly at home, by also considering the system for an outside use.
    - AAL MOTION: develops ICT solutions supporting the seniors to manage autonomously and at home their daily physical activities. In particular the project implements and pilots a system to manage and support exercising in the elderly.

- ALL HOPES: has promoted the socialization of the elderly through the use of the Internet and social networks in order to generate experiences and positive behaviours in the population, also through the enhancement of local resources and users' associations.
- FP6 OLDES: has developed innovative technological solutions for the creation of a new social care network for needy elderly, by providing services of tele-companionship and tele-medicine.
- Central Eu SPES: has supported home care and promotes the use of tele-medicine through the monitoring of vital signs linked to different pathologies. The project is being tested in Ferrara where the Local Health Authority has involved patients with respiratory disorders.

Slovenia

- No shared Electronic Health Record (EHR) neither shared specifically structured health data between primary (GPs), outpatient depts. (secondary care) is there personal healthcare record purposely maintained, e.g. for the chronically ill, with possibly also other information about the care plan nor concept of sharing health date with social care in your county/region.
- No access for citizens to their PHR.

Austria

- Existing software called ELGA. Not only medical facilities but also patients do have access to ELGA and it is filled systematically with data of various healthcare providers like hospitals, general practitioners as well as pharmacies and care facilities.
- No vaccination database due to np requirement in Austria.

Slovakia

- National Center for Health Information (NCZI) of the Slovak Republic as a state subsidized organization is responsible for health informatisation (e-Health), standardization of health information systems and collection, processing and provision of health statistical information, as well as for library information services from medical sciences and healthcare. NCZI operates national health registries. The center is also responsible for the administration of the National Health Portal, which includes the functions of electronic prescription and medication, the electronic health book of the citizen and the system of electronic ordering from health care service providers.

Poland

- Poland admits there is no EHR on a national level. Such systems operate only at regional level - in some voivodships and to a rather limited extent (e.g. access to it is only available to public institutions, subject to the same entity).

- About some kind of “vaccination database”, Providers who keep immunization cards and carry out vaccinations are obliged to send reports to the state district sanitary inspector, which are then forwarded to the state voivodeship sanitary inspectors.

National strategies, documents, regulations concerning eHealth, telemedicine, etc.:

Czech Republic

- National strategy for eHealth (since 2016). No law existing, it is in development.
- The digitalized medical prescription is being used.

Italy

- There are national and regional agencies to establish indicators of performance, budgets, goals, subjects to invest, range to surgery, number of beds in hospital and in residences.
- The personal Electronic Health Record (namely FSE in Italy) is established by the Italian Law for all citizens within the Digital Agenda (AGID) and the Italian Government. The FSE contains the clinical data of the assisted citizens produced by every present and past event. The FSE was established by the Regions and Autonomous Provinces, in accordance with the law for the protection of personal data, with the following aims: 1. prevention, diagnosis, cure and rehabilitation; 2. scientific research on the clinical, biomedical and epidemiological fields; 3. health planning, quality and assessment of care.
- The Italian Digital Agenda has included: the digitalized medical file; the digitalized medical prescription. Agency for Digital Italy (AgID) is the technical agency of the Presidency of the Council of Ministers. The Strategy for digital growth and the Three-year Plan for Information Technology in Public Administration have defined the interventions dedicated to the digital healthcare ecosystem and the main solutions aimed at improving healthcare services, limiting waste and inefficiencies, improving the cost-quality ratio of healthcare services and reducing the differences among regions.
- For what concerns telemedicine the Ministry of Health has issued over the years guidelines for telemedicine.
- Implementation of eHealth projects since 2002 concerning many outputs.

Slovenia

- The Law on data collections in the field of health care is in charge of E-Health.
- The Law on amendments to the law of health activity is in charge of Telemedicine.
- National strategy of eHealth.

- Established organizational framework for telemedicine services and mechanism to evaluate impact of innovations in healthcare, possibly associated with methods for reimbursement for telemedicine interventions in your country such as Teletransfusion, implemented by the Blood Transfusion Centre of Slovenia, is the largest telemedicine project in Slovenia. It is a nation-wide system that covers all blood transfusion institutions involved in the supply of Slovene hospitals. Teleradiological systems for analysis of X-ray images are developed (General Hospital Izola). However, they are not interconnected on national level. Telekap (TeleStroke) network is used for fast and efficient management of stroke patients. All hospitals in the country are connected in this network, which provides continuous access to the data and connections with consulting specialists in the tertiary centre.

Austria

- Health Telematics Act 2012: In order to make the rapid technical progress usable for the healthcare system, open questions from telemedical services, above all regarding financing, quality standards as well as data protection and ethical requirements, have to be answered.
- In May 2015, a catalogue with 14 recommendations was developed, which should be groundbreaking for the further telemonitoring development in Austria. In addition to the recommendations, the IT architecture is an essential product. For this purpose, a binding, compressed framework directive has been drawn up, which specifies the technical standards.
- eHealth strategy of the city of Vienna: From the City of Vienna's perspective, eHealth's primary goal is to increase the quality and efficiency of health and social services through the coordinated use of ICT. A key point is the achievement of integrated care based on interoperable information systems. The focus is on the conception for the establishment of a population-centered or patient-centered digital documentation, communication, storage and processing of health-related and administrative data.
- eHealth strategy of Styria “Digital Health System Styria” = framework and initiator for a systematic and future-oriented further development of the use of information and communication technology in the Styrian health and care system. The eHealth strategy of Styria matches the applications with the possibilities and requirements of the ELGA as Austria's basic eHealth infrastructure.

Slovakia

- Slovak e-Health National Strategy (digital records, telemedicine and eHealth) since December 2005).
- National Health Information System Act No. 153/2013.
- Tools which are currently used: Electronic medical record, Electronic prescription and medication, Public health portal, Outpatient health services.

Poland

- National Health Programme 2016-2020 (contains strategy for population approach to health (enabling both planning services and capacities on national/regional level, and focus in most complex patients and services provided to them)
- No current strategies consisting national strategies, documents, regulations concerning eHealth, telemedicine, etc.:

Openness to innovations

Czech Republic

- Innovations are applied mostly by initiatives of healthcare providers. Exceptionally, central (national, regional, medical branches-related) programs for innovation scaling up are possible, esp. in cases with significant positive impact to public health. In general, implementation of MAST model is part of ongoing negotiations with insurances and other stakeholders conducted with the aim to introduce systematic approach to digital innovations (esp. telemedicine). However, currently in 2020, only ad hoc approach in applied in innovation is to be included in public health system with some reimbursement. Also, theoretical studies of economic aspects of innovations are under way.
- Though patients have mostly no experience with ICT based innovations in care, they are normally quite comfortable with new solutions but exceptions exist. The reason for such reluctance is usually caused rather by lower capability to manage the systems at home and fear of some damage and additional costs. Only rare cases of refusals can be explained as specific case of protection of patients' privacy. So significant effort should be devoted to user interface, user friendliness of new solutions. Specific conditions of Czech market do not allow simple relying on global (user) experience with a given solution; one solution cannot be considered as fully and simply transferable to the CR, starting with language that the solutions speak to the patients, but also as to the service that the solution provides in the view of existing healthcare services.
- This is very important barrier in the CR as there are many aspects of ICT based solutions that require financing and until 2020 not any mechanism has been established to enable development, operation and sustainability of such innovations. HTA (MAST) is not yet part of reimbursement mechanisms in the CR. Moreover, Czech healthcare system has such characteristic that does not give too much space for co-financing of clinical ICT based solutions by patients and they consider healthcare is effectively provided for free. Economic interest of healthcare providers should also be taken into account.
- Low experience with innovations at healthcare professionals leads often to slower acceptance of new solutions. There are not too many ethical issues associated with the new technologies and

services and there are established mechanisms how to deal with ethic on the side of healthcare providers.

- Little or no government support, long-running legislation.
- Financing innovations is difficult national, regional, municipality, company, EU funds and programmes are used.

Italy

- The Local Health Authority of Bologna (LHA BO) has got a specific unit for Technology Assessment.
- Implementation of eHealth projects since 2002 concerning many outputs.
- In a way of using ICT could be senior citizens categorized in 3 groups depending on ICT skills. Especially people from third group (aged between 65 – 75 years) could be best active partners in eCare system. There is existing system working with all the groups.
- Existence of Lepida - an in-house company of the Emilia Romagna region and among other members all Local Health Authorities (including LHA BO). It provides the professional services needed for the development of the initiative and it gives assistance to the user on the application of the system, also through coaching and training activities. More particularly, it provides the professional services to develop, maintain and improve the system, and also to develop, together with the regional health actors, eHealth services and applications

Slovenia

- In Slovenia there is a lot of health promotion centres, mental health centres for children and adults and cancer prevention and early detection centres of breast, cervix and colon cancer. Vaccination programs are expanding and more affordable for specific groups (KME, influenca, and pertussis).
- In Slovenia health technology assessment is implemented (HTA). HTA is the systematic evaluation of properties, effects and/or impacts of health technologies and interventions. It covers both the direct, intended consequences of technologies and interventions and their indirect, unintended consequences.
- New innovations are financed from the state budget and other sources (from European programs and funds, local communities and the economy). So the typical barriers are shortage of financial resources, poor access to information and data and poor communication between patient and health care providers.

Austria

- There are only individual projects from individual providers with ongoing process for creation of framework for mHealth.

- In Austria, the “ELGA – elektronische Gesundheitsakte” was developed between 2006 and 2010 and is to be introduced in stages from 2015 to around 2022. Access is administered and controlled via the e-card system. The HL7 standardization standard forms the basis for data access. Patients have the option of opting out to restrict or prevent usage. With ELGA, stationary facilities such as e.g. Hospitals, general practitioners as well as pharmacies and care facilities, i.e. the ELGA health service providers, are networked across the board.

Slovakia

- Electronic healthcare services - extension of functionality and range of services (National Health Portal).
- Support telemedicine in the Slovak healthcare system (project started in February 2020).

Poland

- "Strategy for Development of eHealth in Poland" is being prepared.

Special approaches to frailty people

Czech Republic

- On academic level, there are studies available but not yet systematically implemented in practice.
- Emergency care (call centre) as a social service provided mostly by NGOs, commercial services at a similar level.
- There is insufficient capacity, an underestimated approach of the government; there are certain innovative and technical solutions at the regional level without the support of insurance companies, municipalities, districts etc.

Italy

- Linking social and health data set through a British math algorithm studied at King’s hospital. Methodology used for risk stratification for frail people is the percentage of risk to die or have an access to an Emergency Room during next year. Seniors are divided in 5 classes.
- Frailty depends on many factors which affect senior people in many different ways; eCare service’s goals are prevention and support. In 2009 LHA BO run a study on elderly in order to assess initiatives aimed at preventing inappropriate access to emergency rooms. At the first evaluation stage, they have found that e-Care users accessed the ER in the same percentage as non e-Care users, because of the complexity of frailty conditions under evaluation. But at a further stage, when LHA BO considered elderly patients by only single disease, for example cardiovascular or orthopaedic disease, e-Care users resulted advantaged. The study showed that whole monitoring of frail seniors makes the difference in the care process, as every single medical

specialty has its own appropriateness, but the health outcomes for a patient are poor without integration of the different care interventions.

- Contact (call) centres for frail people provided by LHA BO together with Lepida (external data processor and put in place all technical and organisational procedures for the security of data).
- There is strategy for prevention and for support of frail people. Nursing services and social workers recommend seniors to e-Care service. Seniors selected usually live alone, are over 75 years old, have a frail index between 50 to 80%. They could have light mental diseases and/or several physical chronic diseases but seniors with dementia or deaf are excluded.

Slovenia

- For frailty people there is "iHELP SOS ASISTENCA", it enables an activation of your emergency contacts (ICE) that you have entered in your iHELP user profile, professional paramedics (112) and first responders within a radius of 500 meters of you in order to reach urgent medical help. HELP SOS alarm works on all mobile phones and via a landline phone. iHELP SOS Assistance is intended for people who are deaf, for people who have health problems and who are mostly home alone, and for them who are older than 60 years.
- E-care Service is a telecare social service which enables active, independent and safe living at home for elderly, patients with chronic diseases, and to disabled persons. E-Care service is provided by Telekom Slovenia. Equipment is installed at the user´s residence which enables triggering an SOS call when needed. Sensors detect unusual behaviour at the user´s residence and alert caregivers and the assistance centre. E-care Service unites different stakeholders: assistance centre, older adults and patients with chronic diseases, supports caregivers and family members, emergency services.

Austria

- There are 7 levels of care. In addition to other prerequisites, these are measured based on the time spent on care. The amount of care allowance depends on the level of care. The first level of care requires a care requirement of more than 65 hours per month. Frailty is assessed with the help of the care level model. Doctors and registered nurses estimate the time spent on nursing. The level of care depends on how many hours are required for care.
- In Austria/ Burgenland the Monitoring Grid is implemented for the first time.
- Several approaches to care of frailty:
    - Health Promotion Strategy Austria: Framework for strengthening targeted and coordinated health promotion as well as for primary prevention in Austria. The central goal of the health promotion strategy is to contribute to a longer, self-determined life in good health for all people in Austria.

- Austrian Dementia Strategy „Live a good life with dementia“ = It shall improve the life situation of people with dementia and their relatives. Therefore, impact goals and recommendations for action were developed in a process together with those affected, decision-makers, implementers and experts. The precise recommendations for action enable decision-makers to plan and implement concrete measures in their respective spheres of activity in order to achieve the defined objectives together.
- Austrian Diabetes Strategy “Counter Diabetes together” = Framework for all activities on the topic of diabetes, which should enable future-oriented, strategic action.

- Using digital tools for frail people
- In the course of the “moduLAAr” (A modular, scalable AAL system as a lifestyle element for silver agers up to assisted living) project, 50 residential units were equipped with modular, standard-compliant AAL technology. The services offered come from the areas of comfort, safety, health and social interaction and should take into account the entire social environment of the residents. The technologies used were scientifically evaluated, especially with regard to user acceptance, usability and the benefit or acceptance of the public service provider.
- Samariterbund Burgenland offers the „Home Emergency call“ for elderly and the “AAL – Ambient Assisted Living” is piloting. In addition there is a project of the „Health and Social Services“ with a university, which focuses the monitoring and analysis of falls. Using mostly technology that is available on the market.

Slovakia

- Strengthening the individual care for the frail people (seniors, people with diseases) and increasing the quality and availability of social services for seniors and reduction the risk of social exclusion of this target group.
- Development of new competences, expertise and technical solutions and care models for local use.

Poland

- In Alzheimer Centre (AC) they use the Barthel scale, it is one of the ADL (Activities of Daily Living) scale. In Poland, the Barthel scale is used as a tool to determine the availability of long-term care (inpatient and home-based). People whose score does not exceed 40 points can count on qualifying for long-term care. We perform it twice a year in accordance with the applicable standards for all nursing homes.
- In addition, AC uses the Norton scale, which is used to assess the risk of decubitus ulcers (bedsores), in accordance with current procedure. The Norton Scale assesses from 1 to 4 variables: physical condition, state of consciousness, activity, ability to change one's position, and rectal and urethral sphincter function. The maximum number of points that can be obtained is 20.

At 14 - we observe an increased risk of bedsores, below this figure the risk increases. The NORTON scale requires knowledge of assessing the patient's physical condition.

What kind of digital tool are used in your country related to your topic from WP T2:

Czech Republic

- Intelligent monitoring – pilots and post pilot operations
- GPS tracking - only pilots or as a part of social care, there are several services in operation
- Care for frail – pilots
- *Awaited benefits*: More intensive focus on real benefits is implemented in the design of many recent and ongoing pilots. Various kinds of benefits are observed: economical, clinical, time saving, quality of care, quality of life, safety, less errors, satisfaction, capacity usage, human resources oriented; for patients, employees of care providers, healthcare service providers (e.g. Hospitals), the healthcare system.

Italy

- Digital tool for frail (to be designed and developed within the niCE-life project).
- Monitoring grid (part of the eCare solution in Bologna).

  (Note: PP5 in collaboration with PP2, PP4 and PP6 (especially for testing).
- *Awaited benefits*: Digital tool for the monitoring of frail elderly (YouBOS platform)
  - Grounded into the local context and based on the steady eCare network.
  - Based on one of the elements of the eCare network which represents a support for delivering some of the activities addressed to the frail elderly and their caregivers: the “Bologna Solidale” (“Bologna, supportive and inclusive city”) Platform.
  - The aim is to reduce the digital divide and social isolation.
  - It represents an innovation of the platform in terms of new functionalities and module components that will be designed and developed.
  - Involvement of all identified stakeholders in all stages of the process (social and health professionals, associations and volunteers, policy makers).

Slovenia

- Care for frail, provided by Telekom Slovenia. Possible problems with obtaining personal consent is necessary for the processing of personal data securely stored in the cloud with the advanced protection.

Austria

- Monitoring grid (as a one tool of the eCare Network of Bologna) will be implemented in the framework of the present project.

Slovakia

- Emergency call centre – the main task of the dispatching office is to take over emergency calls from clients connected to the Domestic Emergency Call (Provider: Association of Samaritans of Slovakia).
- The MONSE service (senior monitoring) – technical solution allowing seniors to live in their homes alone, and providing necessary information about their condition to their relatives (Provider: Aliter Technologies).

Poland

- Mentioned expectation: "The recipients of IT solutions at the Alzheimer's Centre are people with significant cognitive disorders and care and therapeutic staff with limited digital competences (at the level of the ordinary user without technical preparation). Regarding to the patient, these solutions should function without the patient's awareness. The solutions should focus on the aspect of physical safety and monitoring of vital functions. Physical safety: location, falls signaling, signal of departure from the place of residence without the knowledge of the guardians. Monitoring of vital functions - reaction to a parameter imbalance leading to a health incident, e.g. increase of body temperature, pressure, stroke, infarction, vital signs, prevention. On the staff side, ease of operation and data reading. These devices must be easy to use, resistant to devastation and loss, with a durable and long-term power source. Low price and operating costs."
- AP nurse – provided by Slovak University of Technology, Bratislava, SK. The main objective is to improve the quality of care services. The priority is to minimize harmful events and optimize the work of caregivers.

Main outputs

The reactions of partners involved are so diverse in some areas that they are difficult to classify. Because of it we chose such evaluation, which reflects individual interesting or critical points.

- Sometimes mentioned problem called “GDPR”. This can be solved quite easily as from Slovenia mentioned: “General Data Protection Regulation (GDPR) and The Personal data protection law enable protection personal data with a Personal consent of an individual which is a voluntary statement of the will of an individual that his personal data may be processed for a specific purpose.”
- In Italy many actions facilitate access through information and assistance for the use of regional online services, primarily Electronic Health Records (Fascicolo Sanitario Elettronico) and booking facilities, online payments and a specific APP, named ER-SALUTE (https://support.fascicolo-sanitario.it/guida/accesso-mobile/app-er-salute). Lastly, many actions for the elimination of the cash payments at the physical access points desks are in place. Over the years training sessions for the use of online services have been addressed to GPs and Paediatricians, medical specialists, frail citizens like elderly through “Pane & Internet” regional programme, high school students.
- Is there apparent support of innovations that may bring savings in healthcare budget in mid or even long-term perspective in your country/region? This question was answered by several participants and they mentioned mostly existing ways in their countries such as possibility of private or additional insurance.
- “No cooperation”, “No data”, “No sharing”, we can read through the reports, this probably means a sad situation across the health and social system at a time of electronic public administration and the rapid development of affordable technological solutions.
- Interesting is, that most of partners calculate risk of frailty through “Death risk prediction”.
- We gained an overview of what problems the project partners face, but also what they work with, ie. what they have at their disposal. In several cases, it is obvious that one partner needs or does not know the solution of some situation and the other project partner knows and use suitable solution. However, the question of which individual solutions are transferable cannot be easily answered. However, we will focus on those elements that relate to our project – niCElife.

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