

“Improving Healthcare Access through a Personal Health Monitoring System – EHEALTH Monitoring”»,

in the framework of the implementation of the "INTERREG V-A
Greece - Bulgaria 2014-2020" Cooperation Program »



Deliverable 3.1: Joint Strategy towards sustainable e-health management

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

Project co-funded by the European Union and National Funds of the participating countries

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



CENTRE OF CARING AND SOLIDARITY MUNICIPALITY OF KOMOTINI



MUNICIPALITY OF KIRKOVO



EURORADAR ASSOCIATION

Contents

1. Introduction	4
2. Definition of tele-medicine.....	5
3. Tele-medicine in Greece.....	6
3.1 IT technologies and Health	7
3.2 E-health field of implementation.....	7
3.3. Aim of E-health applications.....	9
4. Telemedicine in Bulgaria	10
4.1. E-Health in Bulgaria.....	11
4.2. Analysis of the situation - level of achieving the objectives for building and developing e-health	12
5. General principles of eHealth Care.....	16
6. Description of E-HEALTH Monitoring project.....	18
7. Properties of e-Health systems.....	20
7.1. Advantages.....	20
7.2. Disadvantages.....	21
8. National and European legal framework in the field of electronic health	22
9. Tele-medicine services and Operational Frameworks	26
9.1 Needs covered by Tele-medicine	26
9.1.1 Operational Frameworks	26
Technical Environment	26
9.1.2 Quality of medical data	27
9.1.3. Rates of operation.....	27
9.1.4. Tele-medicine applications and uses	28
10. Fields where tele-medicine can be effectively applied	28
11. E-health challenges and opportunities in Europe.....	29
11.1. Research outcomes and commercial applications	30
11.1.1. HELP4MOOD	30
11.1.2. INTERSTRESS.....	30

11.1.3. ALFRED	30
11.1.4. EMPOWER.....	30
11.1.5. DIGITAL HEALTH FOLDER	31
12. Review of Strong and Weak Points, Opportunities and Risks	31
12.1. The significance of cross-border connection between e-health systems.....	31
12.2. Possibility of extending the system – Proposals	32
12.3. EU Action plan for e-health 2012-2020	32
13. Facilitating integration and ensuring better diffusion of e-health	34
13.1. Cross-border Cooperation.....	34
Cohesion policy	34
13.2. Funding for the development of tele-medicine applications.....	35
13.3. Information and training through provision of web-based services in real time	35
14. Conclusions.....	36

1. Introduction

Nowadays, high quality healthcare is a significant issue for society. Modern technology and science contributes in offering improved health services to all groups facing health issues related to their socio-political status. The problem of providing adequate health care to the elderly and the residents of islands or remote areas has never been more relevant. Enter e-health and various applications such as tele-medicine. All of these developments combined led to the implementation of tele-medicine systems.

Along with the rapid developments in IT technology and information science, great progress was made in communications. Also, during the last decade, various social policies and financial changes have affected healthcare provision.

More specifically, attention is drawn to demographic changes, the increased cost of services, demands for better quality, opening new markets and social pressure for equal services. As to health in particular, population is ageing and people suffering from chronic diseases and are not able to move are dramatically increasing. Furthermore, the extremely high cost of certain machinery and the lack of personnel in remote the isolated areas necessitates gathering many services in central hospitals with all the necessary means.

One of the strategic objectives adopted at the European Council in March 2000 in Lisbon, is that the European countries shall develop most competitive and dynamic knowledge-based economy. The European Council reaffirmed this strategic objective and gave a mandate for an accelerated development of the information society and information and communication technologies.

In the information society, eHealth is an extremely important and is seen as one of the main priorities in European development plans. The new initiatives of the European Commission are related to the introduction of electronic health cards and a single information system as an essential and integral part of modern healthcare.

2. Definition of tele-medicine

Tele-medicine could be defined as: “The use of communication and IT technologies to provide and support healthcare when the parties are separated by great distance”.

Tele-medicine systems were developed to cover these needs and can take one of the following forms:

- ✓ E-consulting, remotely accessing a specialist’s knowledge and expertise.
- ✓ E-diagnosis, remotely diagnosing by a specialized physician.
- ✓ E-monitoring, monitoring patients not in the hospital.
- ✓ E-care, using e-monitoring data to provide assistance.
- ✓ E-learning, remotely training patients or healthcare practitioners.
- ✓ Joint diagnosis, where a group of healthcare practitioners from different locations work together towards a conclusion.
- ✓ Remotely accessing a medical database could be considered a tele-medicine application.

The main needs covered by tele-medicine applications are the following:

- Remote areas with low quality healthcare services
- Navigation
- Home care
- Emergencies
- Health tourism units
- Consulting units to doctors
- Tele-learning
- Rare specialties
- Medical services homogenization

Essentially, tele-medicine or e-health aims at providing clinical support by overcoming the geographical obstacles separating the users via IT technologies in order to improve health outcomes.

Tele-medicine's special properties render it suitable for remote areas (desert, rural, mountain, island regions) where there is a lack of trustworthy and specialized medical presence and knowledge.

3. Tele-medicine in Greece

The year 1989 is a marking point for tele-medicine in our country. Medical Physics Laboratory of Athens University Medical School, in cooperation with Sismanoglio Hospital presented an tele-medicine system to support primary healthcare and created the first network of Health Centers connected to a public Hospital.

Tele-medicine suits Greece especially because of its geographic and demographic peculiarities. At the same time, the constant increase in quality of life, the great number of foreign and Greek visitors per annum, continuously pressure towards improving and upgrading the provided healthcare services by means of modern technology.

The National Healthcare System (ESY) is now compelled to fulfill the reasonable expectations for high quality primary healthcare. Thus, alternative solutions must be found.

To the contrary, positive developments have occurred in the area of modernizing the equipment, indeed to the extreme. The field presenting an excessive delay however compared to the rest of Europe, is the introduction of computers, automations and IT and telematics systems in health and welfare.

While tele-medicine is currently portrayed as a novelty, it can be easily incorporated and accepted by all parties of the health and welfare system. Experience so far, both in Greece and abroad, suffices to convince any observant for tele-medicine's necessity, while also acknowledging that introducing it at a large scale is a complex and difficult task.

Also note that tele-medicine is not an alternative healthcare system. Rather, it is a system which must be introduced in all public and private medical services units or networks to promptly deal with access and quality issues and increase their efficiency and effectiveness.

3.1 IT technologies and Health

Making use of IT technologies has greatly affected healthcare in developing countries. It enabled healthcare practitioners to remotely access medical information and coordinate research activities more effectively than ever. It also created an effective and efficient – cost wise – communication channel for prevention with regards to health and illness in the general population.

Now, healthcare practitioners can provide remote diagnosis, treatment and cooperate with their colleagues without the need for long and costly trips.

The improved access to medical information offered by IT technologies not only helps the public understand general health issues but – as aforementioned – can significantly contribute in disease prevention. By transmitting health-related messages through the radio, TV and the internet, the public can be informed with regards to the necessary measures to prevent or restrict the spread of a disease. Apart from prevention however, healthcare institutions use IT technologies to reduce costs and improve services by expediting administrative procedures, such storing the patients' medical files and procuring medical supplies.

E-health's development goes hand in hand with the progress of new technologies and a country's network infrastructure. The huge technological advancements of the last few years along with society's increased medical demands are the preamble to a **bloom in E-Health**.

According to a study by the Information Society Observatory, there is currently great progress in E-health, to the extent that a comprehensive information system is considered to be vital for the smooth operation of hospitals.

At the same time, the range of provided possibilities is no longer limited to self-sufficiency and full utilization of available resources but is extended to applications such as E-cooperation, E-monitoring of patients, E-learning.

3.2 E-health field of implementation

The view is predominant that the term "health" does not only refer to medicine, disease, healthcare or hospitals but has a wider net. So, E-health's field of implementation is health in general, with its main aspects being the following:

- 1) Public health, falling in state jurisdiction and oriented towards preventing and treating disease in terms of the entire population

2) Healthcare, oriented towards treating disease by addressing each individual patient rather than the total.

Thus, E-health covers all health aspects and not only healthcare.

It includes three main areas:

- The provision of information on health, health practitioners and consumer health through the internet and telecommunications
- The power of IT and e-commerce to improve public health services
- The use e-commerce applied in health management systems.

According to the European Commission on public health, “the term e-health covers a wide range of tools based on IT and communications technologies aiming to better prevention, diagnosis, treatment, monitoring and managing health and way of life”.

IT and communications technologies applications are as such:

- ✓ Tele -medicine
- ✓ e-Learning
- ✓ Healthcare / Medical Informatics

The creation and / or acquisition of electronic health information and its use goes through several stages, namely:

- *Preliminary preparation.* Selection of objects, processes, phenomena that become information sources, with clear indication of the reasons and peculiarities of this choice, as well as the reasons for the expected results.
- *Collecting information.* The gathering of information can be done by measuring devices and apparatus in a real or laboratory situation, by reporting and manually entering of descriptive data, by expert judgment on selected parameters, by comparative analysis with other archived information and some other methods.
- *Controlling the quality of information applying selecting different mechanisms.*
- *Primary data processing,* such as data compression, specialized layout as per pre-set scheme, etc.
- *Actual data processing and possible analyses and conclusions.* Creating new specialized programs or using known ones for diagnosis, prognosis treatment, etc.

- *Documenting the results of the study.* Tables, charts, patterns, conclusions, abstractions, etc. These results may be visible directly on a monitor, or may be saved as a record on a physical medium - paper, plaque, or other external media that requires additional visualization or telemedicine transfer. Results can be accessed in real time or at a selected future time.
- *Storage and archiving on external media.* In the context of the use of the information gathered, it is necessary to have legally regulated rules on the storage of medical, hospital, and health information and allocation of access rights, as well as regarding the possible use of such information as evidence in forensic medical procedures.
- *Update over time and access by priority.* Updating over time and prioritizing access to information are tasks of paramount necessity. They are part of the design and programming of any computer or telecommunication system for processing medical information. The update may be partial or to run at a specific time. The complete software is also subject to regular update.

3.3. Aim of E-health applications

According to the World Health Organisation, the use of IT technologies in health is a means of achieving a series of desired effects ie:

- 1) Better treatment decisions by healthcare practitioners
- 2) Higher quality and safest healthcare by hospitals
- 3) Conscious choices by the public regarding their health
- 4) Greater responsibility by the government in health
- 5) Support effective, efficient and just healthcare systems by national and local IT systems
- 6) Ever better understanding of the health risks by the public and the policy bodies
- 7) Better access to knowledge and information necessary for better health

All above is based on the following properties of e-health:

1. Efficiency
2. Improvement of healthcare quality
3. Scientific documentation
4. Strengthening of citizens and patients

5. Reinforcing interaction
6. Continuous training
7. Extension of healthcare range
8. Safety
9. Equality

4. Telemedicine in Bulgaria

The legal framework of the Bulgarian healthcare system covers the Health Insurance Act, the Law on Professional Organizations of Doctors and Dentists and the Law on Medical Establishments. Legislation and regulations in the field of control over narcotic substances, food, health and safety at work, blood transfusion, etc. are also in force. The by-laws (decrees, ordinances and instructions) are constantly being improved in order to bring it in line with the basic laws.

The establishment of the National Health Information System (NHIS) enables on-line provision of many administrative and health services, provides access for patient to information about for their own health, improves the interconnections between the different levels of the system, improves the quality of medical services and ensures the efficiency of the spending of public funds for health care.

The availability of NHIS is a prerequisite for the financial procedures to be transparent and easy to monitor, analyse and control, and to meet the requirements of all participants in the system.

The concrete steps for the establishment of the National Health Information System (NHIS) will be implemented according to the Roadmap set out in the Program for eHealth Development.

The Roadmap covers a six-year period (2014-2020) and includes three logical stages. The development of the eGovernment architecture of Republic of Bulgaria should be carried out step by step and each subsequent stage builds on and develops the achievements of the previous stage.

The first stage includes an analysis of the current state of the processes in the healthcare system in Bulgaria - participants, processes, responsibilities, used information systems, information flows, analysis of the expected interactions with European health IT systems and identification of the necessary regulatory regulation. The set of unified registers and nomenclatures needed for the work of the NHIS will

be defined and uniform standards for the exchange of health information will be defined.

The second stage includes the extension of the NHIS - the development of additional administrative and specialized registers, the extension of the portal and the electronic services system, the development of risk analysis mechanisms, medical audit, electronic prescriptions, as well as analytical opportunities.

The third stage involves the creation of a backup data center, which includes image diagnostics possibilities, telemedicine, decision support elements, and elaboration of additional electronic services.

4.1. E-Health in Bulgaria

The e-health development program in Bulgaria defines the following main characteristics of e-health:

- Efficiency - one of the goals of e-health is to increase efficiency in health care while reducing costs.
- Improving the quality of health care - increased efficiency includes not only reducing costs but also improving quality.
- Evidence-based medicine - eHealth should support decision-making based on sound scientific assessments.
- Access - enabling citizens and patients to access medical knowledge bases via the Internet. Increasing the patient's ability to choose health services.
- Encouraging a new type of relationship between the patient and the healthcare professional, in which decisions are made with the participation of both parties.
- Training through online methods of doctors (continuing medical education) and the population (health culture, preventive information, etc.).
- Opportunity for exchange of information in a standard way between medical and healthcare institutions.
- Extending the scope of health care beyond conventional boundaries. E-health enables the population to receive health care online from highly specialized medical institutions, regardless of their geographical location.

- Ethics - e-health creates new forms of patient-physician relationships, and poses new challenges and ethical issues in relation to online practices, informed consent, confidentiality, and more.
- Equality - e-health will facilitate equal access of different social strata to health care.

The strategic goal of the introduction of e-health is to improve public health and quality of life in accordance with changing needs and use of existing and new technological opportunities, while increasing the efficiency and reducing the cost of health services (Strategy for the implementation of e-health , 2006).

The measures for realization of the operational goals, defined in the Strategy for implementation of the e-healthcare are in the following main areas:

1. Establishment of an integrated information system for exchange of information between employees in the field of healthcare (between medical, educational, scientific, financial and administrative units).
2. Standardization and information security.
3. Awareness and training

4.2. Analysis of the situation - level of achieving the objectives for building and developing e-health

Health information standards

The successful construction of any information system should be preceded by standardization, structuring and unification of the processed information. The requirement for the introduction of national health information standards has been enshrined in the strategic documents since 2006 and continues to be a priority measure to this day.

From 2006 to 30.06.2016 there was a gradual postponement of the deadlines for implementation of the measure and a change in the structures responsible for its implementation and the sources of funding at the level of a strategic document.

In 2015, the Minister of Health was assigned to normatively approve with an ordinance the technologies and systems for collection and exchange of information, as well as the health information standards to be applied by the medical establishments. The adoption of the standards is a necessary step towards building a project of a National Health Information System. By order of the Minister of Health, a working group of representatives of the Ministry of Health, the National Center for

Public Health and Analysis (NCPHA) and the University Specialized Hospital for Active Treatment in Endocrinology was established to prepare a draft Ordinance for approval of health information standards. The working group does not include representatives of the National Health Insurance Fund, the Executive Agency for Medicines, professional organizations, etc. thus, the necessary preconditions for taking into account the opinion of key participants in e-health have not been created.

With a report dated 12.03.2016, a draft Ordinance was submitted to the Minister of Health for approval of special rules for the provision of electronic services and exchange of electronic documents, guaranteeing information security in the exchange of information in the healthcare system. The report states that there is no legal basis for the issuance of a normative act regulating health information services and the exchange of information between all structures of the health care system. In this regard, the working group made a proposal to create a new provision in the Health Act, which would cover all health care structures with the obligation to apply special rules for the provision of electronic services and exchange of electronic documents.

A draft Ordinance for approval of health information standards applied by medical institutions has been published on the website of the Ministry of Health and the Public Discussion Portal. An appendix to the ordinance lists the titles of 12 health information standards without their content. The ordinance was promulgated at the end of November 2016 and does not provide for the mandatory application of these standards in health facilities under the Health Act and the Medicinal Products in Human Medicine Act, state, municipal and public bodies and institutions for organization, management and control of health protection and promotion activities.

Conclusion: *The lack of mandatory health information standards is an obstacle to structuring and unifying the processed information in the health care system and building an integrated health information system. The introduction of health information standards only for medical institutions is not enough to regulate and service the exchange of information for the purposes of e-health and the forthcoming establishment of the National Health Information System.*

Medical documentation corresponding to the possibilities for electronic processing

The forms, content, conditions and procedure for processing, use and storage of medical documentation and for exchange of medical and statistical information shall be determined by ordinances of the Minister of Health, coordinated with the National Statistical Institute.

The creation of medical documentation, corresponding to the possibilities for electronic processing and exchange of medical and health information, is included as a measure in the National Health Strategy 2014-2020 and the Program for Development of e-Health from 2014.

In 2015, by order of the Minister of Health, a working group was established to prepare a draft Ordinance on the forms and content, conditions and procedure for processing, use and storage of medical documentation. With a report of the working group dated 18.11.2015, a draft Ordinance and a list of medical documents in the healthcare sector and the terms for their storage were submitted to the Minister of Health. The report states that the creation of a single ordinance laying down the forms and content of medical information used by different autonomous IMPs with different subordination and different status is proving impossible. The reason given is the discrepancy between Art. 27, para. 3 of the Health and Decentralization, Privatization and Liberalization in the Healthcare System Act, which occurred after 2001. A report to the Deputy Minister of Health proposed that the creation of unified forms for medical documentation be linked to the establishment of a National Integrated Health Information System. , which in practice postpones the adoption of the draft ordinance in the option proposed by the working group until the introduction of the system.

As of March 2020, the creation of medical documentation, classification and rules for working with it, valid for the entire healthcare system, exists only in the roadmap for the implementation of the National Strategy "eHealth", which at the time of this report , has not yet been adopted.

Conclusion: *The lack of regulation of the forms and content of medical documentation is an additional obstacle to building an integrated health information system and the effective implementation of e-health.*

Access to personal health data

The personalized information system (PIS) of the National Health Insurance Fund (<https://pis.nhif.bg/main/>) contains information on the medical (and since 2012) medical and dental care (since 2012) used by each compulsory health insured person. reported to the NHIF.

Since 2013, the NHIF provides access to IPR through a unique access code only to compulsorily insured persons within the meaning of the Health Insurance Act, including in cases when their health insured rights are interrupted. The certificate for obtaining a unique access code is issued by each RHIF to persons who have

submitted an application for issuance. The unique access code is issued for certain unified civil numbers (PIN), personal number of a foreigner (PIN) or official number from the register of the National Revenue Agency - for persons without PIN or PIN, insured in Bulgaria. In case of change of these identifiers a new code is issued. The same unique access code is used to access the personal data of the persons for whom the holder of the DCO has made a choice of personal physician - children under 18 years of age, persons of whom he is a guardian or trustee and other cases in which it is permissible to an official choice of a personal doctor is made. The personalized information system of the National Health Insurance Fund provides an opportunity to deactivate the code in case of compromise or at the request of the Public Health Insurance Fund.

Conclusion: *A unique access code has been implemented by the NHIF for access to the electronic health records of health insured persons through the personalized information system.*

Electronic services in the field of healthcare: electronic prescription, laboratory data and research

The creation of an electronic direction, electronic prescription, laboratory data and research is a key measure of the Strategy for implementation of e-health from 2006 and continues to be a priority in the next strategic and program documents in Bulgaria, with the exception of the last NHS 2020, in the action plan to which such measures and activities cannot be identified. The lack of an explicit measure / activity in the action plan of the NHS 2020 complicates the correct organization and creates a risk for the realization of the goal.

The Ministry of Health is in the process of implementing the project № BG05SFOP001-1.002-0007-C01 "Completion of the national health information system / NHIS / - stage 1 and stage 2", funded by the operational program "Good Governance" 2014-2020. Through the project, by the end of 2020, it is planned to build software applications for electronic direction, electronic prescription and laboratory data.

Conclusion: *More than a decade after the realized and strategically declared need for software applications for electronic direction, electronic prescription and laboratory data, they have not been realized. A prototype of a system for electronic prescription, electronic referral and outpatient list is currently being developed. For the purposes of the prototype, the scope of the system is limited only to contractual partners of the NHIF and drugs that are paid for by the NHIF. The development and*

implementation of the systems at national level is expected to be implemented through the OPGG 2014-2020 project.

5. General principles of eHealth Care

In order not to alter the meaning, purpose and role of health information in human life, its electronic version should meet the following requirements:

- *Efficiency.* One of the main goals of eHealth is to increase the quality and volume of healthcare services provided while maintaining or reducing costs;
- *Improved service quality.* Increased efficiency involves not only cost reduction but also improved service quality.
- *Evidence Based Medicine and Management.* eHealth interventions must be based on arguments and evidence to become scientifically grounded. In this direction, long-term expert and financial efforts should be invested.
- *Ethics.* EHealth creates new forms of patient-doctor relationships and poses new challenges and ethical issues in relation to on-line practices, informed consent, access to information, privacy and confidentiality, language of communication and sought-after social support and empathy. Medical information is not just about informing, it is exchanged to trigger action and attitude.
- *Adequate qualification and training of health professionals.*
- *Supporting and developing a new form of relationship* between a patient and a health expert through a real partnership where decisions are shared responsibility and true interaction and trust.
- *Interoperability* of information systems in healthcare.
- *Expanding the healthcare beyond conventional borders.* This includes both overcoming geographical constraints and concepts of medical work, which is no longer a subjective act, but a group expertise. eHealth allows you to offer local health care from global sources.
- *Enhanced consumer rights* - through access to personal health records and evidence-based practices, Healthcare is the guarantor of the best "informed choice" for the patient.
- *Equality.* Making healthcare more accessible is one of the major goals of eHealth.

- *Authenticity and veracity.* Any organization or expert who offers health information, products and / or services should be governed by this principle.
- *Professional relationships are regulated through the application of standards.*
- *Informed consent and confidentiality.* Policy to protect patients' rights should be ensured, to ensure informed consent on the collection of their personal data; to limit the unauthorized access to personal health information, to ensure access to the personal information of the users themselves, and to have a mechanism for tracking the use of their personal information.
- *Protection and prevention of usage for commercial purposes.* The objectives of the information flow in terms of content, commercial and commercial intentions, sponsorship, etc. should be clearly regulated. The publisher's independence should be guaranteed; clear policy and terms of use of the site;
- *Electronic dialogues between patient and doctor or a group of experts* should have fixed parameters through: a clear and specific description of the nature of on-line relationships; outlined restrictions on on-line diagnosis; to put emphasis on the fact that on-line consultation does not displace personal contact with the physician; to clearly define the payment methods; that the patients understand every aspect of the necessary health care.

The measures for realization of the operational goals, defined in the Strategy for implementation of the e-healthcare are in the following main areas:

1. Establishment of an integrated information system for exchange of information between employees in the field of healthcare (between medical, educational, scientific, financial and administrative units)
2. Standardization and information security
3. Awareness and training

6. Description of E-HEALTH Monitoring project

E-HEALTH Monitoring project aims at developing an IT system for monitoring citizens' health internationally, based on IT technologies and personal, non-invasive sensors. This system will not only enable remote monitoring of citizens' health, beyond the traditional hospital environment but it will also create a permanent connection between the people and the medical practitioners, thereby directly contributing to the equal treatment and access of all citizens to modern health services with the aim of a social and financial development of an enlarged Europe.

The proposed system brings personalized and cost-effective health monitoring in the entire population of two states. The strategic aim is to improve public health and quality of life by adopting technologies which adapt to personal needs while also being very reliable and low-cost. The project's main aim is to design, plan and develop a novel, user-friendly, adjustable, portable, personal and low-cost e-health system for everyone. This system will consist of a central IT system and portable devices with sensors providing: (1) remote monitoring of citizen's health state, (2) constant monitoring of citizen's compliance to their treatment, (3) live connection to medical personnel.

The system will be able to adjust and reinforce the provision of medical services to: (1) the general population (preventive medicine), (2) short-term patients, (3) chronic patients.

E-HEALTH Monitoring project is part of the "Greece-Bulgaria" European Cross-Border Cooperation Programme 4, «A Socially Inclusive Cross-Border Area», under Priority Axis 9a « Investing in health and social infrastructure which contribute to national, regional and local development, reducing inequalities in terms of health status, promoting social inclusion through improved access to social, cultural and recreational services and the transition from institutional to community-based services» and with the aim 8 «To improve access to primary and emergency health care (at isolated and deprived communities) in the CB area».

The increased impact of poverty has numerous social implications, one of which being the aggravated state of public health. Although the cross-border region (CB) has main health resources (e.g. hospitals and doctors) at quality levels near or even better than the EU28 average, the mean life expectancy is lower than the EU28 average while many epidemiology indexes are higher. In total, Greek regions have in the past presented higher life expectancy rates than the Bulgarian regions but since poverty forces ever more people to seek hospitalization (more than 20% increase

documented in Greece since 2010), the total public health levels are reduced in the Greek regions in greater risk of poor healthcare in the future. At the same time, the financial crisis and the lack of investment prevent many CB area residents from accessing healthcare services (non-insured citizens). The project comes to deal with the fact that the area's population is facing significant challenges in health, especially in remote regions and in regions where "special groups" gather by combining opportunities as "A good interaction between cooperating bodies from both countries, Greece and Bulgaria and strategies of smart specialization in both countries and regions".

The combination of IT technologies in healthcare results in improving diagnosis and healthcare. They must be put to use and coordinated so that these well-defined systems can be used effectively by mankind. The project contributes to healthcare by the programme "tele-medicine and e-care infrastructure and other technology health services" and will try to improve access to primary and emergency healthcare (in isolated and underprivileged communities) in the border area by offering a personal, portable healthcare system on the basis of video devices support.

Indicators for the health status of the population display low levels of provision of health services in border areas. We are witnessing the closure of health institutions due to a shortage of qualified staff and mismanagement of the allocation of financial resources. Indisputable factor for the worsened values of the indicators is the increase of the economic inequalities between the population in these border regions compared to the population living in the inner parts of the country, which affects the health systems and requires measures for improvement and higher efficiency.

The elaboration of an eHealth Management Strategy as part of the project is linked to the goal to improve the access to primary and emergency medical care in rural, isolated and economically disadvantaged areas.

7. Properties of e-Health systems

7.1. Advantages

Emerging IT technologies can have significant benefits for communication efforts in health.

In brief:

Interested party	IT technologies impact
Citizens	Allows for personalized care focused on the citizen. Health at home, in the workplace or at school – not only in hospital. Focus on prevention, training and self-management. Cooperation with other patients for advice and support.
Professionals	Readily available high quality distance learning for continuous professional training. Remote consultations with patients, second opinion and professional networks. Access to modern, specialised, accredited knowledge on clinical care, research and public health.
Hospitals & universities	Hospitals as virtual services network connecting all system levels. Quality and safety: improving healthcare procedures and reducing the chance of medical errors. Facilitating citizen and medical files mobility. New opportunities in basic and applies research: from knowledge to health for health in action. Cooperation and joint computing forces (e.g. grid computing)
Health corporations	Health content provision as merchandise to the public and health professionals. Research and development of new products and services: electronic health records, IT systems, clinical records. Wide range and cost-effective marketing for health products and services.
Government	Health in the center of economy, safety, foreign affairs and international relations. Technology is no longer a limit but the favourable environment is. New roles for interested parties: health professionals, the authorities

	and citizens.
International organizations	Need for fast and coordinated response to worldwide threats: natural disasters, infectious disease and bio-terrorism. Increased realization of IT technologies' significance in sustainable health systems.

7.2. Disadvantages

Although the potential benefits of e-health applications are impressive, there is also the risk of problems.

Even though research shows that risks are rare, the use of unsuitable or bad quality applications could have the following negative implications:

1. Unsuitable or delayed treatment.
2. Problems in patient – healthcare provider relationship.

The unsuitable use of e-Health applications could shake people's trust to the healthcare providers' practices and the recommended treatments and thus lead them to provide unsuitable care by questionable bodies.

3. Privacy and confidentiality issues.
4. Waste of resources and delay innovation.
5. Unwilling mistakes.
6. Widening the gap between technology and health.

Many of these concerns also apply to more traditional communication means. However, the focus on potential problems due to e-Health applications is justifiable since the new and emerging technologies in the media could influence behaviour and decision-making in ways much more powerful than other media.

8. National and European legal framework in the field of electronic health

EU Member States have the primary responsibility for organizing and delivering healthcare and medical care. EU health policy therefore serves to complement national policies and to integrate health issues into all Union policies. EU public health policies and actions aim to:

- To protect and improve the health of EU citizens
- To support the modernization of the health infrastructure
- To increase the efficiency of European health systems. Strategic health issues are discussed by senior officials of national authorities and the European Commission in a working group on public health.

The EU institutions, Member States, regional and local authorities and other stakeholders contribute to the implementation of the Union's health strategy. The role of the European Commission is to support Member States' efforts to protect and improve the health of their citizens and to ensure the accessibility, efficiency and sustainability of their health systems.

This is done by various means, some of which are:

- Proposing legislation
- Providing financial support
- Coordinate and facilitate the exchange of good practices between EU countries and health experts
- Health promotion activities

The development of e-health is enshrined in the strategic documents, as well as in the primary and secondary law of the European Union.

EU strategic documents:

- Europe 2020 Strategy: a strategy for smart, sustainable and inclusive growth;
- EU Health Strategy "Together for Health";
- Health for growth: EU health program (2014-2020) EHealth Action Plan 2012-2020 - Innovative Healthcare in the 21st Century

EU legislation and Community law:

- Treaty on the Functioning of the European Union (TFEU).

- Regulation (EU) № 282/2014 of the European Parliament and of the Council of 11 March 2014 establishing the third Union action program in the field of health (2014-2020) - Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of individuals with regard to the processing of personal data and on the free movement of such data.

- Regulation (EU) (910/2014 of the European Parliament and of the Council of 23 July 2014 on electronic identification and certification services for electronic transactions in the internal market and repealing Directive 1999/93 / EC.

- Regulation (EU) № 883/2004 of the European Parliament and of the Council of 29 April 2004 on the coordination of social security systems.

- Regulation (EU) (987/2009 of the European Parliament and of the Council of 16 September 2009 laying down the procedure for implementing Regulation (EU) № 883/2004 on the coordination of social security systems.

- Directive 2011/24 / EU of the European Parliament and of the Council of 9 March 2011. to exercise patients' rights in cross-border healthcare.

- Directive 2005/36 / EC of the European Parliament and of the Council of 7 September 2005 on the recognition of professional qualifications.

On 25 April 2018, the European Commission adopted an Action Plan on Digital Transformation in Health and Care, which aims to put EU citizens at the heart of the healthcare system.

This will be achieved through:

1. Safe access of citizens to and sharing health data The Commission wants to ensure that EU citizens have secure access to a comprehensive electronic record of their health data throughout the EU. Citizens must continue to monitor their health data (wherever they are) and be able to share it securely with others for purposes chosen by these citizens, such as medical treatment or research. The Commission recommends:

- development and adoption of a "European format for electronic exchange of health records", which would expand the existing infrastructure for digital eHealth services; and
- establishing interoperable standards that minimize barriers to the cross-border transfer of health information and data within the EU and identify incentives to adopt the common format.

2. Better data to promote research, disease prevention and personalized health and care The Commission recognizes that there needs to be better coordination between existing national and regional initiatives on the pooling of health data in research and personalized medicine.

3. Digital tools for citizen empowerment and personal care In its communication, the Commission notes that the demand for health and care is constantly increasing as a result of an aging population, together with "the increasing severity of chronic conditions and multiple morbidity".

The Commission notes that "it is widely recognized that health systems must move from treatment to health promotion and disease prevention, from a focus on disease to a focus on well-being and people, and from the fragmentation of services to the integration and coordination of continuum services care".

7.1. National legislation related to eHealth

The state health policy is managed and implemented by the Council of Ministers, which on the proposal of the Minister of Health approves the National Health Strategy, which is adopted by the National Assembly.

A review of national legislation in the field of eHealth reveals the following specifics. National health strategies in the field:

- National Health Strategy 2008-2013, adopted by a Decision of the National Assembly of 05.12.2008 and an action plan to it;
- National Health Strategy 2014-2020, adopted by the Council of Ministers on 21.01.2014 and action plan to it. It has not been adopted in this version by the National Assembly.
- With a decision of the National Assembly on 17.12.2015 an updated National Health Strategy 2020 was adopted, which is based on the National Health Strategy 2014-2020 and an action plan to it.

According to the Law on e-Government, the Ministers propose to the Council of Ministers the approval of sectoral strategies for e-government and adopt programs for their implementation. The first sectoral Strategy for the implementation of e-health was adopted by the Council of Ministers at the end of 2006. The strategy envisages the establishment of a Coordination Council to develop an Action Plan for the period 2006-2012 and to monitor its implementation. There are no approved rules, meeting materials and action plan for the implementation of the strategy, which hinders the traceability of its work. There is a lack of confidence that the organization of policy

implementation activities for the development of e-health in this period is effective and leads to the achievement of the set goals.

At the end of 2014, the eHealth Development Program was adopted, which defines key actions for the establishment of the National Health Information System (NIS). The program was adopted at a meeting of the leadership of the Ministry of Health and was published on the portal for public discussion. The roadmap to the program covers a period of six years (2014 - 2020), in which three logical stages are distinguished. The program was prepared without the participation of representatives of the National Health Insurance Fund and was not coordinated with them, although the institution is indicated as a partner in the implementation of almost all measures of the document.

In the field of healthcare, the legal framework covers a number of acts, which identify provisions governing e-healthcare, incl. tools and services using information and communication technologies, exchange of information and data between patients, medical professionals and health information networks, expert systems and others:

- Health Act
- Health Insurance Act
- Law on Healthy and Safe Working Conditions
- Law on Ratification of the Framework Convention on Tobacco Control
- Law on Protection from the Harmful Impact of Chemical Substances and Mixtures
- Law on Control over Narcotic Substances and Precursors
- Law on Blood, Blood Donation and Blood Transfusion
- Law on Medicinal Products in Human Medicine
- Law on Medical Establishments
- Medical Devices Act
- Law on Recognition of Professional Qualifications
- Law on the Professional Organization of Nurses, Midwives and Associated Medical Specialists
- Law on the Professional Organizations of Doctors and Dentists (Title amended, SG No. 76/2005, effective 01.01.2007)
- Law on transplantation of organs, tissues and cells
- Food Law.

9. Tele-medicine services and Operational Frameworks

Tele-medicine can be applied in all three healthcare levels (Primary, Secondary, Tertiary) as well as in welfare services.

Rules and specifications are expected to greatly facilitate the substantial involvement of the equipment, material, software and communications industry in the development of tele-medicine and thus contribute in solving numerous problems related to the provision of health and welfare services.

Consequently, significant changes are expected in the organizational and managerial schemes of health and welfare sectors, which will affect the training and continuous learning requirements.

9.1 Needs covered by Tele-medicine

Tele-medicine can be used in remote and isolated areas such as islands, villages etc. with low quality medical services. It is also very useful in shipping to diagnose and provide distance medical assistance in patients on board ships, cruise ships etc. who obviously lack specialized medical personnel. It is used in home care, in consulting units to physicians, to facilitate e-learning and cover rare medical specialties. It can also address emergencies in need of prompt handling, usually in mobile stations (ambulances).

9.1.1 Operational Frameworks

Technical Environment

- *Communications*

Tele-medicine requires connections between the points of communication, allowing for the following:

- verbal communication
- sent and receive medical data
- sent and receive medical signals and images
- access to information sources and databases
- access to e-mail services
- *Terminal equipment*

The terminal equipment requirements vary depending on the medical services they are intended to support. The minimum equipment could consist of a simple telephone

line and device allowing for the communication between peers e.g. doctors, to discuss a medical problem. The possibilities on offer however, albeit completely unsuitable and inadequate in certain cases, fail to fulfill all current demands.

Internationally, the trend is to construct mobile – or not – devices recording the patient's main physiological parameters, with said devices able to be directly connected to computers.

- *Medical equipment suitable to tele-medicine applications*

The diagnostic techniques broadly used today and producing black-and-white or techni-coloured images are the following:

- CT scan
- MRI
- SPECT
- US
- γ -camera
- angiography
- organoscopy by means of video
- PET scan, not yet available in Greece

Another category includes devices converting the signals (electrical, acoustic, mechanical) from the bodies' organs to electrical analogue or digital signals to be presented to the doctor in various final means such as paper, film, screen etc.

9.1.2 Quality of medical data

In tele-medicine applications and especially in organizing and providing tele-medicine services, it is imperative to guarantee the quality of medical data at least at the levels of the great medical units.

As everyone knows, remote health centers lack suitable personnel to verify the reliability of the medical machinery while also there is no central mechanism for periodic checks. In tele-medicine units, these services can be provided through the tele-medicine network, promptly upgrading the medical services on offer.

9.1.3. Rates of operation

Tele-medicine is called to cover emergency situations in priority, to contribute to the resolution of diagnostic problems and to offer better treatment possibilities. In all

these cases, due care must be given so that covering said needs does not impose difficult problems upon the support units.

9.1.4. Tele-medicine applications and uses

Tele-medicine applications can be distinguished in two main types depending on the information transmission time (**simultaneous or not**) and the interaction (health professional to health professional or health professional to patient). Real time communication can be as simple as a phone call or as complex as a robotic surgery.

Non-simultaneous (store-and-forward) communication refers to the collection and transmission of patient data and information (e.g. medical images, bio-signals etc.) to a specialized doctor at a later time so that he can assess them when it suits him. So the simultaneous presence of both sides is not required.

These two alternative approaches are applied in all tele-medicine applications. For example, e-dermatology, e-radiology, e-pathology can operate in both forms.

One of tele-medicine's latest fields of implementation is home care, where the patients can be at home and remotely monitored by his doctor.

The basic equipment for the operation of a standard tele-medicine application could consist (depending on the needs and peculiarities) of a camera, a suitable digitizer, a microphone, speakers, a screen suitable to show medical data etc. Tele-medicine seems to have significant advantages in providing the best possible diagnosis and high quality health services.

10. Fields where tele-medicine can be effectively applied

The main tele-medicine solutions currently on offer pertain to:

- e-radiology (<http://teleradiologyspecialists.com>),
- e-cardiology (<http://www.cardioradpartners.com>),
- e-neurology (<http://specialistsoncall.com>),
- e-psychiatry (<http://specialistsoncall.com>),
- e-ophthalmology (<http://www.hubbletelemedical.com>),
- e-dermatology (<https://www.dermatologistoncall.com>).

11. E-health challenges and opportunities in Europe

Public spending on health in EU's 27 member-states averages 5.9% of GDP in 1990, 7.2% in 2010 and are predicted to keep rising and reach 8.5% of GDP in 2060 due to population ageing and other socio-economic and cultural factors. In addition, forecasts for long-term care costs are almost double in average for the predicted period.

Deep structural reforms are necessary to ensure sustainability of healthcare systems and also ensure access to services for all citizens.

In this frame, Europe must reduce the overall regulatory load while also guaranteeing safety. E-health and wellbeing are fields with high potential for growth and possibilities for innovation, mainly by releasing the effective exchange of health data.

The challenges facing the EU are numerous:

- Need to combine investments in technologies with changes in organization for maximum benefit.
- Facilitating the movement of employees, citizens and patients within the EU.
- Increased demands for social and health services due to population ageing (in 2051 40% of EU population is expected to be over 65 years of age).
- Increased citizens' and patients' knowledge and demands for better quality of services and equal treatment.
- Reduction of working accidents and illnesses and improving quality of life.
- Need to timely and suitably deal with emergencies (epidemics, viruses etc.).
- Need to set off cost reduction and quality and effectiveness improvement.
- Management, storing and suitably processing the vast volume of data daily produced in health.

Acting in this direction, the EU has set qualitative criteria for the websites dealing with health and access to it. In the same frame, non-governmental organisation Health On the Net Foundation - HON promotes and provides guidelines for accurate data information.

11.1. Research outcomes and commercial applications

According to studies, in 2017 3.4billion people worldwide are expected to possess a mobile phone and half of them will be using mHealth applications. The same study estimates that 97,000 mHealth applications are already available. 70% of them are focused on consumer wellbeing and healthy lifestyle while 30% are focused on health professionals and easy access to patient data, distance monitoring and consulting, diagnosis through medical images, provision of pharmaceutical information [30], etc.

Find below some of the main efforts in e-health applications in the EU:

11.1.1. HELP4MOOD

Help4Mood aims to develop a system helping people suffering from severe depression to recuperate at home. The final application is designed to be used in combination with other forms of treatment such as self-help, consulting and pharmaceutical treatment.

11.1.2. INTERSTRESS

INTERSTRESS aims to develop innovative solutions, based on IT technologies, to deal with the issue of psychological pressure in professional and social life. The final solution includes a combination of new technologies such as virtual reality, non-invasive bio-sensors and mobile tools to provide personalized devices for the prevention and management of stress.

11.1.3. ALFRED

This research effort aims to support the autonomous and active living of the elderly. To that aim, they propose a solution focusing on four pillars:

- Assistant guided by user interaction: use of virtual battler offering constant support for works inside and outside the home. ALFRED virtual battler must be very well accepted by the final user and provide a fully controlled environment via voice instructions and non-technical environment.

11.1.4. EMPOWER

This project supports the self-management of patients suffering from diabetes. It helps the patients through observing daily life standards and managing personalized action plans.

11.1.5. DIGITAL HEALTH FOLDER

Distance monitoring of the patients' vital signs and the use of the Digital Health Folder are the main tools towards achieving said goal. Finally, e-health applications could greatly benefit administrative services through proper and prompt information enabling them to make suitable planning, re-organise their departments and properly allocate their resources for the best possible operation of the hospitals and the best possible healthcare to citizens.

12. Review of Strong and Weak Points, Opportunities and Risks

Effectively incorporating e-Health applications and support services could improve citizens' quality of life allowing for safe, independent living and increasing social participation while also reducing social isolation. E-health gives access to health information which can promote a healthier lifestyle by contributing to the handling of primary healthcare challenges by current European systems (such as effectively preventing disease) thereby reducing the cost of clinical healthcare. Apart from the obvious benefits though, there are various challenges to be addressed, be it in the form of weak points or risks. One said challenge is the change in the role of healthcare professionals. Clinical physicians and professionals of the field in general will have to adjust to the new technological customs. A necessary precondition for their proper adjustment is their suitable technological training aiming to the development inter-scientific skills.

12.1. The significance of cross-border connection between e-health systems

The cross-border connection of many e-Health services will boost the certification of healthcare procedures and systems, issues which must be handled at the European level. Furthermore, ensuring equal treatment of the users and privacy are two great challenges, with medical confidentiality considered imperative. Also, inadequate information and communication with the public, the unwillingness demonstrated by some health professionals to use new technologies, limited access to said technologies due to social divergences and limited systems and networks availability are factors aggravating the sector's overall development.

The strong points include reducing the costs and enabling the provision of equal quality medical care regardless of geographical distance.

Saving financial resources dominates the area of opportunities whereas demographic changes and population challenges may bear risks to the field's smooth operation.

Social changes and financial growth combined with free circulation of merchandise, services and work resulting from globalization give rise to significant opportunities to further use and develop e-Health systems.

The support of the European Union in promoting the development of e-health also plays a great part.

12.2. Possibility of extending the system – Proposals

While Greece has the knowhow, we lack in infrastructure. So we must revise and restructure the country's organizational and management structures and modernize infrastructure so that e-Health systems are incorporated into international communication standards thereby enabling the connection between the national, district and European healthcare systems.

Proper public information, a user-friendly system and improving the population's education and the professionals' technological training could eliminate all doubt and thus contribute to developing e-Health systems and remedy public health.

Combined with the factors of the SWOT analysis, these results demonstrate that, should the country decided to strategically focus on organizing and applying e-Health systems, proper actions can be designed and implemented in this framework.

Tele-medicine seems able to effectively assist in dealing with the new challenges originating from population ageing and the lack of specialized physicians. Tele-medicine classification seems to be necessary so that the interested parties can yield maximum benefit. Such an effort would clear the picture while also allow for comparisons, effectiveness assessment etc. Applying such a classification is a process requiring great efforts and constant feedback.

12.3. EU Action plan for e-health 2012-2020

A targeted action plan for e-health by the EU focuses on the following:

1. Offers significant guidelines to the national, district and local institutions as to how healthcare systems can be sustainable while also ensuring universal access to services.
2. Considers that, given the implications of demographic changes and the reduction of healthcare personnel, the EU and its member-states must affect significant structural reforms so as to ensure healthcare systems' sustainability and public access to high quality health services in all EU districts without any exception.
3. Considers that e-health, supplementary to the traditional health services, creates

great opportunities to improve accessibility, flexibility and the standards of services and systems.

4. Considers that the Committee should facilitate the use of EU's Structural Funds in creating e-health infrastructure in the EU.
5. Notes the need to ensure proper support by the media in e-health.
6. Considers that, despite its defects, e-health has great potential and could benefit society as a whole.
7. Considers it necessary to offer the necessary tools to make the best use of real-time public information towards facilitating a better understanding of the risks-benefits relation.
8. Stresses the need for constant efforts towards political cohesion and district policies.
9. Notes that effective health services are a significant tool for district development and competitiveness.
10. Notes that, given the substantial differences between EU districts, e-health could be a significant advantage especially for the residents of the least developed areas.
11. Notes that district differences in terms of access to IT services and inadequate broadband cover in certain areas could prohibit the use of e-health.
12. Notes that organizing the healthcare systems is a task for the member-states' public authorities which are responsible for providing all citizens with access to high quality healthcare services.
13. Especially considering the current competitiveness crisis in the EU, it strongly disapproves of the proposed cuts in Facility "Connecting Europe".
14. Raises concerns over the grave lacks in healthcare services during period of crisis.

From the analysis carried out it is clear that progress is needed in the following main directions:

- Creation of an up-to-date National Strategy for e-health and development of an "Action Plan" for the implementation;
- Creation of an up-to-date Program for development of e-health and development of an "Action Plan" for its implementation;

Without the availability of effective strategic documents in the field of e-health development, we act "piecemeal", which leads to increased investment in health care without achieving the desired result.

- Long and sufficient training of health personnel for the use of ICT;
- Based on the format of the necessary initial data requested by the Ministry of Health and the National Health Insurance Fund, the available solutions at the health care providers should be further developed and integrated with each other;
- Connectivity at national level - it is necessary to build infrastructure - a centralized network connecting health facilities, and not just separate isolated local networks;
- Establishment of national standards and policies for security and confidentiality for exchange and storage of medical information.
- Development of working telemedicine applications;
- The construction of systems should comply with the rules for interoperability;
- Construction of effective health portals for the healthcare system, as well as medical data storage centers;
- Establishment of a unified licensing policy in the healthcare system - for the used software solutions and products.

13. Facilitating integration and ensuring better diffusion of e-health

13.1. Cross-border Cooperation

"Connecting Europe" cross-border cooperation aims to facilitate the installation of cross-border IT technologies services to the public interest, such as e-health, by eliminating the obstacles leading to the high original cost of investment and the risks related to said installation.

Cohesion policy

In the period 2007-2013, the European Regional Development Fund (ERDF) allocated around 15 billion € for IT technologies (or 4.4% of the overall cohesion policy budget) to ensure access to basic and broadband connections (2.3 billion €) and relevant IT applications for citizens and media (12.7 billion €) for the 27 member-states. The "Data on joint strategic plan 2014 to 2020" determine various main actions for the ERDF, contributing the wider use of e-health services, such as the installation of innovative IT applications helping to deal with social challenges and

opportunities. It also determines basic actions to reduce inequality in healthcare, aiming to improve access to healthcare services for marginalized groups.

13.2. Funding for the development of tele-medicine applications

Funding to develop e-health applications is a necessary precondition to improve healthcare systems. The state itself and the individual public sectors will have to participate in EU funding programmes towards developing healthcare provision in all levels.

a) The state should fund the creation of e e-health applications in Greece's remote areas where there are currently health centers with few or minimum personnel thereby offering innovative healthcare services to the citizens.

b) Finally, business development and investment requires private initiatives funding actions towards the development of e-health mainly in remote parts of Greece.

13.3. Information and training through provision of web-based services in real time

- provision of information to the population (health prophylaxis, rights and obligations of health insured persons, etc.);
- provision of administrative services;
- provision of information to health care providers about rights and obligations, ways and level of reimbursement, etc.;
- health education;
- maintaining the qualification and continuing training of health professionals;
- provision of public registers for medical establishments, for persons providing medical services, health insurance funds, pharmacies, etc .;

14. Conclusions

Although an e-health system introduces new data, new technologies and unknown working conditions for health professionals, it also changes the clinical procedures and increases the workload at the first stages of its implementation. All these could cause reactions by the personnel who are not usually very receptive to great changes. The increased cost of e-health systems' initial installation and of personnel training along with the necessary organizational changes increase difficulty levels.

Extending e-health services to all medical units (primary, secondary and tertiary healthcare) requires training many professionals of various specialties for a considerable time, which could mean that some may be away from their position for a while.

In this frame, owners, managers, healthcare professionals, patients, researchers and other employees will be interconnected in a decentralized and cooperative organization, where technology will have the leading role in the model's implementation and proper operation.

Cultivating a spirit of innovation in e-health in Europe is the best way to ensure better healthcare, high quality and safer treatment for EU citizens, greater transparency and freedom of choice, specialized personnel, more effective and sustainable healthcare systems, faster and better responding public administration, new business opportunities and a more competitive EU economy which could benefit from international commerce in e-health and thus tele-medicine.