

## STUDY ABOUT THE DEGREE OF APPLICATION IN GREECE

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# Abstract

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This paper deals with health, a subject of fundamental concern for the individual, which comprises one of the most important parts of life in general. Since the time of Asklepios, the ancient Greek God of Medicine, the emphasis lies in methods of confronting epidemics, as well as each threat, as far as the integrity of the human body is regarded. Nowadays, it is not difficult to realise that similar actions are continuously taken in this very same direction.

Because of the unprecedented development in Information and Communication Technology (ICTs) in the entire world and the rapid incessant spread of the Internet, new approaches are being integrated in the domain of public health. The growth of services, such as the electronic service of health (e-health) gave the opportunity to stakeholders to be informed on medical terms, in addition to the distribution of the acquisition of knowledge, which concerns the confrontation of urgent emerging incidents. To a large extent, a system for the prevention of illnesses via Data Bases (DB) is developed, where the health personnel and researchers can analyze medical records, creating thus not only a picture of common presumption and advice in the sector of health, but a rather complete statistical picture of the population in concrete subjects of health. Finally, with the possibility provided through the communication between patients, health personnel, pharmacies, laboratories etc, independently of their geographical location, the patient can be consulted or helped on subjects of individual concern.

In this study, the degree of application of e-health in Greece is investigated; new challenges, such as privacy policy and security will be emphasized. Furthermore, an attempt will be made to provide answers to certain questions, such as the degree of acceptance of the services provided by e-health, by carrying out an extended literature review and a survey including quantitative data analysis of responses to questionnaires from different stakeholders. Different questionnaires will be developed depending on the research population (patients, health personnel, pharmacies, laboratories etc.) in order to get a picture of the degree of application of e-health in Greece and to identify future challenges. Validation of the results will be undertaken by in-depth interviews with key stakeholders.

**Keywords:** e-health, electronic services, Greek, privacy policy, challenges

# Introduction

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The aim of this work is the study of certain Health Internet Based Services related with in Greece and more concretely, the degree of use of these types of services by private and public institutions of health as well as by the public. It is a fact that the Greek households are relatively seldom connected to the Internet, even if an intense increase of demand is observed in the computer market, as well as in the internet connections. One reason in which are owed the low rhythms of internet penetration in Greece is the high cost. Especially in comparison with the prices in the rest of European Union which are very low. Information and Communication Technology (ICT) expenditure is higher than the EU average. From an Information Technologies (IT) point of view this indicator seems to be misleading since most of the expenses are actually destined for telecommunications. In fact, Greeks have a marked affinity for mobile telecommunications with eight out of ten people having a mobile phone, although not using its WAP services.

For better understanding, we will start with some general information on the country in which this particular study is carried out. Greece is situated in the southern border of Europe with Athens as its capital and her regime is the Chaired Democracy. From 28<sup>th</sup> of June 1979 it constitutes a member of the European Union. The extent is calculated in the 131.957.000 km<sup>2</sup> with a population reaching 11.000.000 according to the National Statistical Service of Greece, in 2001. The percentage of citizens that lives in cities amounts to 65.7%, while the corresponding percentage of population that lives in the countryside in 34.3%, where the comforts of modern society is lacking daily needs, even with their health. This category of the population constitutes a main motive for this research.

The national System of Health in Greece is managed by the Ministry of Health and Welfare and the two sub secretaries, appointed by the government. The sub secretaries are framed by the general secretary, the general secretary of public health and the general secretary of social solidarity. In the immediately next rang of administration is the general management of health is found, divided into four different sub ministries:

- The first degree care of health, that deals with the organization and the operation of units of health in both public and private sector.
- Growth of medical units, that deals with the organization and operation of hospitals, both in the public and the private sector.
- The sector of blood donation and first aid's, the address of mental health, that deals with the hospital care and the pre-hospital protection.
- Personnel of legal persons, that deals with medical specialized staff and nursing personnel

Moreover, it should be reported that the responsible carrier for patients is the Hellenic National Centre for Emergency Care (EKAB), which was founded in 1985, transporting of people in need, to the Departments of Urgent Incidents at the local Hospitals in each city. Until its foundation, this type of services was provided by the department of the Hellenic Red Cross, that its departments functioned as stations of first aid's.

# Current status of eServices in Greece

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## 1. Internet development through the last years

From the creation of Internet, in the middle of the 70's up to today, an unprecedented need for interconnection has been recognized. Beginning from the Department of Defense of the United States of America, Internet saw a fast development in universities and as they realized the benefits, they wanted to be a part of this new communication system. In decade of 80's, it became the time of Europe to become a member in this huge network. In only few years, Internet has seen an incredible, for the era, growth. In 1987 it was calculated that the percentage of internet had reached of growth 15% per month. In 2000 fifty millions computers in 209 countries were connected to each other via the internet. A fact, that meant the foundation of a new world wide society; The internet society. Until today, more people are connecting daily to the internet. Characteristic is the percentage, for the use of internet, according to statistical studies that became in September 2007, where we have an increase at 244.7% in interval 2000 -2007 in the entire the world. Concretely in Europe the corresponding percentage is 221.5%. A percentage that shows the acceptance of internet from the European citizens.

Focusing in Greece, the growth of internet has been increased in interval 2000 - 2007 at 280%. Roughly 3,800,000 users of internet seek services, have fun, are informed, communicate, etc. Daily the rate of use of internet increases. However, does this percentage show the satisfaction of public from the already existing services?

## 2. eServices

This growth of the Information and Communication Technology (ICT) and the growth of Information Technology (IT), which both took place approximately at the same time, brought as a result a need of creation of services via internet that as objective to facilitate citizens in various sectors. The internet services that are offered to the citizens of each country are plenty and differ depending on the degree of Information Society penetration in each country. With the continuous increase of the internet access rate also electronic services (eServices) developed. A suitable definition for the electronic services is given below.

*'eServices are online services of public interest, i.e. services that are offered online in a domain that is of central public interest' (e-user, 2007).*

### A few examples

eServices, includes various types of electronic services. Many of them deal with the everyday routine of the individual. Below some examples are described of such services.

The two most popular services are perhaps the eMail and the eSearch. eMail is a system for sending and receiving of electronic messages in a computer network. eSearch is a user friendly tool for searching of information in the Internet fast.

In addition governments in different countries have taken steps for the establishment of electronic services in order to facilitate the needs of local authorities, companies and organizations. Such services are e.g. Electronic Services of Government (eGovernment). A general term that is used for governmental operations and processes that are offered to the public via the Internet.

Electronic transaction services that deal with exchange of money via internet are become popular. However many users of internet consider them uncertain, because of the fear that exists for loss of personal data given, as well as personal confidential elements, such as the number of credit cards.

An example of such services is the electronic service of bank accounting (eBanking) that includes services of banks deals with the personal accounts of customers of a bank, in which can be accepted from everywhere by anyone who possesses certain personal information.

A second and perhaps even more popular service is the eCommerce. This service gives the possibility of purchase and sale of products via internet. As a condition for the use of such services, is the possession of credit card. For many customers this creates a feeling of insecurity.

In the next chapter, we will introduce the electronic services of health (eHealth), an important sector of information technology, which is developing continuously. The possibilities and the services provided by eHealth is analyzed and examined from a new point of eHealth in Greece.

# eHealth

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## 1. Introduction to eHealth

In our days, eHealth services are an emergent issue. However, there is no explicit definition that will completely describe this topic and the services included. The word eHealth is relatively new in the IT sector. After 1999, when the word eHealth was introduced not only the services provided through the Internet was meant with this word but each issue that had a relation with the IT and the medical sector. This term was initially used by the managerial executives of industry and marketing people. It was created according to other electronic words, 'e-words', such as eCommerce, eBusiness, eMail, etc, to emphasize electronic trade, (publicity, possibilities, etc), to provide a description of new possibilities of internet in the sector of health care. As an example, the term eHealth was reported as "a concerted effort undertaken by leaders in health care and hi-tech industries to fully harness the benefits available through convergence of the Internet and health care."

Because of the rapid growth of the internet and the new possibilities that were offered, a new term was required. And the term eHealth was proposed.

A member of the Journal of Medical Internet Research (JMIR) Editorial Board once stated "*stamping a definition on something like e-health is somewhat like stamping a definition on 'the Internet': It is defined how it is used - the definition cannot be pinned down, as it is a dynamic environment, constantly moving*" (JMIR, 2007).

It is obvious that the Electronic Services of Health are not reported in one only concrete context, but in a group of services that is offered in Medicine related issues. Having in mind all the above, how is the term eHealth defined?

## 2. Definition of eHealth

We looked for a definition that will satisfy the needs of the current research. We discovered fifty one definitions for eHealth, which cover a total of dissimilar issues including health, technology and commerce. Below a general definition is presented, which covers satisfactory not only the technological and business aspect, but also the necessary change of mindsets to achieve the goals of the Information Society.

*"eHealth is an emerging field in the intersection of medical informatics, public health and business, referring to health services and information delivered or enhanced through the Internet and related technologies. In a broader sense, the term characterizes not only a technical development, but also a state-of-mind, a way of thinking, an attitude, and a commitment for networked, global thinking, to improve health care locally, regionally, and worldwide by using information and communication technology"* (J Med Internet Res 2001;3(2):e20, 2007).

### Benefits of eHealth

An objective of eHealth is the improvement of public health independent of economic and geographical conditions. More analytically it can be said that the services of eHealth, aim at the following:

- *Increase of efficiency.* An important objective of e-health is to increase the efficiency of the health care with simultaneous cost reductions.
- *Improvement of the quality of health care.* The increasing efficiency includes not only cost reduction, but simultaneously improvement of quality of services. eHealth can improve the quality of health care for example by allowing comparisons between the level of services of different suppliers by also taking into consideration the opinions of the customers (patients) regarding their level of satisfaction.
- *Evidence based.* eHealth Interventions should be element-based in a sense, that their effectiveness and efficiency should not be assumed, but proven by rigorous scientific evaluation. However, much work still has to be done in this area.
- *Encouragement* of a new relation between the patient and the provider of medical services, to a genuine collaboration, where the decisions are taken commonly.
- *Education* of specialized medical personnel via eLearning applications regarding health and adapted preventive information for consumers.
- *Facilitation* of exchange of information and communication in a standardized way between the health care establishments.
- *Extension* of the field of health care beyond its conventional limits to distant geographic areas new conceptual field. eHealth gives to the consumers the possibility of on-line access in health services via global providers. Such services range from the simple advices to complex interventions pharmaceutical advice.
- *Ethics.* eHealth includes new forms of interaction of patient-medical personnel and patients placing new challenges and threats regarding moral questions such as on-line professional practice and subjects of privacy and protection.
- To *render* the sanitary care fairer is one of the promises of eHealth, but simultaneously a particular threat exists that eHealth may deepen the gap between people that can use computers and their abilities and people that can not. For example, people that do not have the money, or the dexterities, are not able to access computers and internet, which creates the digital divide. The digital divide refers to the gap between people that benefit from the ICT and those that can not use them effectively because of their age, skills etc (Elisa Mancinelly, 2007).

### 3. Services provided

The question seems to be in which way eHealth services, do strengthen the health care? eHealth services do not describe a technical growth but offers a certain amount of services that can strengthen the various levels of health care within many sectors of health. Below, certain services that eHealth offers are described.

According to the Greek Observatory of the Information Society (Observatory, 2007) the objectives of the European Union Operational Planning, Action and Initiatives focused on the following sectors:

- Electronic healthcare records
- Electronic supplies

- Electronic health cards
- Information Systems of hospitals
- Electronic Social Security
- Telemedicine
- Electronic appointments
- Electronics closure appointment
- Protection of personal data
- Electronic pharmacy

Each sector includes multiple services developed, which constitutes a complete system that will support completely the category in which it belongs. Facing the types of applications of ICT that is used in the sector of Health and Providence, the basic Computer Systems that are used in the sector of IT, as well as the basic services that offer and constitute the sector of Telemedicine in Greece are presented and described below. We believe that in this point should be a more explicit separation between the definitions of Telemedicine and Health Informatics which the majority of the people confuse.

Telemedicine is a rapidly developing application of clinical medicine where medical information is transferred via telephone, the Internet or other networks for the purpose of consulting, and sometimes remote medical procedures or examinations<sup>1</sup>.

Health informatics or medical informatics is the intersection of information science, computer science and health care. It deals with the resources, devices and methods required to optimize the acquisition, storage, retrieval and use of information in health and biomedicine. Health informatics tools include not only computers but also clinical guidelines, formal medical terminologies, and information and communication systems<sup>1</sup>.

## 4. eHealth services in Greece

According to a study by the European Commission, Information Society and Media Directorate (Empirica, 2007), comprising 315 General Practitioners (GPs) in Greece out of totally 6789 GPs in the European Union

*“Greece is considered rather a laggard in terms of eHealth as it scores below the EU27 average with regard to most indicators included in the survey. This concerns both the availability of ICT infrastructure (computer, Internet) and the use of ICT for different eHealth-related purposes”.*

In terms of infrastructure it was found that 79% of the Greek GP practices use a computer and 66% of practices have an Internet connection. Broadband connections are used in 44% of GP practices.

In total 20% of the GPs use computers in consultation with the patients. Decision Support Systems are used by 12% of Greek GPs. Patient data transfer and the use of electronic networks for the transmission of medical patient data is not established. Only 4% of the GP practices participating in the survey reported having

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<sup>1</sup> Definition taken from en.wikipedia.org

exchanged medical data or administrative data with other care providers via some sort of network, 3% having received analytic lab results this way. 2% of GPs having participated in the survey reported using ePrescribing.

The rather low usage rates of eHealth applications in Greece is likely to be due to the only recently establishment of a National Health Information System (2006) which also includes the introduction of Electronic Health Records. Pilot implementations and demonstrations are planned for the 2007 - 2012 period.

Below eHealth services that are currently developing and some of them already used in Greece are described in more detail.

### **Electronic Healthcare Records**

Electronic Healthcare Records refers to the storage of information and various examinations of patients in an information system. Access is provided only to specialized medical personnel. Information, such as the medical background of patients, can be retrieved from e.g. health centers in distant areas with limited medical staff and limited support. The information can be used for complete diagnosis and correct distance treatment of the incident, which means that the urgent incidents can be treated by specialized paramedical personnel (with the use of telemedicine) in the distant area where the incident happened. This is a pilot program which functions since 2006 in islands of southern Aegean, through the European program TWIISTER (“Terrestrial Wireless Infrastructure Integrated with Satellite Communications for e-rural (2004-07)”). The program is partially financed by the European committee and aims at the growth and acceptance of broadband services in important regions of applications such as health, rural growth, public administration and electronic trade. The co-ordination of the program is carried out by the ICS-FORTH aiming at the improvement of benefit of electronic medical services in the isolated regions of Greece ( ).

### **Health Information Systems**

Health Information Systems, in the substance, allows the automation of internal processes of a medical unit in combination with the Electronic Healthcare Records. Extension or special subunit of Health Information Systems constitutes the informative systems of laboratories (Laboratory Information Systems). Also in combination with the Electronic Healthcare Records they give the possibility of automated transmission of laboratorial results in the stations of work of medical and nursing personnel, in step with the briefing of file of patient. As a result, it changes the quality and the speed of service of patients.

### **Enterprise Resource Planning – ERP**

The control and management systems of resources are supported by software that supports each health center specific processes. ERP systems unify all of the operations of a medical unit, from the management of materials, deposit (disposable medical materials, office materials, etc), to the financing management and the Human Resources Management (HRM). It contributes to the improvement of productivity and efficiency, due to the facts that the lacks are indentified and action is taken immediately via the parallel controls of financing sizes and the staffing of each department.

### **Electronic Health Cards**

The Electronic Health Cards comes to replace the personal Sickness Booklet of the patient. It constitutes the health identity of each citizen and includes medical services provided to the patient. The use of the electronic health card gives the possibility to the medical staff to easy, quickly and safely identify previous medical treatments (e.g. results of examinations).

## Health Portals

Health Portals provide access in briefings and scientific information. In a network place the visitor can find information such as:

- Medical and nutrition news and advices
- Description of illnesses
- References to the web pages of organizations, pharmaceutical companies, hospitals, private institutions for various services, health administration, etc
- Lists of doctors
- Correspondence possibilities for advice by specialized doctors.
- Trade of medical types

Specifically with regard to the last category these also exists specialized electronic gates for the electronic trade between final consumer (B2C - Business to Consumer) or between suppliers of companies and services institutions (B2B - Business to Business).

As we see from the provided services above, the electronic health gates do not only concern specialized medical personnel, but also the citizen who can be informed regarding any medical subject concerning him/her.

## e-Procurement

The applications of electronic supplies allow the transactions between hospitals, pharmaceutical suppliers and suppliers of medical equipment via electronic means. The adoption of such transactions contributes to the reduction of functional cost, improvement of supplies management and in more rapid transactions, via the automation of the entire chain of supply and process planning from the order application until the supply of units and the control of inventories.

## 5. Telemedicine Services

### Telediagnosis, eAdvisory

Telediagnosis concerns diagnosis from distance, independent of geographic restrictions, such as difficult approachable locations. In the telediagnosis medical data can be transmitted (e.g. encephalogram, radiographs, etc), as well as the other medical data of the patient (e.g. pressure, temperature, vibration, etc) from a remote point (e.g. a small medical centre in a distant area) to a central station of reception and management of data. The scientific personnel of the central station provide diagnosis to the remote point. In Greece, there are many inaccessible regions that could gain advantages from telediagnosis regarding limited expert medical staff availability and related high costs. The big advantage for this particular example is the benefit of medical help on time, even at small health centers. The units that use these new services of telemedicine cover more completely the population in geographic regions (Observatory, 2007).

eAdvisory, in particular, strengthens the health professionals due to the fact that they can collaborate with specialized scientists. In Greece, there are some regions that have only one doctor for an entire village. Often

these doctors are relatively new doctors with little experience. With the potential of tediagnosis and eAdvisory, the doctor could receive advice through the communication with specialized scientists for providing the adequate treatment.

### **Home care telemetry / Telesurveillance**

It is generally considered that the continuous evaluation of the medical status of a patient in the environment in which he lives is preferable to the environment of a hospital, particularly for cases of chronic illnesses. With the help of practices of telemedicine and new telemedicine devices the personal environment of the patient can constitute a specialized centre of care. The use of new small and functional applications, contribute to the communication between patients and medical personnel in real time and in the direct exchange of medical data. In this way convenient diagnosis are achieved and the follow-up of the health of patients from distance. The new medical appliances collect precious diagnostic data that assist the health institutions in the follow-up of physical condition of the patient or in the control of treatment progress. The data that emanate from the applications of home care are promoted in time to the central system of the health via internet or telephone (Observatory, 2007).

### **eManagement**

The combination of advanced services of telesurveillance and tediagnosis encourages telematics of management, the diagnostic and therapeutic processes. The technological developments supported by computers of surgery interventions, automatic surgery interventions tools and sensors constitute the guarantee for the growth of advanced services of telemedicine in surgery, the introspection, etc. (Observatory, 2007).

### **Teleducation/Teleconference**

The development of ICT in the past few years rendered the possibility of teleconference between two or more persons to a relatively low cost. Medicine was one of the first sectors that developed this possibility for the benefit of specialized health services (Karousis, 2000). It is common today, in cases where experienced opinion is required, that one or more doctors use teleconference service in order to provide their opinion. Teleducation concerns the observation of the educational process by electronic means, such as cameras, microphones, tv sets or monitors etc. It is often found in “asynchronous form”, where the instructor fulfils certain medical processes, educating a team of doctors/students in concrete medical processes/techniques without necessarily being in the same room. In the asynchronous form, students do not have the possibility of interrupting the instructor. Questions made from the audience are made after the completion of the process. In the synchronous form, the possibility of communicating between the instructor and the audience and the support of conversation in real time is provided. The development of technologies such us virtual reality, have changed the “passive” education into “energetic”. In the sector of medicine more specifically, teleducation contributes to permanent education and training of the medical and auxiliary personnel of health centers. In the ideal case, the guidance of an examination via teleconferences is possible. Afterwards the experienced doctor can see the patient during the examination process and simultaneously guide the servant doctor. In other cases the constitution of medical councils via teleconferences is possible. Finally, it also contributes to the education of patients so that they undertake a more active role in the re-establishment of their health (Karousis A, 2000, Observatory, 2007).

### **Telesurgery**

Telesurgery, also known as remote surgery, is the ability for a doctor to perform surgery on a patient even though they are not physically in the same location (Karousis 2000, Wikipedia, 2007). In the sector of telemedicine telesurgery developed during 90s. The basis in the growth of telesurgery is the need of transmission

and diffusion of specialized surgical techniques and knowledge. The Telesurgery facilitates the even and more effective education and distribution of Laparoscopic<sup>2</sup> surgical processes. An important number of constructors of laparoscopic applications is provided with possibilities of moving picture, video and sound transmission, allowing thus the connection of surgeries with educational or experienced institutions. Today telesurgery can be seen as a full duplex transmission of picture and sound allowing the communication between surgeons of small experience in surgeries and surgeons with big experience in remote locations. The use of robotics applications allows the remote surgeons to participate actively in the surgery interventions via virtual reality systems.

## 6. eHealth Application in Crete

### HYGEIAnet

During the second half of the 90s a telematics network, called HYGEIAnet, has been established in Crete. The purpose of this network is to create a communication infrastructure aimed to constitute the basis of the establishment of the citizens Electronic Health Record (EHR) and the creation of information systems in order to cover the different needs in the health care sector. Those information systems are the Primary Health Care Information System, the Pre-Hospital Information System, Home Care, eHealth platforms for secondary opinion provision and eHealth support to the mobile patient. As it can be realized HYGEIAnet deals with many sectors of eHealth services covering a long geographical distance and connecting the main hospitals of Crete with areas of difficult access. (Traganitis et al, 2001)

### PDA's and eHealth

Nowadays, advances in the Personal Digital Assistants (PDAs) have been made and as a result a single PDA can offer to the public services such as multimedia applications, internet connection, navigation through the Global Navigation Satellite System (GPS), eMail and many other services. In the health care sector companies realized the use of those portable computers. They started to provide medical practitioners such portable devices with wireless access to a wealth of medical information that could support them in their practice. Those PDAs can provide immediate access to a patients Integrated Electronic Health Record (EHR) in order to provide all the necessary information related with him/her. eHealth services through such devices benefit the doctors that will have immediate access to a patients medical information. (Chiarugi et al, 2001).

An important advantage of the use of PDAs is the possibility of online communication in the form of a chat room between specialised doctors, where the evaluation of the situation of a certain patient can be given by a specialist. As it was mentioned previously in the mountainous and in the distant regions of Greece, the medical personnel that exists are usually general doctors with no specialised knowledge. With the help of PDAs and the Electronic Healthcare Records of patients and the possibility that is given through this technology a fast and reliable diagnosis can be given. According to ICS-FORTH the program is in pilot use since 2006 in islands of southern Aegean and Crete and will be soon in full implementation.

### PreHospital emergency care

As it was mentioned in the introduction the responsible carrier for patients of Greece, is the Hellenic National Centre for Emergency Care (EKAB). Since 1998 a Pre-Hospital Information System has been established in the EKAB Coordination Center of Crete (HECC). This Information System is providing information to

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<sup>2</sup> Laparoscopic is the technologically evolved surgery that allows the action of complicated surgical interventions without sections with the help of specifically designed tools and video (www.skrekas.net, 2008)

the HECC about ambulance tracking, using a geographic information system, resource management and medical devices. Medical devices communicating with the HECC have been developed in order to enable the transfer of patient information from the ambulance establishing a telediagnosis system in order to provide effective treatment in real time. The medical devices can provide HECC with all the necessary information before even the ambulance reaches the hospital. That kind of telediagnosis systems can reduce the percentage of losses because of the late transportation of the patient to the hospital (Vourvahakis et al, 2004).

The Greek government showed big interest in implementing such systems and also educating personnel in telediagnosis in the whole country in order to facilitate the use of telediagnosis by the ambulances in the distant regions of Greece.

### **Conclusive Remarks**

In the previous chapters we analyzed and described the eHealth services, the benefits of using this kind of services. Furthermore, we gave certain examples of such services that have been developed in research programs of Universities and have been placed under pilot application in certain hospitals and health centers, in order to be tested and to be in full establishment in the National Health System in Greece.

# Statistical analysis

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## I. Research Methodology

A field study was undertaken in order to discover and present the degree of application of eHealth in Greece. The research question concerns the public opinion and the awareness regarding eHealth services. More specifically we tried to investigate if the Greek citizens are ready to accept such services in their daily life, as well as their acceptance level of eHealth services, having in mind issues regarding the quality of service, trust and privacy safety. For this purpose we carried out a survey by using questionnaires that were created and distributed to the public in order to draw conclusions and receive answers to the above issues. The questionnaire was distributed to three different cities of Greece, both to citizens and health related professions, such as doctors, nurses, pharmacists etc. The sample can not be considered statistically valid. However, it gives a definite indication of the situation concerning eHealth in Greece.

## 2. Demographic analysis

The questionnaire was distributed to 165 different people during January 2008 in Thessaloniki, Kavala and Heraklion. The response rate was 100%, more specifically 39.4% from Thessaloniki, 10.9% from Kavala and 49.7% from Iraklion. The demographic picture of the sample was as follows: In total 28.4% of the responders belong to the category of medical related professions and 71.6% are citizens. Of the whole population 51.5% are male and 48.5% female. The Age related intervals are described in Table 1 below:

Table 1: Age related intervals

<b>Age</b>	<b><i>Frequencies</i></b>	<b>Percentage</b>
18 – 29	81	49,1
30 – 39	36	21,8
40 - 49	22	13.3
50 - >	26	15.8

In total 69.1% of the respondents have an internet connection at home, 74.8% communicate via the internet by e-mails and 60% by communication tools, such as chat, MSN, Skype etc. In total, 79.4% of the respondents use internet for informative purposes and 74.7% for entertainment. These values are slightly higher for the younger ages. In total 4.3% of the medical professionals and 9.3% of the citizens do not use computers at all. The percentages seem to confirm that the level of e-readiness is reasonable high in Greece.

### 3. eHealth and public

On the question “Do you know what eHealth Services are?” 48.7% of the respondents replied “yes”. In total 23.7% of the responders know about the eHealth services from work related sources, 45.1% due to general knowledge and 18% learnt about them from the internet coincidentally. However, from the 48.7% of those that answered positive in the knowledge of eHealth services 52.7% are using such services. Analytically, a percentage of 22.2% are using eHealth services to gain information about medical issues of personal concern and 44.4% of them are interested in medical information. In total 30.6% are using eHealth web pages in an informative way and the rest 2.8% have visited such web pages accidentally. The high percentage of people using eHealth services seems logical in the point of view that many people, especially younger ages, are feeling uncomfortable discussing face to face about issues of personal concern even with their personal doctor. Thus, they prefer to find out for a solution to their problem through the Internet. In Table 2 below, the respondents’ (not related to medical professions) opinions, regarding certain eHealth services, are presented. These respondents have reported that they know what e-Health is.

Table 2: Public opinion regarding eHealth services in percentages (%)

<b>eHealth service</b>	<b><i>Known services</i></b>	<b><i>Useful services</i></b>	<b><i>Require additional information</i></b>	<b><i>Trust of services</i></b>	<b><i>Offered in Greece</i></b>
Telemedicine	33.9	50	35.6	28	19.5
Electronic Healthcare Record	15.3	43.2	22.9	26.3	15.3
Electronic knowledge Data Base	35.6	47.5	32.2	29.7	27.1
Electronic Health Cards	27.1	45.8	30.5	22.9	22.9
ePharmacy	15.3	46.6	34.7	20.3	11
Home Care Information Systems	15.3	49.2	34.7	22.9	11.9

As we can see from table 2 it is remarkable that the percentages regarding the level of knowledge of existing electronic health services, are most explicit lower than these in the 2nd and 3rd column. This, as interpretation, we think that the majority of people may not know the existence of these services, however considers them being useful. They also would require more information regarding these electronic services. On the contrary the use of eHealth services in Greece is believed to be on a low level despite the fact that the acceptance and the confidence of eHealth is relatively high by the Greek citizens.

The percentages, which regarding electronic health services are all above 20%. This seems to indicate that despite the fact that a relatively low knowledge about eHealth services was reported by the respondents they would have trust in such services. Simultaneously, it is interpreted to indicate that eHealth services can be relatively quickly adopted by the Greek public. In a more specific question concerning trust issues in services, that private doctors offer through the Internet, the corresponding percentage is 6.8% indicating some fear in providing personal data through the Internet. In ePharmacy there seems to be limited trust. In this service we encounter a majority of 74.6% that disagree with the purchase of medicines from the Internet. The main reason of such a denial of ePharmacy is the lack of reliability due to the quality of the products and the guarantee of the storage approval.

The development of eHealth services can constitute important steps in the development of the Health science, simultaneously with the IT development. Below, we mention to you two sectors in which we believe that the eHealth services will play an important role, if they are applied permanently.

The first sector, that eHealth services are likely to find application in, is the countryside and more concretely the regions with a lack of medical equipment. Those regions encounter the biggest need in electronic health services. The rural regions show a considerable lack of required access to doctors and hospitals at critical moments. Our questionnaire, showed that the public believes that the under discussion / examination services would be useful to be applied. 79.2% that answered in our questionnaire considers those services absolutely useful in the countryside and it declares the need of direct action to the direction of application of this services.

A second sector, in which it appears that the electronic health services can be very helpful, is in the field of the chronic diseases. Thousands persons are internationally suffering from illnesses such as asthma, diabetes, HIV, various forms of cancer, cardiac diseases etc. For these people it is important to be provided with information and advices regarding their inquiries and. In this chapter the main focus is on the opinion of the public regarding eHealth issues. On the question “Do you believe that eHealth services would help in the confrontation of chronic illnesses” a 75.9% of the responders, including people that suffer from such type of diseases, gave us an affirmative reply. Contradictory perhaps, that hardly the 37.8% know that such types of researches are carried out on this, via internet.

## 4. The doctor’s opinion for eHealth services

The opinion of people closely related to the sector of health plays a significant role for the conclusions of our research. We found it reasonable to include their opinion in a separate section, in order to discover the level of awareness of such services as well as the receptivity of offering such services. In Table 3 we provide the opinions the medical staff.

Table 3: Opinion from health professionals for eHealth percentages (%)

eHealth service	<i>Known services</i>	<i>Useful services</i>	<i>Require additional information</i>	<i>Offered in Greece</i>
Telemedicine	66	63.8	68.3	44.7
Electronic Healthcare Record	59.6	54.5	65.9	48.9
Electronic knowledge Data Base	59.6	74.5	70.7	51.1
Electronic Health Cards	59.6	66	65.9	51.1
ePharmacy	48.9	66	65.9	42.6
Home Care Information Systems	57.4	68.1	63.4	44.7

Observing the table above, we conclude that there is no doubt about the acceptance of this kind of services by medical professionals and their willingness to offer them. A percentage of 45.7% have already used eHealth services for personal issues. Related to their wish to learn more about eHealth services, a high will-

ingness is shown to be trained in the application of eHealth services, as the percentages in the specific column are above 60%.

Considering a major question the application of eHealth services in distant regions, we re-examine the subject under the focus of experts on health issues. Taking into consideration their responses, 85% of the medical professionals, consider that eHealth services are in particular useful in regions with difficult access and that they would offer such services in applicable.

Finally, regarding the sector of chronic illnesses, 72.3% of professionals consider that the eHealth services will help in the better briefing and confrontation of chronic diseases. 10.2% of the professionals have taken part in on-time research regarding chronic illnesses.

## 5. Conclusion

According to the European Commission, Greece is considered to be below the average of the rest of the European countries regarding the use of eHealth services. The best performance is in the patient data storage, which is slightly below the EU27 average. The rather low usage rates of eHealth applications in Greece is likely to be due to the only recently establishment of a National Health Information System (2006) which also includes the introduction of Electronic Health Records.

Our study found that there is a high readiness for eHealth services in Greece, both among the health professionals and the public. Some professionals already use a number of eHealth services and those who do not are prepared to be trained in eHealth issues in order to offer such services to the public.

Important issues for promoting eHealth services in Greece are the improvements of the computer/internet infrastructure, the medical personnel training regarding eHealth services and promotion of the services provided by eHealth to the public in order to raise the trustworthiness of eHealth services.

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