

2015



# e-health solutions in European countries project report, part 1

## Table of content

<b>INTRODUCTORY RESEARCH</b> .....	3
<b>Aim</b> .....	3
<b>Methodology</b> .....	3
<b>Results</b> .....	3
<i>Meaning of e-health</i> .....	3
<i>Barriers</i> .....	4
<i>Opportunities for further development</i> .....	4
<i>Contemporary use of e-health</i> .....	5
<i>Innovations in e-health</i> .....	6
<b>DESK STUDY RESEARCH</b> .....	7
<b>Aim</b> .....	7
<b>Denmark</b> .....	8
<b>Poland</b> .....	8
<b>Legal regulations of e-health</b> .....	9
<b>Introduction</b> .....	9
Legislative fundamentals of e-health .....	10
Personal data protection.....	11
Patients' records .....	13
E-administration .....	17
<b>National plans for future e-health development</b> .....	20
<b>Introduction</b> .....	20
<b>Denmark</b> .....	21
<b>Poland</b> .....	21
<b>Spain</b> .....	22
<b>UK</b> .....	23
<b>Barriers in development of e-health solutions</b> .....	25
<b>Introduction</b> .....	25
<b>EU</b> .....	25
<b>Denmark</b> .....	26
<b>Poland</b> .....	26

Spain .....	28
UK .....	29
<b>Opportunities in development of e-health solutions .....</b>	<b>29</b>
<b>Introduction.....</b>	<b>29</b>
<b>UE .....</b>	<b>30</b>
<b>Denmark.....</b>	<b>30</b>
<b>Poland.....</b>	<b>31</b>
<b>Spain .....</b>	<b>32</b>
<b>UK .....</b>	<b>32</b>
<b>Bibliography.....</b>	<b>34</b>
<b>Appendix.....</b>	<b>42</b>
<b>E-health success stories – case studies.....</b>	<b>42</b>
Denmark.....	42
Poland.....	42
Spain .....	44
UK .....	47
<b>E-health failure stories – case studies: .....</b>	<b>48</b>
Poland.....	48
Spain .....	50
UK .....	51

## INTRODUCTORY RESEARCH

### Aim

Introductory research was executed in Poland in the first weeks of running EPP project. It was meant to be a benchmark for future studies and aimed to map the scope of understanding of e-health in demand and supply side perspective. During the interviews researchers' goal was to identify the most important issues concerning e-health perceived by buyers and suppliers, including the meaning of e-health, barriers and chances for development. This would serve as a benchmark in preparing desk research and qualitative research.

### Methodology

This introductory research was based on semi-structured interviews on non-probabilistic convenient sample:

- Interview 1, buyer (B1) – middle management staff in public hospital
- Interview 2, supplier (S1) – representative of commercial company offering e-health solutions
- Interview 3 (B2) – management of public county Hospital
- Interview 4 (B3) – manager of a private healthcare provider

The sample does not allow for making any kind of wider generalizations although it enables researchers to map the most important notions of e-health.

The interviews were conducted 9-13 February 2015 and were conducted by two researchers. Notes were being taken during the process.

Grounded coding was based on emerging and reoccurring themes (either similar or conflicting). Identified themes were: *meaning of e-health, barriers, opportunities for further development, contemporary use of e-health, understanding of innovations in e-health.*

### Results

#### ***Meaning of e-health***

Introductory research indicates considerable difference in understanding notion of e-health among representatives of demand side and supply side. B1 admitted very **limited intuitive understanding of e-health** which (based on initial provided examples) could be narrowed down to the **use of ICT in administer tasks** (e.g. electronic patients' registration). B2 definition was broader and included **use of ICT in facilitating work of medical personnel** by means of e.g. neurosurgical consultations. S1 undermines involving administrative utilities in the definition of e-health and understands it as **interaction between patient – health professional or health professional – health professional through ICT solutions**. It includes teleradiology, teleconsultations, video-consultations, telemonitoring, telecare, teleprophylactic, telerehabilitation.

### **Barriers**

There is a wide range of issues identified by the demand side and supply side. Representatives of both sides of demand-supply spectrum (B1, B2, S1) point to lack of proper and consistent policymakers strategy regarding e-health. They indicate **lack of coordination in actions concerning e-health** that enables development of sustainable and economically feasible e-health projects. The consequence of this is a lot of dissemination activities regarding future plans and considerable amount of limited pilot projects but little attention is put in their further development. That lack of middle and long term plans going beyond pilot projects results in **lack of economic feasibility of those initiatives**. They last as long an external funding is provided, but after it ends they are not being funded by any other source (e.g. healthcare payers) and therefore are not being continued.

Cost efficiency of e-health solutions can exist in private sector and hence its use is growing; there are also examples of using ICT technologies (supporting 'normal' services) being used by public institutions to monitor public social/health services. In case of public sector investing in e-health solutions practically does not exist, due to a **very limited range of health e-services acknowledged by the payer** (B1, B2). So e-health solutions in public sector seem to be exceptions from the rule, not a rule. Because of that e-health initiatives in public units may be inhibited by financial directors due to cost/benefits balance (B1). S1 also points out that financial motivators are among the most important ones in development of e-health sector and **without a consent of health services purchaser (National Health Fund) to cover costs of such services it will be difficult to achieve any progress in publicly funded healthcare**.

Among factors that could potentially motivate the development of e-health sector B2 and S1 see increase of work efficiency of units (motivators for management) and more free time or more patients (for doctors).

B1 points out that **underdeveloped organizational culture** is present in public healthcare units in Poland and **further amplified by constant audits** focused not on the outcome but rather on the form of the process. B1 believes that it is another reason for limited development of e-health sector. Those factors also contribute to **managing procurements in ways to satisfy a potential auditor rather than increase their efficiency**.

Administrative hospital staff is not the only potential inhibitor of development of e-health sector. According to C1 experience, **many doctors tend to be distrustful towards e-health** undermining its usefulness and focusing of potential threats of transferring some responsibilities from people to computer systems. One of the reason for such approach may be the threat of bigger control and even future possibility of the decrease of demand for doctors and a perceived threat of losing power. S1 and B2 agree that one of the fundamentals needed to be built is presenting doctors with arguments regarding the increase of their free time and/or consultations with more patients that could result from efficient use of e-health.

### **Opportunities for further development**

S1 indicates that a **growing interest of e-health solutions in private sector** in Poland and other countries (e.g. USA) can enable future development of e-health. The fact that commercial companies **can make e-health solutions economically feasible** even without

external funding indicates that it is a sector worth looking into also for public units. Interviewee also underlines the change in e-health solutions delivery and the **transition from interest in single e-health products towards demand of integrated e-health services** (that include management of the solution). That also includes **payment method based on share in benefits** generated by the service rather than the purchase of the product.

B1 points out that in developing e-health strategy **public hospitals should draw from the experience of private sector**. According to the interviewee important differences lay in the **level of respect of patients** (higher in private sector) and **forward thinking and planning**. B2 believes that the starting point of any comprehensive development of e-health in public sector must begin with making it **profitable for stakeholders** e.g. patients, insurance companies. S1 broadens this list with telecommunication companies and banks. According to S1 insurance companies in USA broadly use e-health solutions in order to minimise the cost of risk they are taking. By offering discounts for people who regularly use the provided e-health products in order to measure their health, insurance companies can identify potential risk groups and adjust the insurance offer accordingly.

S1 claims that screening tests become more popular as a **part of benefit package offered by corporations to their employees** (next to e.g. multisport package and health insurance). Further development of this practice can increase a demand for e-health screening solutions. Another opportunity for growth of interest in e-health solutions may be the group of **active people putting much attention to their health**. They can increase demand for a variety of wellness e-services such as dieticians and personal trainers.

Another potential buyers category that could stimulate development of demand for e-health solutions are **various homecare organizations**. Independently whereas its governmental units aimed to provide basic care or commercial homecare companies aimed to provide comprehensive care while producing income, they both need to **monitor quality of provided services, check if the work is done according to the schedule and provide an automatic financial calculation for the service (billing)**. In all those aspects S1 predicts that e-health solutions may be found helpful.

With development and popularisation of technology, **costs of products and services is dropping** which can prove to be another stimulant for development of e-health solutions. In recent past the price of mobile ECG monitor for telerehabilitation was too high for wider market, now its price is decreasing. The same rule applies to telecommunication services that are vital for efficient communication of e-health products. A few years back a monthly payment for a SIM card through which a device could transmit information was about 50 PLN (13 EURO). Today it is about 2 PLN (0.5 EURO) which makes it affordable by much wider population (S1).

### ***Contemporary use of e-health***

B1 and B2 agree that there are **many plans and declarations of policymakers** regarding the use of e-health as there are quite a few pilot studies. The biggest problem is that they are **either not executed or not sustainable**. Some of such examples given is the e-prescription service that was developed some time ago but eventually was never used. Another given example was Internet Patient Record that allowed diabetes patient to access his/hers health

records which was also provided to some doctors around Poland. The system was eventually discontinued.

Public hospitals use ICT in limited extent in administrative procedures (e.g. some hospitals start to use e-registration, some use automated text reminders of upcoming visits for patients) or medical procedures (e.g. histopathology through telemedicine).

Majority of examples regarding effective use of e-health solutions come from private sector. All mentioned private healthcare providers use e-registration. They also increase usage of teleconsultations with patients (e.g. in care for dependent users) and among doctors (e.g. radiological consultations). They are subcontracting development of e-health solutions to external ICT companies or develop them themselves (S1).

### ***Innovations in e-health***

B1 imagines innovative e-health solution as a comprehensive system that allows doctor to have complete knowledge regarding patients records, monitor patients' basic health parameters, monitoring patients falls or leaving the premises of the building, usage of ICT to inform about schedule changes and possibility of use of e-prescriptions. Ultimately B1 states that innovative e-health solution would be nothing out of the scope of today's technology but rather a solution that actually works and is economically sustainable.

## DESK STUDY RESEARCH

### Aim

Aim of the desk study part of the research was to recognise state of the art as well as to build a basic model of comparison of researched countries, basing on secondary data analysis. Doing so will enable EPP Project Consortium to formulate basis for qualitative research. Analysed aspects include legal regulations, national plans for development as well as barriers and opportunities of development.

### Meaning of e-health

#### Introduction

Clear understanding of e-health is important for supporting its development. In the subsequent parts of the research, the report is going to refer to the legal definition of e-health as well as the intuitive understanding of the notion by various stakeholders. This part reflects on the search for official definition present in laws, ministerial reports, etc.

#### EU

Definition of e-health used by European Commission is very broad and seems to include most of the healthcare tasks executed via information and communications technology (ICT). With that understanding e-health:

- 'refers to tools and services using **information and communication technologies (ICTs)** that can improve prevention, diagnosis, treatment, monitoring and management.
- can benefit the entire community by **improving access to care and quality of care** and by making the health sector more efficient.
- includes information and data sharing between patients and health service providers, hospitals, health professionals and health information networks; electronic health records; telemedicine services; portable patient-monitoring devices, operating room scheduling software, robotized surgery and blue-sky research on the virtual physiological human.<sup>1</sup>

Some confusion emerges in connection to term *telemedicine* and how it relates to *e-health*. Looking at documents issued by the European Commission it is clear that telemedicine is a category of e-health: 'eHealth (...) includes health information networks, electronic health records, telemedicine services, (...)'<sup>2</sup> Telemedicine itself is defined as '(...) the provision of healthcare services, through use of ICT, in situations where the health professional and the patient (or two health professionals) are not in the same location. It involves secure

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<sup>1</sup> European Commission. *Ehealth: Policy*, [http://ec.europa.eu/health/ehealth/policy/index\\_en.htm](http://ec.europa.eu/health/ehealth/policy/index_en.htm), access: February 2015.

<sup>2</sup> European Commission, 2012. *Communication from the Commission to the European Parliament, the European Economic and Social Committee and the Committee of the Regions. eHealth Action Plan 2012-2020 – Innovative healthcare for the 21st century*, p.4, [http://ec.europa.eu/health/ehealth/docs/com\\_2012\\_736\\_en.pdf](http://ec.europa.eu/health/ehealth/docs/com_2012_736_en.pdf).

transmission of medical data and information, through text, sound, images or other forms needed for the prevention, diagnosis, treatment and follow-up of patients.<sup>3</sup>

Technologies like telecare, teleconsultation, telemonitoring are consistently classified as telemedicine, while e-prescriptions and e-referrals fall under e-health<sup>4</sup>. In short, whenever IT or ICT enters the diagnostic or treatment process, we speak of telemedicine. Most of the above terms are new – their understanding and definitions remain somewhat unstable, especially in popular parlance as opposed to specialised EU and academic ones.

## Denmark

Although official documents do not define *e-health* (*e-sundhed*), use of the term is consistent with the way it is defined by EU authorities. Danish Ministry of Health and Medicines explains *telemedicine* (*telemedicin*) on its website as a situation where ‘a healthcare provider, not being present in the same place as the patient, uses video, pictures, audio and test results in diagnosis and treatment’<sup>5</sup>.

## Poland

*E-health* (*e-zdrowie*) is a term widely used in national documents like acts, bills, reports and communicates. However, its definition is nowhere to be found in official legal documents. Therefore it seems that the definitions included in the official European Union documents related to e-health are to be taken as guidance. Judging from the context in which e-health is talked about in the national documents, the policy makers connect it mainly to medical information systems (registration, databases etc.), with little attention on aspects directly supporting prevention or therapy. There are cases of equating the terms of *e-health* and *telemedicine*, as well as *e-medicine* in regional official documents.<sup>6</sup> Authors of report *Conditions of development of Telemedicine in Poland*<sup>7</sup> from 2014 admit that there is no official definition of telemedicine and go on to cite definitions that could match e-health as well. The fact that Polish name for Polish Association of Telemedicine translates as Polish Association of Telemedicine and E-health (Polskie Towarzystwo TeleMedycyny i e-Zdrowia) may serve as a proof for the confusion<sup>8</sup>. Nevertheless, when academic publications and reports from the medical sector are taken into account, it is clear that understanding of the terms in question matches precisely that presented by the European Commission: *e-health* is construed as transmission of medical information (including registration, checking laboratory

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<sup>3</sup> *Ibidem*.

<sup>4</sup> European Commission, 2004. *E-Health - Making Healthcare Better for European Citizens: An Action Plan for a European E-Health Area*.

<sup>5</sup> Sundhedsstyrelsen, 2014. Telemedicin, [http://sundhedsstyrelsen.dk/da/uddannelse-  
autorisation/autorisation/autorisation-og-pligter/telemedicin](http://sundhedsstyrelsen.dk/da/uddannelse-autorisation/autorisation/autorisation-og-pligter/telemedicin), access: 1 May 2015.

<sup>6</sup> eZdrowie Łódzkie. Serwis Innowacyjny, eZdrowie - Definicja eZdrowia i Telemedycyny, <http://www.ezdrowie.lodzkie.pl/ezdrowie/definicja-ezdrowia-i-telemedycyny>, access: 2 March 2015.

<sup>7</sup> Bujok, J. et al., 2014. *Uwarunkowania Rozwoju Telemedycyny W Polsce. Potrzeby Bariery, Korzyści, Analiza Rynku, Rekomendacje. Raport*. Economic Chamber Medycyna Polska, [http://izbamedpol.pl/data/Pliki/94/Plik/Raport---telemedycyna-\(fin\)22.07.2014.pdf](http://izbamedpol.pl/data/Pliki/94/Plik/Raport---telemedycyna-(fin)22.07.2014.pdf).

<sup>8</sup> Polish Telemedicine Society, Polskie Towarzystwo Telemedycyny. E-Zdrowia. Polish Telemedicine Society, <http://www.telemedycyna.org>, access: 22 April 2015.

analysis results), while *telemedicine* is used where actual service is rendered (as describing a scan by radiologist, *teleconsultation*, *telerehabilitation*)<sup>9,10</sup>.

## Spain

In Spain, the most widely cited definition of *e-health* (*e-sanidad*) seems to be the one given by the Information Society in Spain: 'e-health is defined as the application of Information and Communication Technologies (ICT) for a wide scope of issues affecting healthcare from diagnosis to follow-up of patients, through management of organizations involved in those activities'<sup>11</sup>. Usage of terms such as *telemedicine* (*telemedicina*) seems to align with the UE's understanding.

## UK

*E-health in Scotland*<sup>12</sup> strongly builds on the European Commission's understanding of e-health stating that 'e-health covers the interaction between patients and health-service providers, institution-to-institution transmission of data, or peer-to-peer communication between patients and/or health professionals. Examples include health information networks, electronic health records, telemedicine services, wearable and portable personal health systems and many other information and communication technology (ICT)-based tools assisting disease prevention, diagnosis, treatment and follow up'.<sup>13</sup>

Therefore, e-health is a broad term that can refer to a number of different programmes and initiatives, as well as to a concept. Often in the UK, the definition of e-e-health encompasses a number of specific types of technology including *health informatics telehealth* and *telecare*.

## Legal regulations of e-health

### Introduction

Legal regulations addressing e-health build upon and must be compliant with earlier laws related to personal data protection, health records, patient's rights, and finally – electronic processing of personal information. Due to various legal systems of researched countries, direct comparisons cannot be easily made yet some recurring themes were identified and presented below. As the referred laws are often very extensive, for practical reasons only their parts relating to e-health are mentioned.

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<sup>9</sup> Duplaga, M. & Grysztar, M., 2013. *Poglądy lekarzy na temat przydatności systemów e-zdrowia*. *Hygieia Public Health*, 48(4), pp.553–559, <http://www.h-ph.pl/pdf/hyg-2013/hyg-2013-4-553.pdf>.

<sup>10</sup> Zgliczyński, W. et al., 2013. *Telemedycyna w Polsce – bariery rozwoju w opinii lekarzy*. *Medycyna Ogólna i Nauki o Zdrowiu*, 19(4), pp.496–499, <http://jml2012.indexcopernicus.com/fulltxt.php?ICID=1096968>, access: March 2015.

<sup>11</sup> Red.es, 2012. *TIC Y Salud: Aplicaciones Móviles, Redes Sociales E Iniciativas Públicas*, *Ministerio de Industria, Energía y Turismo*. <http://www.red.es/redes/sala-de-prensa/reportaje/tic-y-salud-aplicaciones-moviles-redes-sociales-e-iniciativas-publicas>, access: 2 May 2015.

<sup>12</sup> Payne, J., 2013. *SPICe Briefing eHealth in Scotland*, [http://www.scottish.parliament.uk/ResearchBriefingsAndFactsheets/S4/SB\\_13-10.pdf](http://www.scottish.parliament.uk/ResearchBriefingsAndFactsheets/S4/SB_13-10.pdf).

<sup>13</sup> European Commission, 2012. *Op. cit.*

## Legislative fundamentals of e-health

### EU

*E-Health Action Plan 2004-2011* and *eHealth Action Plan 2012-2020* operate in the context of **Article 14 of Directive 2011/24/EU on application of patients' rights in cross-border healthcare**<sup>14</sup> that focuses on:

- Supporting research, development and innovation,
- Promoting international cooperation,
- Achieving wider interoperability of e-health services among EU member states.

### Denmark

A foundational document for Danish healthcare-related legislation is the **Health Act: Consolidating Act no. 913 of 13 July 2010** (*lovbekendtgørelse nr. 913 af 13. Juli 2010. Sundhedsloven*). It covers a wide range of issues. There are 25 amendments, of some are of particular relevance<sup>15</sup>:

- Act no 605 of 14 November 2011 addresses access to public registers and electronic health records,
- Act no 603 of 18 June 2012 is a revision regarding planning, collaboration, IT, quality and financing of the healthcare sector,
- Act 1638 of 26 December 2013 covers implementation of part of directive 2011/24/EU on the application of patients' rights in cross-border healthcare.

### Poland

In Poland, **Act on the System of Information in Healthcare** (Ustawa z dnia 28 kwietnia 2011 o systemie informacji w ochronie zdrowia), introduced on the 28<sup>th</sup> April 2011 and amended in 2014, sets deadlines and legal ramifications for keeping medical records, dispensing prescriptions etc. in electronic form, obliging healthcare providers to start keeping them in an electronic form only from a designated date<sup>16</sup>.

### Spain

Spanish **Law 16/2003, of cohesion and quality of SNS** (Ley 16/2003, de cohesión y calidad del SNS), introduced on 28<sup>th</sup> May 2004, establishes legal framework for coordination and cooperation actions of Health Public Administrations, in the exercise of their powers, in a way that equality, quality and social engagement in the SNS is guaranteed, and also to

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<sup>14</sup> European Commission, 2015. eHealth, Digital Agenda for Europe, <http://ec.europa.eu/digital-agenda/en/eu-policy-ehealth>, access: 2 May 2015.

<sup>15</sup> Hartlev, Mette, 2014. *Overview of the National Laws on Electronic Health Records in the EU Member States. National Report for Denmark*, [http://ec.europa.eu/health/ehealth/docs/laws\\_denmark\\_en.pdf](http://ec.europa.eu/health/ehealth/docs/laws_denmark_en.pdf).

<sup>16</sup> Ministerstwo Zdrowia, 2011. *Ustawa z dnia 28 kwietnia 2011 o systemie informacji o ochronie zdrowia*, [http://www2.mz.gov.pl/wwwfiles/ma\\_struktura/docs/ustawaoi\\_29062011.pdf](http://www2.mz.gov.pl/wwwfiles/ma_struktura/docs/ustawaoi_29062011.pdf).

guarantee the active collaboration of SNS in the reduction of health inequalities<sup>17</sup>. It is worth noting how strongly reduction of health inequalities is featured in Spanish legislation relating to e-administration and e-health.

## UK

There is a number of legislative measures in place to protect patient confidentiality and data, thus all having implications for e-health. In terms of health records, there are two acts including the *Access to Medical Reports Act 1988*<sup>18</sup> which allows patients to see medical reports about them and the *Access to Health Records Act 1990*<sup>19</sup> which provides access to the record of a deceased individual.

### Personal data protection

Personal data protection acts set the standards that e-health solution must meet in each country.

## EU

On the EU level, personal data protection is regulated with several acts. **Article 8 of the European Convention of Human Rights** from 1953 guarantees a right to have one's family life and correspondence respected<sup>20</sup>. Council of Europe's **Convention for the protection of individuals with regard to the automatic processing of personal data** (so-called **Convention 108**) from 1981 remains the only legally binding international instrument in the area of data protection. It deals with collection and processing of personal data by public and private bodies, at the same time addressing cross-border flows of the data. **Directive 95/46/EC**<sup>21</sup> (Data Protection Directive) sought to harmonize and set a common standard of data protection among the member states **Directive 2002/58/EC** (Directive on privacy and electronic communications) was concerned with data in the communication sector. **Directive 2006/24/EC** (Data Retention Directive) amended the previous one and regulated data management in the context of public services delivered electronically<sup>22</sup>.

The European Commission plans to unify data protection within the European Union (EU) with a single law, the **General Data Protection Regulation (GDPR)**.

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<sup>17</sup> Agencia Estatal Boletín Oficial del Estado, 2003, Ley 16/2003, de 28 de mayo, de cohesión y calidad del Sistema Nacional de Salud, <http://www.boe.es/buscar/doc.php?id=BOE-A-2003-10715>, access: March 2015.

<sup>18</sup> National Archives. *Access to Medical Reports Act 1988*, <http://www.legislation.gov.uk/ukpga/1988/28/contents>, access: 2 May 2015.

<sup>19</sup> *Ibidem*.

<sup>20</sup> European Union Agency for Fundamental Rights & Council of Europe, 2014. *Handbook on European data protection law*, [http://fra.europa.eu/sites/default/files/fra-2014-handbook-data-protection-law-2nd-ed\\_en.pdf](http://fra.europa.eu/sites/default/files/fra-2014-handbook-data-protection-law-2nd-ed_en.pdf).

<sup>21</sup> *Ibidem*.

<sup>22</sup> *Ibidem*.

## Denmark

Privacy law is enforced by Datatilsynet (The Danish Data Protection Agency), which oversees implementation of the data protection legislation and investigates possible violations.<sup>23</sup> The main bill tackling data protection is **Act on Processing of Personal Data from 1<sup>st</sup> July 2000** (amended 2007), which applies to processing of personal data wholly or partly by automatic means, and to the processing otherwise than by automatic means of personal data which form part of a filing system or are intended to form part of a filing system.

## Poland

Poland's **Act on the Protection of Personal Data 1997** (Ustawa o ochronie danych osobowych) regulates records administrator's liability for violation of or failure to protect privacy of personal data<sup>24</sup>.

GIODO (Generalny Inspektor Ochrony Danych Osobowych, Inspector General for Personal Data Protection) is a position created in 1997 for the purpose of supervising and ensuring compliance with data protection legislation<sup>25</sup>. GIODO takes administrative decisions, enforces the privacy laws and investigates complaints.

## Spain

Spain's **Organic Law 15/1999, 13th December, of Protection of Personal Data** (Ley Orgánica 15/1999, de 13 de diciembre, de Protección de Datos de Carácter Personal) from 13<sup>th</sup> December 1999 guarantees and protects, in terms of everything concerning personal data handling, public liberties and fundamental rights of individuals, and specially their honour and personal and family privacy<sup>26</sup>. The personal data subjected to processing may only be disclosed to a third party for purposes directly related to the legitimate functions of the assignor and the assignee with prior consent.

It was further developed by **Royal Decree 1720/2007, 21st December, per which Regulations of development of Organic Law 15/1999, 13th December, of Personal Data Protection** (Real Decreto 1720/2007, de 21 de diciembre, por el que se aprueba el Reglamento de desarrollo de la Ley Orgánica 15/1999, de 13 de diciembre, de protección de datos de carácter personal)<sup>27</sup>. It tackles personal data processing by automatic (i.e. also electronic) in addition to non-automatic (i.e. paper) means.

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<sup>23</sup> Datatilsynet, 2011. *Introduction to the Danish Data Protection Agency*. <http://www.datatilsynet.dk/english/>, access: April 2015.

<sup>24</sup> Adamski, D., 2014. *Overview of the national laws on electronic health records in the EU Member States. National Report for Poland*, [http://ec.europa.eu/health/ehealth/docs/laws\\_poland\\_en.pdf](http://ec.europa.eu/health/ehealth/docs/laws_poland_en.pdf).

<sup>25</sup> GIODO Generalny Inspektor Ochrony Danych Osobowych. *Responsibilities of the Inspector General for Personal Data Protection*, [http://www.giodo.gov.pl/138/id\\_art/368/j/en/](http://www.giodo.gov.pl/138/id_art/368/j/en/), access: April 2015.

<sup>26</sup> Agencia Estatal Boletín Oficial del Estado. Ley Orgánica 15/1999, de 13 de diciembre, de Protección de Datos de Carácter Personal. <http://www.boe.es/buscar/doc.php?id=BOE-A-1999-23750>, access: April 2015.

<sup>27</sup> Agencia Estatal Boletín Oficial del Estado. Real Decreto 1720/2007, de 21 de diciembre, por el que se aprueba el Reglamento de desarrollo de la Ley Orgánica 15/1999, de 13 de diciembre, de

**The Law 41/2002 of 14 November regulates patient autonomy, rights and obligations regarding clinical information and documentation.** The Law states that personal health data must be protected by high-level measures, that only health professionals (institutions, private and public health centres) are entitled to collect and process that information. Healthcare professionals are held responsible for maintaining the adequate security measures. Therefore, these professionals should implement a safety management system in rugged enough information to prevent information loss.

Telemedicine occupies an increasingly prominent place in the Spanish healthcare. The Data Protection Act regulates the security measures applying to it:

- Management and transfer: personal data must be encoded when transferred to ensure that such information is not intelligible or manipulated by a third party,
- Backups and recovery: a backup of data is to be kept, and recovery procedures are to be established,
- Access record. Each access attempt will be saved, recording the following: user identification, date and time, the accessed file, type of access and whether it has been approved or denied. Minimum retention period is two years. Safety Officer is responsible of reviewing access records on a monthly basis.

## UK

In the United Kingdom, **Freedom of Information Act 2000**<sup>28</sup> makes provision for the disclosure of information held by public authorities or by persons providing services for them. It amends earlier **Data Protection Act 1998**<sup>29</sup>, which defined law on the processing of data on identifiable living people and still is the main piece of legislation that governs the protection of personal data in the UK, and **Public Records Act 1958**<sup>30</sup>.

### Patients' records

Trend towards patient's empowerment and regulation of stakeholder relations within healthcare led to development of laws that e-health is subject to. They regulate who has right to access and change health records, as well as an obligation to keep and update them. 'Doctors have traditionally acted as custodians of health information, sharing relevant details with others providing care and making decisions to share information with others, with or without patients' consent. (...)The move towards centralised databases of electronic health

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protección de datos de carácter personal. <http://www.boe.es/buscar/doc.php?id=BOE-A-2008-979>, access: March 2015.

<sup>28</sup> National Archives. Freedom of Information Act 2000, <http://www.legislation.gov.uk/ukpga/2000/36/contents>, access: March 2015.

<sup>29</sup> National Archives. *Data Protection Act 1998*, <http://www.legislation.gov.uk/ukpga/1998/29/contents>, access: March 2015.

<sup>30</sup> National Archives. *Public Records Act 1958*, <http://www.legislation.gov.uk/ukpga/Eliz2/6-7/51/contents>, access: March 2015.

records marks a fundamental shift in the paradigm of professional responsibility for the security of patient data and about decisions to share such data.<sup>31</sup>

## EU

The EU Digital Agenda emphasises individual patient's right to access their own medical data in a safe way<sup>32</sup>, supporting patient empowerment and increased engagement in their own treatment. While EU member states generally both grant the patients access to their medical records, the extent of the access, ways in which it is granted and the patient's ability to change the data vary widely, often being a subject of public debate and legal battles<sup>33</sup>. Much controversy ensues when it comes to mass storing of data, offering the patients an opt-out<sup>34</sup>, and possibility of unauthorised or unwished-for access<sup>35</sup>. These matters are mostly set at the national level.

**Article 17 of the Directive 95/46/EC** requires member states to ensure that the data controller implement appropriate technical and organisational measures to protect personal data from destruction, loss, unauthorised alteration, unauthorised disclosure or access, whether by accident or by unlawful action.<sup>36</sup>

## Denmark

While there is no special patients' rights act, a section of the **Health Act (Consolidating Act no. 913 of 13 July 2010 – Health Act)** is dedicated specifically to patients' rights<sup>37</sup>. Neither is there a special and comprehensive regulation on EHRs (Electronic Health Record). Consequently, acts of law tackling processing of personal data, patients' rights and health care professional's duties apply to both paper and electronic health records.<sup>38</sup>

E-health relies on sundhed.dk, which hosts several platforms: *Sundhedsjournalen* (the Health record), *E-journalen* (E-record), *P-journalen* (P-record) and *Fælles Medicinkort*

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<sup>31</sup> Carlisle, George, 2014. *Overview of the National Laws on Electronic Health Records in the EU Member States. National Report for United Kingdom (England)*, p.66, [http://ec.europa.eu/health/ehealth/docs/laws\\_united\\_kingdom\\_en.pdf](http://ec.europa.eu/health/ehealth/docs/laws_united_kingdom_en.pdf).

<sup>32</sup> eHealth Stakeholder Group, 2004. *Patient access to Electronic Health Records*, [http://ec.europa.eu/information\\_society/newsroom/cf/dae/document.cfm?doc\\_id=5169](http://ec.europa.eu/information_society/newsroom/cf/dae/document.cfm?doc_id=5169), access: March 2015.

<sup>33</sup> European Union Agency for Fundamental Rights & Council of Europe, 2014. *Handbook on European data protection law*, [http://fra.europa.eu/sites/default/files/fra-2014-handbook-data-protection-law-2nd-ed\\_en.pdf](http://fra.europa.eu/sites/default/files/fra-2014-handbook-data-protection-law-2nd-ed_en.pdf).

<sup>34</sup> Ramesh, R., 2015. *NHS disregards patient requests to opt out of sharing medical records. The Guardian*, <http://www.theguardian.com/society/2015/jan/22/nhs-disregards-patients-requests-sharing-medical-records>, access: April 2015.

<sup>35</sup> Donnelly, L., 2014. Millions of NHS records sold to insurance firms. *The Telegraph*, <http://www.telegraph.co.uk/news/health/news/10906390/Millions-of-NHS-records-sold-to-insurance-firms.html>, access: April 2015.

<sup>36</sup> Milieu Ltd, and Time.lex, 2014. *Overview of the National Laws on Electronic Health Records in the EU Member States and Their Interaction with the Provision of Cross-Border eHealth Services*, [http://ec.europa.eu/health/ehealth/docs/laws\\_report\\_recommendations\\_en.pdf](http://ec.europa.eu/health/ehealth/docs/laws_report_recommendations_en.pdf).

<sup>37</sup> Hartlev, Mette, 2014. *Op. cit.*

<sup>38</sup> *Ibidem.*

(Shared Med Shared Medication Record, SMR). Together they constitute the *Sundhedsjournal* (Health Record).

Patient's right to self-determination, an important principle of Danish healthcare, is being balanced with ensuring safety and maximum efficiency of the state-run system, for which easy and fast access to information is needed.

Access to EHRs and patient consent is regulated in **Consolidating Act no. 913 of 13 July 2010 – Health Act, Art. 42a-42c and Art. 157-157a**. Keeping and updating health records is mandatory for healthcare professionals in Denmark, irrespective of patient's consent. GP's are also obliged to provide patient data to the regions for planning purposes. The Danish systems is deemed by some to be too permissive in allowing many groups of healthcare professionals and other persons working in social institutions, prisons to have access to patient records. Data can be used for quality control, research and statistics without the patient's consent.<sup>39</sup> Hospitals are allowed to keep a psychiatric record separate from the somatic one. Patients are not allowed to update, modify or erase EHR content. However, in regards to the medicine part of the SMR, they can edit information about use of non-prescribed drugs to their SMR by themselves. In general, implied consent of patient is presumed.

Hence, it is often challenging to manage access of various categories of healthcare professionals involved in the treatment, access by health professionals not directly involved in the particular treatment and access by other persons (health administrators, insurance companies, social services etc). According to the Ministry of Health<sup>40</sup> all public hospitals must keep a log file of the health care professionals who have accessed a patient's data. As part of security measures, random samples can be taken of the employee's access to files in the EHR (Electronic Health Records) systems in order to avoid misuse of the system. The patients have control over their own health data. Thus a patient can deny health care professionals access to information on the patient's health data at any time. The National Board of Health issued in 2008 legal recommendations regarding how health care staff should comply with existing legislation when dealing with patients' records and data<sup>41</sup>.

Data security in the public sector is regulated by **Executive Order no. 528 of 15 June 2000 on Security Measures for the Protection of Personal Data Processed for Public Authorities**, which includes rules for the EHRs.

## Poland

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<sup>39</sup> Hartlev, Mette, 2014. *Op. cit.*

<sup>40</sup> Danish Ministry of Health, 2012, eHealth in Denmark, [http://www.sum.dk/Aktuelt/Nyheder/Digitalisering/2012/Maj/~media/Filer%20-%20Publikationer\\_i\\_pdf/2012/Sundheds-IT/Sundheds\\_IT\\_juni\\_web.ashx](http://www.sum.dk/Aktuelt/Nyheder/Digitalisering/2012/Maj/~media/Filer%20-%20Publikationer_i_pdf/2012/Sundheds-IT/Sundheds_IT_juni_web.ashx), access: April 2015

<sup>41</sup> Sundhedsstyrelsen, 2008, Informationssikkerhed – vejledning for sundhedsvæsenet, [http://sundhedsstyrelsen.dk/publ/Publ2008/SDSD/Infosikkerhed\\_vejl08.pdf](http://sundhedsstyrelsen.dk/publ/Publ2008/SDSD/Infosikkerhed_vejl08.pdf)

Polish **Act on Rights of Patients** (Ustawa o prawach pacjenta) from 2008 regulates disclosure of medical and personal information about the patient; it improved protection of the information and forced healthcare practitioners to give the patient full access to their data. The Act is perceived to enforce changes in prevalent culture within healthcare sector and is considered an important step towards patient empowerment<sup>42</sup>.

## Spain

In Spain, **Law 41/2002, of patient autonomy**<sup>43</sup> (Ley 41/2002, de la autonomía del paciente) from 14th November 2002 regulates rights and duties of patients, users and professionals, as well as health centres and services, public and private, in terms of patient autonomy and of information and clinical documentation. It is quite specific as far as storing health data is concerned, making distinguishing three types of health data:

- Medical or clinical documentation: related to a patient's specific care episode.
- Patient's medical record: contains information on the status and the medical evolution of a patient through the entire care process.
- Medical or clinical information: refers to the acquisition of knowledge on the physical and health status of a patient in order to provide him/her a better health observation, attendance and recovery. This keeps being maintained and updated by the healthcare professionals.

This classification added clarity to further regulations regarding responsibilities and ways of handling information of each type.

## UK

In the UK, two acts play major role in setting legal framework for handling of patient's records and access to this information. **Access to Medical Reports Act 1988** established a right of access by individuals to reports relating to themselves provided by medical practitioners for employment or insurance purposes and to make provision for related matters. **Access to Health Records Act 1990** was created to include records of deceased persons. It established a right of access to health records by the individuals to whom they relate and other persons. It also provided for the correction of inaccurate health records.

There are two types of EHRs: detailed ones used by General Practitioners (GPs) and summary EHRs records used by hospitals and emergency services, which contain only crucial information (e.g. medication, allergies – extent differs in the countries of the UK) Summary records are shared nationally. No comprehensive legislation specifically focused on EHRs exists.<sup>44</sup>

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<sup>42</sup> Adamski, D., Op. Cit.

<sup>43</sup> Agencia Estatal Boletín Oficial del Estado. Ley 41/2002, de 14 de noviembre, básica reguladora de la autonomía del paciente y de derechos y obligaciones en materia de información y documentación clínica, <http://www.boe.es/buscar/doc.php?id=BOE-A-2002-22188>, access: March 2015.

<sup>44</sup> Carlisle, George, 2014. *Op. cit.*

Hospitals are required to keep mental health notes separate. Additionally, certain types of data that are considered sensitive are automatically excluded, e.g. HIV/AIDS status, termination of pregnancy, sexually transmitted diseases. **Health and Social Care Act 2012** empowered The Health and Social Care Information Centre (HSCIC) to collect such data, although patients can object to sharing such information.

Summary records are created based on a patient's implied (implicit) consent, while creation of detailed EHRs is obligatory for GPs and other healthcare professionals responsible for it, and cannot be prevented by the patient. Patient's explicit consent is required every time summary record is to be accessed (as long as the patient is able to give it). Similarly, explicit consent should be obtained before sharing the patient's whole care record with other health and social care professionals. **Data Protection Act 1998** prevents the sharing of EHRs for non-healthcare purposes without a patient's explicit consent. Patients cannot update their EHRs.

Guidance for when implicit and explicit consent is required for sharing patient data is given in various policy documents, but in particular in the Caldicotte principles. They underwent revision in 2013 in response to new distribution of responsibility prompted by rise of ICT in the healthcare, and seventh principle was added:

1. 'Justify the purpose (i.e., use or transfer of personal confidential data);
2. Don't use personal data unless it is absolutely necessary;
3. Use the minimum necessary personal confidential data;
4. Access to personal confidential data should be on a strict need-to-know basis;
5. Everyone with access to personal confidential data should be aware of their responsibilities;
6. Comply with the law;
7. The duty to share information can be as important as the duty to protect patient confidentiality.<sup>45</sup>

### E-administration

#### EU

European Commission's communication *eEurope 2005 Action Plan* set general targets for the member states in the area of digitalization of public services, including healthcare<sup>46</sup>. It is advised to introduce electronic health cards, teleconsultations, Electronic Health Records, etc., all based on an important pre-requisite: country-wide broadband access. Another document, *i2010 – A European Information Society for growth and employment*<sup>47</sup> pushed the

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<sup>45</sup> *Ibidem*.

<sup>46</sup> Summaries of EU Legislation, 2010. *eEurope 2005*, [http://europa.eu/legislation\\_summaries/information\\_society/strategies/l24226\\_en.htm](http://europa.eu/legislation_summaries/information_society/strategies/l24226_en.htm), access: April 2015.

<sup>47</sup> European Commission, 2005. *i2010 – A European Information Society for growth and employment*, <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52005DC0229&from=EN>, access: March 2015.



agenda further, specifying some targets and calling for accessibility of the e-services for everyone, as well as using ICT development in the public sphere as a chance for stimulating business.

## Denmark

The **Competition Act** and **Consolidation Act**<sup>48</sup>, both introduced on the 8<sup>th</sup> August 2005 and amended in 2008, have a purpose of promoting efficient allocation of resources within society through competition for the benefit of entrepreneurial undertakings and of the consumers. It applies to any form of commercial activity as well as aid from public funds granted to the commercial activity.

## Poland

Poland tackles digitalisation of its administration through Development Strategy 2020 (Strategia Rozwoju 2020), a document adopted in 2012 by **Council of Ministers' resolution of 25 September 2012 no 157**. It declares that the state will ensure country-wide access to the Internet and implement use of IT technologies in the public sphere, e-health being one aspect of it<sup>49</sup>.

## Spain

**Law 11/2007, 22th June, of citizens' electronic access to Public Services** (Ley 11/2007, de 22 de junio, de acceso electrónico de los ciudadanos a los Servicios Públicos) guarantees Spanish citizens a right to interact with the public administration by electronic means and regulates the basic issues of using information technologies in administrative activity in this context. The law serves a warrant of citizens' rights and of legitimacy and efficacy of public administration whenever it uses information technology<sup>50</sup>.

Following that, two pieces of legislation were enacted that not only addressed data security, but also systems interoperability.

- **Royal Decree 3/2010, 8th January, by which National Scheme of Security within scope of eAdministration is regulated** (Real Decreto 3/2010, de 8 de enero, por el que se regula el Esquema Nacional de Seguridad en el ámbito de la Administración Electrónica) regulates the National Scheme of Security as established in the article 42 of Law 11/2007, 22th June, and determines the applicable security policy of electronic media referred to in the law<sup>51</sup>.
- **Royal Decree 4/2010, 8th January, by which National Scheme of Interoperability within scope of E-administration is regulated** (Real Decreto 4/2010, de 8 de enero,

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<sup>48</sup> Danish Consumer and Competition Authority, 2007. The Competition Act Consolidation Act Consolidation Act No 1027 of 21 August 2007, <http://en.kfst.dk/Competition/Legislation/Historic/The-Competition-Act-Consolidation-Act-Consolidation-Act-No-1027-of-21-August-2007>, access: 6 May 2015.

<sup>49</sup> Rada Ministrów, 2012. *Uchwała Nr 157 Rady Ministrów z dnia 25 września 2012 r. w sprawie przyjęcia Strategii Rozwoju Kraju 2020*, [http://g.ekspert.infor.pl/p/\\_dane/akty\\_pdf/MPO/2012/170/882.pdf](http://g.ekspert.infor.pl/p/_dane/akty_pdf/MPO/2012/170/882.pdf).

<sup>50</sup> Agencia Estatal Boletín Oficial del Estado. Ley 11/2007, de 22 de junio, de acceso electrónico de los ciudadanos a los Servicios Públicos, <http://www.boe.es/buscar/doc.php?id=BOE-A-2007-12352>, access: March 2015.

<sup>51</sup> Agencia Estatal Boletín Oficial del Estado. Real Decreto 3/2010, de 8 de enero, por el que se regula el Esquema Nacional de Seguridad en el ámbito de la Administración Electrónica, <http://www.boe.es/buscar/doc.php?id=BOE-A-2010-1330>, access: March 2015.

por el que se regula el Esquema Nacional de Interoperabilidad en el ámbito de la Administración Electrónica) shows determination to make e-administration systems work. The decree regulates the National Scheme of Interoperability as established in the article 42 of Law 11/2007, 22th June<sup>52</sup>. Interoperability is an issue that permeates e-administration systems (including those related to healthcare) throughout Europe. It is often treated as a technical problem. Nevertheless, Spain decided to regulate and guarantee it by legal means.

## UK

In the UK, **Computer Misuse Act** was enacted already in 1990. It regulated securing computer material against unauthorised access or modification. *The Electronic Communications Act 2000*, makes digital signatures legally admissible. This allows ePrescriptions to be electronically signed, therefore making them a legal document. Similarly, the *Electronic Communications Act 2000*<sup>53</sup> allows for the creation and transmission of prescriptions by electronic means and again will directly impact upon systems.<sup>54</sup>

## National plans for future e-health development

### Introduction

Countries differ vastly in their progress in implementing e-health solutions and the areas, which attract their special attention.

United Kingdom's approach to e-health is characterised by delegation of strategy-making and implementation to the national level. What sets it apart from other countries is a strong link between e-health and social care in general both on strategic and practical level<sup>55,56</sup>. Spain's targets revolve around integration between regions and ensuring maximum confidentiality of Electronic Health Records<sup>57</sup>. Poland still strives to ensure country-wide digitalisation of data exchange<sup>58</sup>. Significant differences in level of implementation of e-health

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<sup>52</sup> *Ibidem*.

<sup>53</sup> National Archives. *Electronic Communications Act 2000*, <http://www.legislation.gov.uk/ukpga/2000/7/contents>, access: March 2015.

<sup>54</sup> Carlisle, George, Op. cit.

<sup>55</sup> Deloitte, 2012. *Primary care: Working differently Telecare and telehealth – a game changer for health and social care*, <http://www.deloitte.com/assets/Dcom-Angola/Local Assets/Documents/uk-ls-telehealth-telecare.pdf>.

<sup>56</sup> National Information Board, 2014. *Personalised Health and Care 2020, Using Data and Technology to Transform Outcomes for Patients and Citizens, A Framework for Action*, [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/384650/NIB\\_Report.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/384650/NIB_Report.pdf).

<sup>57</sup> Ministerio de Sanidad Servicios Sociales e Igualdad, 2012. *Informe anual del Sistema Nacional de Salud, 2012*,

<http://www.msssi.gob.es/estadEstudios/estadisticas/sisInfSanSNS/tablasEstadisticas/infSNS2012.pdf>.

<sup>58</sup> Pędziński, B. & Sowa, P., 2014. *Stopień wdrożenia elektronicznej dokumentacji medycznej w placówkach podstawowej opieki zdrowotnej w Polsce*, <http://www.telemedycyna.org/wp-content/uploads/2014/10/20-B.P%C4%99dzinski-Stopie%C5%84-wdrozenia-EDM-w-POZ-w-Polsce.pdf>.

solutions between regions may be observed. Denmark may be considered a front-runner of e-health implementation among analysed countries.

## Denmark

National Strategy for Digitalisation of the Danish Healthcare Sector 2013-2017 constitutes a part of broader strategy for digitalisation introduced as a collaborative project between the Danish government, Local Government Denmark and Danish Regions coordinated by National Board of e-health<sup>59</sup>. It focuses on implementing coherent, efficient and standardised IT solutions for healthcare professionals within public sector. An emphasis is put on making the most of the solutions and projects launched in previous phases of e-health development through full deployment of technological solutions and raising awareness.

Five focus areas have been selected, each including multiple goals to be achieved by 2017:

- Healthcare services delivered in new ways: dissemination of telemedicine services, e.g. ulcer assessment and psychiatry,
- Digital workflows and processes: eliminating paper health records and multiple records,
- Coherent patient pathways: improving communication of various parts of the system, resulting in reduced re-admission and errors,
- Better use of data: includes incorporation of self-reported data and data safety assurance,
- Governance refers to transparent prioritization and coordination,

The strategy includes clear indicators for its goals and plans of reporting of milestones<sup>60</sup>.

## Poland

When *eHealth Action Plan* was introduced, the national healthcare system was not digitalised to any significant degree, and there was not any country-wide strategy to do so. As a result, Polish targets remain heavily driven by EU strategy and requirements. Poland focuses on putting in place functioning EHR systems with the aims<sup>61</sup> of providing patients with full access to their health records, promoting telemedicine, improving circulation of EHR and other medical data and creation of Medical Information System (System Informacji Medycznej – SIM). Digitalisation was seen as both a necessity and a way of tightening control over public healthcare spending.

The targets are being executed through various programmes. Multiple central registers (equipment, healthcare units' location etc.) are being planned. On-line education of doctors and the public also features in the programme<sup>62</sup>. Centrum Systemów Informacyjnych

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<sup>59</sup> Danish Government, Local Government Denmark & Danish Regions, 2013. *Making eHealth Work. National Strategy for Digitalisation of the Danish Healthcare Sector 2013-2017*, <http://www.ssi.dk/~media/Indhold/DK - dansk/Sundhedsdata og it/NationalSundhedsIt/Om NSI/Strategy2013-17.ashx>.

<sup>60</sup> *Ibidem*.

<sup>61</sup> Ministerstwo Zdrowia, 2009. *Kierunki informatyzacji e-Zdrowie Polska na lata 2011-2015*, [http://www2.mz.gov.pl/wwwfiles/ma\\_struktura/docs/kierunki\\_e\\_zdrowie\\_09022011.pdf](http://www2.mz.gov.pl/wwwfiles/ma_struktura/docs/kierunki_e_zdrowie_09022011.pdf).

<sup>62</sup> *Ibidem*.

Ochrony Zdrowia (Centre of Health Information Systems, CSIOZ) is responsible for the following projects<sup>63</sup>:

- P1: Electronic platform for gathering, sharing and analysis of medical data. Includes SIM,
- P2: An on-line platform allowing entrepreneurs to access services and medical registers,
- P3: Systems related to re-structuring, adaptation, maintenance and monitoring of registers and other resources related to healthcare,
- P4: Teleinformation systems destined to improve management, e.g. continuous education of medical staff, public health dangers, medical products trade,
- P5: Electronic platform for telemedicine consulting services,
- P6: Reinforcement of the strategy of public information and connecting with foreign healthcare systems.

As of April 2015, P1, P3, P4 are still being conducted<sup>64</sup>, P2 is completed. P5 and P6 were not mentioned in CSIOZ's reports in the last year (2014), it is therefore reasonable to conclude that they are still not launched. Among platforms already made available for public are e-WUŚ (electronic system of verification of the right to healthcare, launched in 2013). Portal [ezdrowie.gov.pl](http://ezdrowie.gov.pl) has been launched, informing of the services that are planned to be made available to the public, like e-prescriptions, EHRs etc.

As far as timeframes are concerned, there were numerous delays on the part of the central government: e-prescriptions, EHRs, full integration of medical information systems have not been achieved yet (April 2015). At the same time, isolated regional healthcare centres (e.g. Swietokrzyskie Province Oncology Centre) went well beyond national targets in technology use.

## Spain

Annual Report of the National Health Service (SNS) from 2012 sets two priorities regarding e-health: introduction of **Health Card** (Tarjeta Sanitaria) that records basic patient information, and introduction of Electronic Prescription.

In addition to that, national strategic targets include assuring easy access to EHR for both patients and healthcare professionals through a system that is both highly usable and guarantees security. Emphasis is put on ensuring confidentiality and proper access authorisation procedures. This includes preventing healthcare professionals other than the ones treating the patients from accessing the data.

The Quality Plan for the National Health System<sup>65</sup>, developed and presented by the Ministry of Health is supposed to respond to the challenges faced by the Spanish national health

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<sup>63</sup> NIK, 2012. *Informacja o wynikach kontroli. Informatyzacja szpitali*,  
<http://www.nik.gov.pl/plik/id,4849,vp,6462.pdf>.

<sup>64</sup> Sejm Rzeczypospolitej Polskiej, 2015. *Informacja o posiedzeniu Komisji Innowacyjności i Nowoczesnych Technologii*,  
<http://www.sejm.gov.pl/sejm7.nsf/komunikat.xsp?documentId=5AB1A022D207AE84C1257DCF00481B20>.

<sup>65</sup> Ministerio de Sanidad Servicios Sociales e Igualdad, 2014. *Fases del desarrollo del Proyecto*,  
<http://www.msssi.gob.es/profesionales/hcdsns/contenidoDoc/fases.htm>, access: April 2015.

system. One of its main targets is to disseminate use of ICT in healthcare in order to improve quality of general practitioners (GP) appointments.

The strategy for e-health in Spain may be divided into two phases<sup>66,67</sup>. The first phase, lasting from 2006 to 2010, concentrated on implementing of the designed management model and establishing cooperation among multiple bodies: Ministry of Industry, Energy and Tourism, Ministry of Health, Social Services and Equality, 17 regions, as well as National Health Management Institute. The second phase, spanning years 2010 to 2013, was devoted to enhancement of inter-regional exchange of clinical information through national EHR system. Social and professional information in addition to the occupational situation are required in the primary care clinical record. However it is not required in the summary record.<sup>68</sup>

Access to medical records for judicial, epidemiological, public health, investigation, research or education purposes requires preserving the personal identification data of the patient, keeping it separate from those of clinical health character so that as a rule the anonymity is secured, unless the patient has consented to not separate them.

The **Royal Decree 81/2014** provides for different coverage to patients that have access to health systems in other countries than to patients under treatment in different regions in the same country.

Other health professionals may also have access without the need for explicit consent if they are authorised by the health centre or service. However the patient has access to information on the persons who have access to the EHRs enabling to act against that implicit consent.

## UK

The UK as a whole does not have an e-health strategy. Instead, four national NHS systems set their own strategies and targets, within their individual timeframes. Although phrased in different ways, the targets have certain elements in common. Guaranteed and safe patients' and healthcare professionals' access to EHR is of concern, in addition to providing reliable information to patients about their condition, treatment options and prevention. Wales and Scotland plan to empower patients by putting them in a position of responsibility for their own health and wellbeing. They accentuate communication between patients and the NHS, integration and social care services as well as value-for money approach in making investments.

**NHS Scotland's eHealth Strategy 2011-2017<sup>69</sup>** is focused on effective and safe use of drugs and information management.

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<sup>66</sup> Health Information Institute, 2014. *NHS Electronic Health Record System*,

[http://www.msssi.gob.es/organizacion/sns/planCalidadSNS/docs/HCDNSNS\\_English.pdf](http://www.msssi.gob.es/organizacion/sns/planCalidadSNS/docs/HCDNSNS_English.pdf).

<sup>67</sup> Ministerio de Sanidad Servicios Sociales e Igualdad, 2014. Situación actual del Proyecto, <http://www.msssi.gob.es/profesionales/hcdnsns/contenidoDoc/situacionActual.htm>, access: April 2015.

<sup>68</sup> Carlisle, George, 2014. *Overview of the National Laws on Electronic Health Records in the EU Member States. National Report for United Kingdom (England)*, [http://ec.europa.eu/health/ehealth/docs/laws\\_united\\_kingdom\\_en.pdf](http://ec.europa.eu/health/ehealth/docs/laws_united_kingdom_en.pdf).

<sup>69</sup> Scottish Government & NHS Scotland, 2012. *eHealth Strategy 2011-2017 (Revised July 2012 to include a Sixth Strategic Aim)*, Edinburgh: the Scottish Government, <http://www.gov.scot/Resource/0040/00409128.pdf>.

**NHS Wales.** The Welsh Government announced in April 2014 that it would develop a new *eHealth and Care* strategy in conjunction with health boards, NHS trusts and local authorities<sup>70</sup>. It puts emphasis on prevention, patient-agreed outcomes and support for people with long-term conditions and for those whose access to healthcare was limited due to distance.

**NHS Northern Ireland** developed a Health and Care strategy aimed at delivering a safer, better connected and more sustainable health and social care system over the next 5 years. The next stage of the regional e-health work programme will be determined by the Department of Health, Social Services and Public Safety, together with Health and Social Care Board, and in consultation<sup>71</sup> with key stakeholders during 2015.

**NHS England.** In England, the National Information Board (NIB) established 'Personalised Health and Care 2020: A Framework for Action'<sup>72</sup>, with a deadline of 2020. It is more of framework for action than a strategy in conventional sense. The framework encourages healthcare providers to be guided by transparency and to be take care of keeping public trust. What is more, England plans to exploit potential of ICT to develop life-saving treatments while investing in innovation and growth.

The *Personalised Health and Care 2020: A Framework for Action* aims to set out proposals that will:

- 'enable me to make the right health and care choices – citizens to have full access to their care records and access to an expanding set of NHS-accredited health and care apps and digital information services,
- give care professionals and carers access to all the data, information and knowledge they need' – real-time digital information on a person's health and care by 2020 for all NHS-funded services, and comprehensive data on the outcomes and value of services to support improvement and sustainability,
- make the quality of care transparent – publish comparative information on all publicly funded health and care services, including the results of treatment and what patients and carers say,
- build and sustain public trust – ensure citizens are confident about sharing their data to improve care and health outcomes,
- bring forward life-saving treatments and support innovation and growth – make England a leading digital health economy in the world and develop new resources to support

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<sup>70</sup> Drakeford, M., Written Statement - eHealth and Care in Wales,

<http://gov.wales/about/cabinet/cabinetstatements/2014/ehealth/?lang=en>, access: April 2015.

<sup>71</sup>Health and Social Care Board, 2015. *eHealth and Care Strategy for Northern Ireland. Improving health and wealth through the use of information and communication technology.*, Available at: [http://www.hscboard.hscni.net/consult/Previous Consultations/2014-15 eHealth\\_and\\_Care\\_Strategy\\_Consultation/Consultation\\_Document-e-Health\\_and\\_Care-PDF\\_2mb.pdf](http://www.hscboard.hscni.net/consult/Previous%20Consultations/2014-15%20eHealth_and_Care_Strategy_Consultation/Consultation_Document-e-Health_and_Care-PDF_2mb.pdf).

<sup>72</sup> Department of Health & National Information Board, 2014. Personalised health and care 2020: a framework for action, <https://www.gov.uk/government/publications/personalised-health-and-care-2020/using-data-and-technology-to-transform-outcomes-for-patients-and-citizens#why-do-we-need-to-act-now>, access: April 2015.

research and maximise the benefits of new medicines and treatments, particularly in light of breakthroughs in genomic science to combat long-term conditions including cancer, mental health services and tackling infectious diseases.’<sup>73</sup>

## Barriers in development of e-health solutions

### Introduction

In pursue of set targets all countries face a number of challenges that hinder the development of e-health solutions. National desk studies identified below barriers as some of the most important ones.

### EU

European Commission made note of seven barriers to the development of e-health programmes, which exist to a greater or lesser extent in different countries and systems<sup>74</sup>:

- Lack of awareness of, and confidence in e-health solutions among patients, citizens and healthcare professionals,
- Lack of interoperability between e-health solutions,
- Limited large-scale evidence of the cost-effectiveness of e-health tools and services,
- Lack of legal clarity for health and wellbeing mobile applications and the lack of transparency regarding the utilisation of data collected by such applications,
- Inadequate or fragmented legal frameworks including the lack of reimbursement schemes for e-health services,
- High start-up costs involved in setting up e-health systems,
- Regional differences in accessing ICT services and limited access in deprived areas.

The barriers and opportunities for development of e-health have been defined based on the experience of the personnel<sup>75</sup> involved in this activity:

- Evidence of the benefits associated with telemedicine services is still not enough for all the most common chronic diseases,
- There is a market uncertainty due to the legal frameworks in this area,
- Lack of reimbursement by the refusal of the government to pay for the remote monitoring of patients.
- The fast changing technology; with each passing year, technologies become obsolete.
- Privacy and confidential issues. Healthcare entities must adopt written privacy policies and procedures that define how they intend to abide by the highly complex regulation and protect individually identifiable health information.

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<sup>73</sup> National Information Board, 2014. *Personalised Health and Care 2020. Using Data and Technology to Transform Outcomes for Patients and Citizens. A Framework for Action*, [http://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/384650/NIB\\_Report.pdf](http://www.gov.uk/government/uploads/system/uploads/attachment_data/file/384650/NIB_Report.pdf).

<sup>74</sup> European Commission, 2012. *Op. cit.*

<sup>75</sup> Garcia Martinez, R., 2012. *E-health experiences in Spain: mapping and analysis*. Escola Tècnica Superior d'Enginyeria Industrial de Barcelona, <http://upcommons.upc.edu/pfc/handle/2099.1/18047>.

- Resistance of aged population to the new technologies.

The financial cost is also a real concern and a perceived barrier to the application of telemedicine. Equipment, transport, maintenance and training costs are costs that lots of countries cannot assume or are not disposed to assume.

## Denmark

There is no official analysis of barriers in development of e-health solutions in Denmark even though substantial difficulties have been encountered over the years. For example in 2007 all in all 27 different EHR systems were in operation with no or only limited capacity to exchange data with each other<sup>76</sup>.

With project TeleCare Nord<sup>77</sup> from 2012 serving as an example, the main challenges were those related to leading a cross-disciplinary, cross-organizational project that required reaching a consensus among stakeholders on a project challenging existing models for cooperation, and at the same time requiring trust among the different stakeholders. A study of EPJ-Observatoriet<sup>78</sup> found out a number of difficulties healthcare professionals encountered on an operational level when working with e-health solutions:

- Difficulty in managing user names and passwords experienced by the staff,
- Incompatibility of IT systems of various hospitals; EHR had to be printed out and sent by fax, while scanned photos could not be shared across regions,
- The Shared Medication Record, a central data base previously operated by the Pharmaceutical Agency, covering all patients' purchase of medicals and prescriptions, had suffered from numerous delays and faults,
- The National Patients Index was substantially delayed.

## Poland

Development of e-health in the public sector faces several serious barriers<sup>79</sup> on its way. Fragmentation and low quality of the digital systems introduced is coupled with lack of integration of different databases. They are attributed to severe problems in major public procurement projects<sup>80,81</sup>. Another hurdle on the way is still unaccomplished digitalisation of patients' records which are often still kept in paper form only.

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<sup>76</sup> Nøhr, C. et al., 2006. *EPJ-Observatoriet. Statusbeskrivelser for EPJ i amterne 2006*, [http://www.epj-observatoriet.dk/publikationer/Statusbeskrivelser2006\\_WEB.pdf](http://www.epj-observatoriet.dk/publikationer/Statusbeskrivelser2006_WEB.pdf).

<sup>77</sup> E-sundhedsobservatoriet Dansk Center for Sundhedsinformatik, 2012. *Årskonference 2012. E-sundhed som fundamentet, der sikrer kontinuitet og sammenhæng i borgerens sundhedsvæsen*, [http://2012.e-sundhedsobservatoriet.dk/sites/2012.e-sundhedsobservatoriet.dk/files/web\\_EPJaarskonference2012\\_vers2.pdf](http://2012.e-sundhedsobservatoriet.dk/sites/2012.e-sundhedsobservatoriet.dk/files/web_EPJaarskonference2012_vers2.pdf).

<sup>78</sup> Version2, 2012. Her er 5 kendte problemer med sundheds-it anno 2012, <http://www.version2.dk/galleri/sundheds-it-dummies-her-er-de-5-store-problemer-anno-2012-48252#5>, access: April 2015.

<sup>79</sup> Ministerstwo Zdrowia, 2009. *Kierunki informatyzacji e-Zdrowie Polska na lata 2011-2015*, [http://www2.mz.gov.pl/wwwfiles/ma\\_struktura/docs/kierunki\\_e\\_zdrowie\\_09022011.pdf](http://www2.mz.gov.pl/wwwfiles/ma_struktura/docs/kierunki_e_zdrowie_09022011.pdf).

<sup>80</sup> Gazeta.pl, 2015. *Miał być internetowy system pacjenta. Jest awantura. Przez tzw. szybną usług portal e-Zdrowie znowu zagrożony*,

The Ministry of Health cites<sup>82</sup> lack of engagement of the final user, especially patient, in planning and development stages of the systems as serious barrier, probably because it results in low usability. Implementation of e-prescriptions, e-referrals and EHR was postponed to 2017<sup>83</sup> when difficulties unpredicted by the governments were uncovered by doctors and pharmacists. It is important however to keep in mind that this presents the governments line of defence. In further research steps additional stakeholder will be engaged in order to verify it.

When it comes to telemedicine, legal ramifications seem to be the biggest impediment and are vividly discussed in the press. This particular branch of e-health suffers from insufficient governmental funding and is not an object of central government's development plans: therefore, initiatives remain local<sup>84,85</sup>. These barriers affect to some extent private e-health solutions suppliers as well as private healthcare providers. Despite new legislation, stronger regulation facilitating introduction of telemedicine is called for<sup>86,87,88</sup>. Some telemedicine solutions already function at the local level, like teleconsultation for cardiovascular patients in ambulances in Małopolska Province<sup>89</sup>, and distance evaluation of scans by radiologists. On the other hand, prescribing medication without actual meeting with the patient causes some controversies from the legal and professional ethics points of view<sup>90</sup>.

Telemedicine enjoys strong support from several prominent figures in the medical world. For instance Witold Rużyłło, a pioneer of interventional cardiology in Poland, often promotes its use as a time- and money-saving measure necessary in healthcare of the future<sup>91</sup>. There is, however, no reliable evidence for such support among other representatives of this professional group.

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[http://pieniadze.gazeta.pl/pieniadz/1,136158,17223528,Mial\\_byc\\_internetowy\\_system\\_pacjenta\\_\\_Jest\\_awantura\\_.html](http://pieniadze.gazeta.pl/pieniadz/1,136158,17223528,Mial_byc_internetowy_system_pacjenta__Jest_awantura_.html), access: March 2015.

<sup>81</sup> Onet Biznes, 2015. CSIOZ: zakończenie budowy platformy e-zdrowie nadal możliwe w tym roku – Biznes, <http://biznes.onet.pl/wiadomosci/kraj/csioz-zakonczenie-budowy-platformy-e-zdrowie-nadal-mozliwe-w-tym-roku/zkpe7>, access: March 2015.

<sup>82</sup> Ministerstwo Zdrowia, 2009. *Op. Cit.*

<sup>83</sup> Adamski, D., *Op. cit.*

<sup>84</sup> Bujok, J. et al., 2014. *Uwarunkowania Rozwoju Telemedycyny w Polsce. Potrzeby bariery, korzyści, analiza rynku, rekomendacje. Raport*, Economic Chamber Medycyna Polska, [http://izbamedpol.pl/data/Pliki/94/Plik/Raport---telemedycyna-\(fin\)22.07.2014.pdf](http://izbamedpol.pl/data/Pliki/94/Plik/Raport---telemedycyna-(fin)22.07.2014.pdf).

<sup>85</sup> Zgliczyński, W. et al., 2013. Telemedycyna w Polsce – bariery rozwoju w opinii lekarzy. *Medycyna Ogólna i Nauki o Zdrowiu*, 19(4), pp.496–499, <http://jml2012.indexcopernicus.com/fulltxt.php?ICID=1096968>.

<sup>86</sup> Bujok, J. et al., *Op. cit.*

<sup>87</sup> Zgliczyński, W. et al., *Op. cit.*

<sup>88</sup> Najbuk, P., 2014. *Telemedycyna – aktualny stan prawny i perspektywy zmian w przyszłości*. *DZP Life Sciences Law Blog*, <http://blog.dzp.pl/pharma/telemedycyna-aktualny-stan-prawny-i-perspektywy-zmian-w-przyszlosci/>, access: March 2015.

<sup>89</sup> Pasek, A., 2013. *Małopolska: system telemedycyny ratunkowej usprawni leczenie chorych na serce*. *zdrowie.abc.com.pl*, <http://www.zdrowie.abc.com.pl/czytaj/-/artykul/malopolska-system-telemedycyny-ratunkowej-usprawni-leczenie-chorych-na-serce>, access: March 2015.

<sup>90</sup> Najbuk, P., 2014. *Op. cit.*

<sup>91</sup> TerMedia.pl, 2013. Instytut Kardiologii stawia na telemedycynę, [http://www.termedia.pl/Instytut\\_Kardiologii\\_stawia\\_na\\_telemedycyne-2013](http://www.termedia.pl/Instytut_Kardiologii_stawia_na_telemedycyne-2013), access: March 2015.

A study by Duplaga and Grysztar<sup>92</sup> showed that physicians strongly (~90%) support e-health solutions related to patient registration, access to lab results and professional education. Their support drops when it comes to distance monitoring of patient's physiological parameters (mean level of acceptance  $3,84 \pm 1,22$  on 5-item Likert scale). Distance communication between them and patients was also viewed unfavourably (mean level of acceptance  $3,28 \pm 1,24$ ). Notion that only direct contact guarantees reliable diagnosis was cited as the reason. Ambiguous attitudes towards making EHR available to patients suggest that patriarchal attitudes may play a role. Interestingly, a study<sup>93</sup> on attitudes of patients suffering from chronic respiratory diseases revealed a similar pattern to that of physicians. However, probably the most important barrier is that the National Health Fund (NFZ), the national purchaser of health services funded from public sources does not recognize e-health and does not pay for services conducted in this way (see below: *Opportunities in development of e-health solutions, Poland*).

## Spain

According to a report from a workshop on e-health of the Ministry of Health, Social Services and Equality<sup>94</sup>, application of ICT in Health to establish a new healthcare model is important as the system is unsustainable due to demographic, lifestyle changes, chronic diseases and budgetary restrictions. Research by Roig and Saigí<sup>95</sup> identified four main categories of barriers to widespread implementation of telemedicine in Spain:

- **Technological barriers:** Despite the almost unanimous perception that technology per se is not a barrier, there are three challenges for normalization of telemedicine: access to bandwidth, incompatibility of existing information systems and complexity in the use of the solutions implemented.
- **Organisational barriers:** The need to provide training professionals in the new model of care was perceived as a barrier. What is more, there is a need for constant learning and making changes in the projects in order to keep up with improving technology. Introduction of new technologies entails redefinition of roles and the emergence of new professional profiles, along with the redistribution of responsibilities - that causes conflicts and sense of insecurity within highly hierarchical structures of the Spanish healthcare.

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<sup>92</sup> Duplaga, M. & Grysztar, M., 2013. Poglądy lekarzy na temat przydatności systemów e-zdrowia. *Hygieia Public Health*, 48(4), pp.553–559, <http://www.h-ph.pl/pdf/hyg-2013/hyg-2013-4-553.pdf>.

<sup>93</sup> Duplaga, M., 2013. The acceptance of e-health solutions among patients with chronic respiratory conditions. *Telemedicine journal and e-health : the official journal of the American Telemedicine Association*, 19(9), pp.683–691, <http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=3757530&tool=pmcentrez&rendertype=abstract>.

<sup>94</sup> Muñoz, Juan Fernando, 2013. *eHealth in Spain: A Strategy for a Decentralised National Health Service*, <http://www.europarl.europa.eu/document/activities/cont/201309/20130923ATT71806/20130923ATT71806EN.pdf>.

<sup>95</sup> Roig, F. & Saigí, F., 2011. Barreras para la normalización de la telemedicina en un sistema de salud basado en la concertación de servicios. *Gaceta Sanitaria*, 25(5), pp.397–402.

Finally, a lack of strategic alignment between the various participants in telemedicine projects was observed.

- **Human factor barriers:** Resistance to change was repeatedly cited as the main barrier to spread of telemedicine.
- **Financial barriers:** Funding comes from consistently held as one of the key challenges for the normalization of telemedicine. In general, the government provides funding to help with investment burden and launch projects. However, there is an absence of business models that local administrations could implement to make these projects financially sustainable in the long-term.

These findings are supported by Ballesteros,<sup>96</sup> who cites reluctance of changing well-established practices and patient behaviours are the key challenges, next to insufficient institutional and regulatory frameworks.

## UK

Challenges related to Scotland's patient electronic health record<sup>97</sup> are mostly non-technological in nature. Firstly, quality of data from GP systems is poor thus, the quality of the input data is not of a good standard, and thus invaluable or non-transferrable to other systems. Secondly, primary and secondary care organisations tend not to share data, in addition to clinicians being allowed to decline to share data without providing a reason, and often doing so. Relevant clinical professional groups do not currently share data, either.

The National Information Board<sup>98</sup> blames lack of universal Wi-Fi access in UK hospitals and variation of systems used by them that hinders interoperability.

More importantly, the systems and their users (healthcare staff) proved incompatible: the staff work around out-moded systems, which remain non-modernised. A failure to provide computers or tablets to ward or community-based staff is also mentioned.

Deloitte's report cites lack of 'robust' government funding and reimbursement as a barrier specific to the UK. The result is that solutions are adopted on the local level, with some services being paid for by social care and other by healthcare<sup>99</sup>.

## Opportunities in development of e-health solutions

### Introduction

Comprehensive development of innovative market requires strong institutionalised allies. This part focuses on opportunities for further development of e-health in researched countries.

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<sup>96</sup> Ballesteros, Maria, 2014. *Overview of the National Laws on Electronic Health Records in the EU Member States. National Report for Spain*, [http://ec.europa.eu/health/ehealth/docs/laws\\_spain\\_en.pdf](http://ec.europa.eu/health/ehealth/docs/laws_spain_en.pdf).

<sup>97</sup> Whitehouse, D., Giest, S. & Artmann, J., 2010. *eHealth Strategies. Country Brief: Scotland*, [http://ehealth-strategies.eu/database/documents/Scotland\\_CountryBrief\\_eHStrategies.pdf](http://ehealth-strategies.eu/database/documents/Scotland_CountryBrief_eHStrategies.pdf).

<sup>98</sup> Department of Health & National Information Board, *Op. cit.*

<sup>99</sup> Deloitte, 2012. *Primary care : Working differently Telecare and telehealth – a game changer for health and social care*, <http://www.deloitte.com/assets/Dcom-Angola/Local Assets/Documents/uk-ls-telehealth-telecare.pdf>.

## UE

The European Commission delineated a few areas that present opportunities for the development of e-health programmes that are relevant for most countries and systems:<sup>100</sup>

- Further development of e-health to support a more targeted, efficient and productive Health system that also reduces failures and length of hospitalization.
- E-health solutions that support more transparent and easy accessible services and information and the use of social media in Health. These advantages has been shown in the use of telemedicine for control of chronic diseases, mental health and health promotion.
- There has been shown similar advantages with technology based treatment that can effectively supplement routine clinical treatment and enhance the cost effectiveness of treatment.

## Denmark

The Ministry of Health described in publication 'eHealth in Denmark'<sup>101</sup> the following benefits of introducing e-health in Denmark so far:

'Well-functioning e-health solutions hold the potential to benefit citizens, patients and health care professionals in several ways:

- Improved flexibility and effective ways of organising treatment, leading to improved quality and safety in treatment and care.
- Enabling more individualised treatment by empowering patients and involving them in their own treatment.
- Better working conditions for employees in the health and welfare sectors by improving workflows and reducing time spent on gathering information about a patient from other parts of the health care sector. This allows doctors and nurses to devote more time to patients'.

Danish approach to e-health can be reasonably presented as a success story, with many projects taken beyond pilot stage and many solutions mainstreamed<sup>102</sup>. Opportunities were exploited in several critical areas.

- **Governance & funding mechanisms:** planning for and ensuring long-term, sustainable funding positively distinguishes Denmark from many other European countries. Integrated governance model that engaged all stakeholders, combined with the adaptation of the legal frame-work, have also contributed to the decisions on mainstreaming.
- **Care reorganisation:** e-health often forces reorganisation good relationship between primary care, hospitals and social care made the reorganisation possible.

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<sup>100</sup>European Commission, 2012. *Op. cit.*

<sup>101</sup> Juhl, A., 2007. *E-health in Denmark. eHealth as a part of a coherent Danish health care system*, [http://www.sum.dk/~media/Filer - Publikationer\\_i\\_pdf/2012/Sundheds-IT/Sundheds\\_IT\\_juni\\_web.ashx](http://www.sum.dk/~media/Filer - Publikationer_i_pdf/2012/Sundheds-IT/Sundheds_IT_juni_web.ashx).

<sup>102</sup> Ibidem.

- **Incentives:** incentives on all levels of care need to be aligned to ensure consistency and eliminate conflicting priorities.
- **E-health deployment:** actual widespread introduction of e-health solutions stimulated innovation and interoperability, leading to creation of robust infrastructure.

## Poland

Opportunities depend on continuation of the current strong support from the government, and include<sup>103</sup>:

- National public investment and access to European funds,
- Achievement of integration of the existing systems,
- Development of regional and central platforms for patients,
- Transnational movement of EU patients,
- Development of ICT technologies.

Anticipated steady increase in need for e-health and telemedicine solutions, related to ageing of the society and medical staff shortage<sup>104</sup> will likely be a favourable factor, as will be acceptance of e-health technologies by doctors<sup>105</sup> and patients<sup>106</sup>.

As steps to resolve legal problems hampering development of telemedicine are being taken, some important acts face revision and possible amendment. For example, the Medical Profession Act includes a requirement of actual physical meeting with patient for a medical consultation to be properly conducted. Financing is also an unresolved issue. National Health Fund is bound by strict regulations of what health services it can purchase. This can prevent it from investing in telemedicine. Consequently, co-financing by private insurers is considered<sup>107</sup>.

As it was mentioned, the government does not stimulate innovation in e-health, it , however, occasionally supports it, as evidenced by Kigmed project – an e-medicine technology hub, which resulted in eight start-ups. Kigmed project was concluded in 2013<sup>108</sup>. However, facts about actual implementation of the products and services proposed by the companies are still not known.

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<sup>103</sup> Ministerstwo Zdrowia, 2009. *Op. cit.*

<sup>104</sup> Bujok, J. et al., *Op.*

<sup>105</sup> Zgliczyński, W. et al., 2013. *Telemedycyna w Polsce – bariery rozwoju w opinii lekarzy. Medycyna Ogólna i Nauki o Zdrowiu*, 19(4), pp.496–499,  
<http://jmi2012.indexcopernicus.com/fulltxt.php?ICID=1096968>.

<sup>106</sup> Duplaga, M., 2013. *The acceptance of e-health solutions among patients with chronic respiratory conditions. Telemedicine journal and e-health : the official journal of the American Telemedicine Association*, 19(9), pp.683–691,  
<http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=3757530&tool=pmcentrez&rendertype=abstract>.

<sup>107</sup> Najbuk, P., 2014. *Telemedycyna – aktualny stan prawny i perspektywy zmian w przyszłości. DZP Life Sciences Law Blog*, <http://blog.dzp.pl/pharma/telemedycyna-aktualny-stan-prawny-i-perspektywy-zmian-w-przyszlosci/>, access: March 2015.

<sup>108</sup> Kigmed, 2011. Kigmed – O projekcie, [http://kigmed.eu/o\\_projekcie.php](http://kigmed.eu/o_projekcie.php), access: March 2015.

It may be assumed that expected launch of project/aim P5 (described above) may rise already substantial interest in telemedicine, stimulating country-wide and transnational solutions.

## Spain

Opportunities in Spain arise particularly in relation to the strong support from the government<sup>109</sup> it enjoys. It is intended to be the tool of improving inter-regional cooperation in providing healthcare to users moving across the country. Moreover, Spain is engaged in epSOS<sup>110</sup> (Open and Intelligent services for European patients) with the aim of improving healthcare of citizens when they are out of their countries.

Spain is one of the countries with the oldest populations in the world with more than 25% of the population over 65. Moreover, it could become more than 30% in 2020 (according to estimates of Statistics National Institute) and close to 40% in 2050. Furthermore, the incidence of chronic diseases due to this ageing population is really important, which represents about 75% of healthcare expenditure in Spain. All this leads to an urgent need to change the care model of health services, implementing a new model that extends beyond primary health centres and hospitals, to ensure continuity of assistance and care, and that allows to manage chronic conditions much more efficiently.

## UK

Three trends can be observed in the UK health system that open opportunities for development of telemedicine<sup>111</sup>. Firstly, patient will be increasingly responsible for self-care and self-monitoring. It requires suitable technologies enabling them to learn and to communicate with doctors and nurses. Ageing of the society and rise in long-term conditions put already pressure on homecare. King's Fund report states that telemedicine will be crucial for healthy ageing, a major challenge for EU<sup>112</sup>. Secondly, more efficient means of communication are needed to implement a more team-based approach to treatment. Thirdly, recent major reorganisation of the NHS will result in less focus on fee-for-service and face-to-face approach to financing services, instead looking more to actual outcomes, facilitating reimbursement of telemedicine<sup>113</sup>.

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<sup>109</sup> Garcia Martinez, R., 2012. *E-health experiences in Spain: mapping and analysis*. Escola Tècnica Superior d'Enginyeria Industrial de Barcelona, <http://upcommons.upc.edu/pfc/handle/2099.1/18047>.

<sup>110</sup> epSOS, 2011. *Country profile: Spain*, <http://www.epsos.eu/home/project-members-beneficiaries/participating-nations/spain.html>, access: April 2015.

<sup>111</sup> Medd, C., 2013. *Why 2013 could turn out to be a watershed year for telehealth*. *The Guardian*, <http://www.theguardian.com/healthcare-network/2013/jul/01/2013-watershed-year-telehealth>, access: April 2015.

<sup>112</sup> Ham, C., Dixon, A. & Brooke, B., 2012. *Transforming the Delivery of Health and Social Care: The case for fundament change*, pp.1–52, [http://www.kingsfund.org.uk/sites/files/kf/field/field\\_publication\\_file/transforming-the-delivery-of-health-and-social-care-the-kings-fund-sep-2012.pdf](http://www.kingsfund.org.uk/sites/files/kf/field/field_publication_file/transforming-the-delivery-of-health-and-social-care-the-kings-fund-sep-2012.pdf).

<sup>113</sup> Deloitte, 2012. *Primary care : Working differently Telecare and telehealth – a game changer for health and social care*, <http://www.deloitte.com/assets/Dcom-Angola/Local Assets/Documents/uk-ls-telehealth-telecare.pdf>.



As evidence for cost-effectiveness of e-health in clinical and social care environments is growing<sup>114</sup>, it may fast gain popularity. Hospitals and local governments will seek to reduce hospital and care home admissions in times of increasing needs combined with constrained funds.

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<sup>114</sup> Ham, C., Dixon, A. & Brooke, B., *Op. cit.*

## Bibliography

- Adamski, D., 2014. *Overview of the national laws on electronic health records in the EU Member States. National Report for Poland*, [http://ec.europa.eu/health/ehealth/docs/laws\\_poland\\_en.pdf](http://ec.europa.eu/health/ehealth/docs/laws_poland_en.pdf).
- Agencia Estatal Boletín Oficial del Estado, 2003. Ley 16/2003, de 28 de mayo, de cohesión y calidad del Sistema Nacional de Salud, <http://www.boe.es/buscar/doc.php?id=BOE-A-2003-10715>, access: March 2015.
- Agencia Estatal Boletín Oficial del Estado. Ley 11/2007, de 22 de junio, de acceso electrónico de los ciudadanos a los Servicios Públicos, <http://www.boe.es/buscar/doc.php?id=BOE-A-2007-12352>, access: March 2015.
- Agencia Estatal Boletín Oficial del Estado. Ley 41/2002, de 14 de noviembre, básica reguladora de la autonomía del paciente y de derechos y obligaciones en materia de información y documentación clínica, <http://www.boe.es/buscar/doc.php?id=BOE-A-2002-22188>, access: March 2015.
- Agencia Estatal Boletín Oficial del Estado. Ley Orgánica 15/1999, de 13 de diciembre, de Protección de Datos de Carácter Personal. <http://www.boe.es/buscar/doc.php?id=BOE-A-1999-23750>, access: April 2015.
- Agencia Estatal Boletín Oficial del Estado. Real Decreto 1720/2007, de 21 de diciembre, por el que se aprueba el Reglamento de desarrollo de la Ley Orgánica 15/1999, de 13 de diciembre, de protección de datos de carácter personal. <http://www.boe.es/buscar/doc.php?id=BOE-A-2008-979>, access: March 2015.
- Agencia Estatal Boletín Oficial del Estado. Real Decreto 3/2010, de 8 de enero, por el que se regula el Esquema Nacional de Seguridad en el ámbito de la Administración Electrónica, <http://www.boe.es/buscar/doc.php?id=BOE-A-2010-1330>, access: March 2015.
- Agencia Estatal Boletín Oficial del Estado. Real Decreto 4/2010, de 8 de enero, por el que se regula el Esquema Nacional de Interoperabilidad en el ámbito de la Administración Electrónica, <http://www.boe.es/buscar/doc.php?id=BOE-A-2010-1331>, access: March 2015.
- Argyll and Bute Community Planning Partnership. *Argyll and Bute Community Plan and Single Outcome Agreement 2012-2013*, <http://www.argyll-bute.gov.uk/sites/default/files/CP%20SOA%2012-13.pdf>.
- Ballesteros, Maria, 2014. *Overview of the National Laws on Electronic Health Records in the EU Member States. National Report for Spain*, [http://ec.europa.eu/health/ehealth/docs/laws\\_spain\\_en.pdf](http://ec.europa.eu/health/ehealth/docs/laws_spain_en.pdf).
- BBC News, 2013. *NHS IT system one of worst fiascos ever, say MPs*, <http://www.bbc.com/news/uk-politics-24130684>, access: 4 May 2015.
- Bujok, J. et al., 2014. *Uwarunkowania Rozwoju Telemedycyny w Polsce. Potrzeby bariery, korzyści, analiza rynku, rekomendacje. Raport*, Economic Chamber Medycyna Polska, [http://izbamedpol.pl/data/Pliki/94/Plik/Raport---telemedycyna-\(fin\)22.07.2014.pdf](http://izbamedpol.pl/data/Pliki/94/Plik/Raport---telemedycyna-(fin)22.07.2014.pdf).

- Carlisle, George, 2014. *Overview of the National Laws on Electronic Health Records in the EU Member States. National Report for United Kingdom (England)*, p.66, [http://ec.europa.eu/health/ehealth/docs/laws\\_united\\_kingdom\\_en.pdf](http://ec.europa.eu/health/ehealth/docs/laws_united_kingdom_en.pdf).
- Charua-Guindic, L., 2009. *A fast track program reduces complications and length of hospital stay after open colonic surgery. Rev Gastroenterol Mex*, 74(2), pp.141–142, <http://www.ncbi.nlm.nih.gov/pubmed/19666302>.
- Counihan, T.C. & Favuzza, J., 2009. Fast track colorectal surgery. *Clinics in Colon and Rectal Surgery*, 22(1), pp.60–72.
- Danish Consumer and Competition Authority, 2007. The Competition Act Consolidation Act Consolidation Act No 1027 of 21 August 2007, <http://en.kfst.dk/Competition/Legislation/Historic/The-Competition-Act-Consolidation-Act-Consolidation-Act-No-1027-of-21-August-2007>, access: 6 May 2015.
- Danish Government, Local Government Denmark & Danish Regions, 2013. *Making eHealth Work. National Strategy for Digitalisation of the Danish Healthcare Sector 2013-2017*, <http://www.ssi.dk/~media/Indhold/DK - dansk/Sundhedsdata og it/NationalSundhedsIt/Om NSI/Strategy2013-17.ashx>.
- Danish Ministry of Health, 2012, eHealth in Denmark, [http://www.sum.dk/Aktuelt/Nyheder/Digitalisering/2012/Maj/~media/Filer%20-%20Publikationer\\_i\\_pdf/2012/Sundheds-IT/Sundheds\\_IT\\_juni\\_web.ashx](http://www.sum.dk/Aktuelt/Nyheder/Digitalisering/2012/Maj/~media/Filer%20-%20Publikationer_i_pdf/2012/Sundheds-IT/Sundheds_IT_juni_web.ashx), access: April 2015
- Datilsynet, 2011. *Introduction to the Danish Data Protection Agency*. <http://www.datilsynet.dk/english/>, access: April 2015.
- Deloitte, 2012. *Primary care : Working differently Telecare and telehealth – a game changer for health and social care*, <http://www.deloitte.com/assets/Dcom-Angola/Local Assets/Documents/uk-Is-telehealth-telecare.pdf>.
- Department of Health & National Information Board, 2014. *Personalised health and care 2020: a framework for action*, <https://www.gov.uk/government/publications/personalised-health-and-care-2020/using-data-and-technology-to-transform-outcomes-for-patients-and-citizens#why-do-we-need-to-act-now>, access: April 2015.
- Donnelly, L., 2014. *Millions of NHS records sold to insurance firms. The Telegraph*, <http://www.telegraph.co.uk/news/health/news/10906390/Millions-of-NHS-records-sold-to-insurance-firms.html>, access: April 2015.
- Drakeford, M., *Written Statement - eHealth and Care in Wales*, <http://gov.wales/about/cabinet/cabinetstatements/2014/ehealth/?lang=en>, access: April 2015.
- Duplaga, M. & Grysztar, M., 2013. *Poglądy lekarzy na temat przydatności systemów e-zdrowia. Hygieia Public Health*, 48(4), pp.553–559, <http://www.h-ph.pl/pdf/hyg-2013/hyg-2013-4-553.pdf>.
- Duplaga, M., 2013. The acceptance of e-health solutions among patients with chronic respiratory conditions. *Telemedicine journal and e-health: the official journal of the American Telemedicine Association*, 19(9), pp.683–691,

- <http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=3757530&tool=pmcentrez&rendertype=abstract>.
- eHealth Stakeholder Group, 2004. *Patient access to Electronic Health Records*, [http://ec.europa.eu/information\\_society/newsroom/cf/dae/document.cfm?doc\\_id=5169](http://ec.europa.eu/information_society/newsroom/cf/dae/document.cfm?doc_id=5169), access: March 2015.
- epSOS, 2011. Country profile: Spain, <http://www.epsos.eu/home/project-members-beneficiaries/participating-nations/spain.html>, access: April 2015.
- E-sundhedsobservatoriet Dansk Center for Sundhedsinformatik, 2012. *Årskonference 2012. E-sundhed som fundamentet, der sikrer kontinuitet og sammenhæng i borgerens sundhedsvæsen*, [http://2012.e-sundhedsobservatoriet.dk/sites/2012.e-sundhedsobservatoriet.dk/files/web\\_EPJaarskonference2012\\_vers2.pdf](http://2012.e-sundhedsobservatoriet.dk/sites/2012.e-sundhedsobservatoriet.dk/files/web_EPJaarskonference2012_vers2.pdf).
- European Commission, 2004. *E-Health - Making Healthcare Better for European Citizens: An Action Plan for a European E-Health Area*.
- European Commission, 2005. *i2010 – A European Information Society for growth and employment*, <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52005DC0229&from=EN>, access: March 2015.
- European Commission, 2012. *Commission Staff Working Document eHealth Action Plan 2012-2020 – Innovative Healthcare for the 21st Century*, p.4.
- European Commission, 2012. *Communication from the Commission to the European Parliament, the European Economic and Social Committee and the Committee of the Regions. eHealth Action Plan 2012-2020 - Innovative healthcare for the 21st century*, p.4, [http://ec.europa.eu/health/ehealth/docs/com\\_2012\\_736\\_en.pdf](http://ec.europa.eu/health/ehealth/docs/com_2012_736_en.pdf).
- European Commission, 2012. *Communication from the Commission to the European Parliament, the European Economic and Social Committee and the Committee of the Regions. eHealth Action Plan 2012-2020 - Innovative Healthcare for the 21st Century*, [http://ec.europa.eu/health/ehealth/docs/com\\_2012\\_736\\_en.pdf](http://ec.europa.eu/health/ehealth/docs/com_2012_736_en.pdf).
- European Commission, 2015. *eHealth, Digital Agenda for Europe*, <http://ec.europa.eu/digital-agenda/en/eu-policy-ehealth>, access: 2 May 2015.
- European Commission. *Ehealth: Policy*, [http://ec.europa.eu/health/ehealth/policy/index\\_en.htm](http://ec.europa.eu/health/ehealth/policy/index_en.htm), access: February 2015.
- European Union Agency for Fundamental Rights & Council of Europe, 2014. *Handbook on European data protection law*, [http://fra.europa.eu/sites/default/files/fra-2014-handbook-data-protection-law-2nd-ed\\_en.pdf](http://fra.europa.eu/sites/default/files/fra-2014-handbook-data-protection-law-2nd-ed_en.pdf).
- eZdrowie Łódzkie. *Serwis Innowacyjny, eZdrowie - Definicja eZdrowia I Telemedycyny*, <http://www.ezdrowie.lodzkie.pl/ezdrowie/definicja-ezdrowia-i-telemedycyny>, access: 2 March 2015.
- Fearon, K.C.H. et al., 2005. *Enhanced recovery after surgery: a consensus review of clinical care for patients undergoing colonic resection. Clinical nutrition (Edinburgh, Scotland)*, 24(3), pp.466–77, <http://www.sciencedirect.com/science/article/pii/S026156140500023>.

- Garcia Martinez, R., 2012. *E-health experiences in Spain: mapping and analysis*. Escola Tècnica Superior d'Enginyeria Industrial de Barcelona, <http://upcommons.upc.edu/pfc/handle/2099.1/18047>.
- Gazeta.pl, 2015. Miał być internetowy system pacjenta. Jest awantura. Przez tzw. szynę usług portal e-Zdrowie znowu zagrożony, [http://pieniadze.gazeta.pl/pieniadz/1,136158,17223528,Mial\\_byc\\_internetowy\\_system\\_pacjenta\\_\\_Jest\\_awantura\\_.html](http://pieniadze.gazeta.pl/pieniadz/1,136158,17223528,Mial_byc_internetowy_system_pacjenta__Jest_awantura_.html), access: March 2015.
- GIODO Generalny Inspektor Ochrony Danych Osobowych. Responsibilities of the Inspector General for Personal Data Protection, [http://www.giodo.gov.pl/138/id\\_art/368/j/en/](http://www.giodo.gov.pl/138/id_art/368/j/en/), access: April 2015.
- Glinkowski, W. & Czyżewska, A., 2014. *Rehabilitacja zdalnie nadzorowana u pacjentów ze zmianami zwyrodnieniowymi stawu biodrowego*, <http://www.telemedycyna.org/wp-content/uploads/2014/10/16-A.Czy%C5%BCewska-Rehabilitacja-zdalnie-nadzorowana....pdf>
- Gothard, P., 2013. Abandoned NHS IT project costs taxpayers £10bn - and there may be more to come - 18 Sep 2013 - Computing News. *Computing*, <http://www.computing.co.uk/ctg/news/2295455/abandoned-nhs-it-project-costs-taxpayers-gbp10bn-and-there-may-be-more-to-come>, access: 4 May 2015.
- Ham, C., Dixon, A. & Brooke, B., 2012. *Transforming the Delivery of Health and Social Care: The case for fundamental change*, pp.1–52, [http://www.kingsfund.org.uk/sites/files/kf/field/field\\_publication\\_file/transforming-the-delivery-of-health-and-social-care-the-kings-fund-sep-2012.pdf](http://www.kingsfund.org.uk/sites/files/kf/field/field_publication_file/transforming-the-delivery-of-health-and-social-care-the-kings-fund-sep-2012.pdf).
- Hartlev, Mette, 2014. *Overview of the National Laws on Electronic Health Records in the EU Member States. National Report for Denmark*, [http://ec.europa.eu/health/ehealth/docs/laws\\_denmark\\_en.pdf](http://ec.europa.eu/health/ehealth/docs/laws_denmark_en.pdf).
- Health and Social Care Board, 2015. *eHealth and Care Strategy for Northern Ireland. Improving health and wealth through the use of information and communication technology.*, Available at: [http://www.hsboard.hscni.net/consult/PreviousConsultations/2014-15eHealth\\_and\\_Care\\_Strategy\\_Consultation/Consultation\\_Document-e-Health\\_and\\_Care-PDF\\_2mb.pdf](http://www.hsboard.hscni.net/consult/PreviousConsultations/2014-15eHealth_and_Care_Strategy_Consultation/Consultation_Document-e-Health_and_Care-PDF_2mb.pdf).
- Health Information Institute. *NHS Electronic Health Record System*, [http://www.msssi.gob.es/organizacion/sns/planCalidadSNS/docs/HCDSNS\\_English.pdf](http://www.msssi.gob.es/organizacion/sns/planCalidadSNS/docs/HCDSNS_English.pdf)
- Hospital La Paz Institute for Health Research, 2011. *Home*, <http://www.idipaz.es>, access: 3 April 2015.
- Imatis : Integrated Healthcare. Products. Imatis Visi, [http://www.imatis.com/imatis/Visi\\_product.html](http://www.imatis.com/imatis/Visi_product.html), access: 2 March 2015.
- Juhl, A., 2007. *E-health in Denmark. eHealth as a part of a coherent Danish health care system*, [http://www.sum.dk/~media/Filer - Publikationer\\_i\\_pdf/2012/Sundheds-IT/Sundheds\\_IT\\_juni\\_web.ashx](http://www.sum.dk/~media/Filer_Publikationer_i_pdf/2012/Sundheds-IT/Sundheds_IT_juni_web.ashx).

Junta de Andalucía, 2015. *Diraya - Historia clínica electrónica*, [http://www.juntadeandalucia.es/servicioandaluzdesalud/principal/documentosacc.asp?pagina=pr\\_diraya](http://www.juntadeandalucia.es/servicioandaluzdesalud/principal/documentosacc.asp?pagina=pr_diraya), access: 4 March 2015.

Junta de Andalucía, 2015. *Oficina Virtual*, [http://ws003.juntadeandalucia.es/pls/intersas/servicios.acceso\\_portal](http://ws003.juntadeandalucia.es/pls/intersas/servicios.acceso_portal), access: 4 March 2015.

Junta de Andalucía, 2015. *Receta Electrónica. FAQs*, [http://ws027.juntadeandalucia.es/principal/documentosacc.asp?pagina=gr\\_farmacia&file=/contenidos/gestioncalidad/gasistencial/farmacia%5CqueesRecetaElectronica.html#diez](http://ws027.juntadeandalucia.es/principal/documentosacc.asp?pagina=gr_farmacia&file=/contenidos/gestioncalidad/gasistencial/farmacia%5CqueesRecetaElectronica.html#diez), access: 4 March 2015.

Junta de Andalucía, 2015. *Receta Electrónica. FAQs*, [http://ws027.juntadeandalucia.es/principal/documentosacc.asp?pagina=gr\\_farmacia&file=/contenidos/gestioncalidad/gasistencial/farmacia%5CqueesRecetaElectronica.html#diez](http://ws027.juntadeandalucia.es/principal/documentosacc.asp?pagina=gr_farmacia&file=/contenidos/gestioncalidad/gasistencial/farmacia%5CqueesRecetaElectronica.html#diez), access: 4 March 2015.

Kigmed, 2011. Kigmed – O projekcie, [http://kigmed.eu/o\\_projekcie.php](http://kigmed.eu/o_projekcie.php), access: March 2015.

Masiarz, P., Karlińska, M. & Mężyk, R., 2014. *Regionalne Systemy Informacji Medycznej – przykład z województwa świętokrzyskiego*, <http://www.telemedycyna.org/wp-content/uploads/2014/10/06-P.Masiarz-Regionalne-Systemy-Informacji-Medycznej.pdf>.

Medd, C., 2013. Why 2013 could turn out to be a watershed year for telehealth. *The Guardian*, <http://www.theguardian.com/healthcare-network/2013/jul/01/2013-watershed-year-telehealth>, access: April 2015.

Mężyk, R., Karlińska, M. & Masiarz, P., 2014. *E-Zdrowie w Województwie Świętokrzyskim, rozbudowa i wdrażanie systemów informatycznych w jednostkach służby zdrowia - etap I*, <http://www.telemedycyna.org/prezentacje-konferencji-telemedycyna-i-e-zdrowie-2014>, access: 3 March, 2015.

Milieu Ltd, and Time.lex, 2014. *Overview of the National Laws on Electronic Health Records in the EU Member States and Their Interaction with the Provision of Cross-Border eHealth Services*, [http://ec.europa.eu/health/ehealth/docs/laws\\_report\\_recommendations\\_en.pdf](http://ec.europa.eu/health/ehealth/docs/laws_report_recommendations_en.pdf).

Ministerio de Sanidad Servicios Sociales e Igualdad, 2012. *Informe anual del Sistema Nacional de Salud, 2012*, <http://www.msssi.gob.es/estadEstudios/estadisticas/sisInfSanSNS/tablasEstadisticas/infsns2012.pdf>.

Ministerio de Sanidad Servicios Sociales e Igualdad, 2014. Fases del desarrollo del Proyecto, <http://www.msssi.gob.es/profesionales/hcdsns/contenidoDoc/fases.htm>, access: April 2015.

Ministerio de Sanidad Servicios Sociales e Igualdad, 2014. Situación actual del Proyecto, <http://www.msssi.gob.es/profesionales/hcdsns/contenidoDoc/situacionActual.htm>, access: April 2015.

Ministerstwo Zdrowia, 2009. *Kierunki informatyzacji e-Zdrowie Polska na lata 2011-2015*, [http://www2.mz.gov.pl/wwwfiles/ma\\_struktura/docs/kierunki\\_e\\_zdrowie\\_09022011.pdf](http://www2.mz.gov.pl/wwwfiles/ma_struktura/docs/kierunki_e_zdrowie_09022011.pdf).

- Ministerstwo Zdrowia, 2011. *Ustawa z dnia 28 kwietnia 2011 o systemie informacji o ochronie zdrowia*, [http://www2.mz.gov.pl/wwwfiles/ma\\_struktura/docs/ustawaoi\\_29062011.pdf](http://www2.mz.gov.pl/wwwfiles/ma_struktura/docs/ustawaoi_29062011.pdf).
- Muñoz, Juan Fernando, 2013. *eHealth in Spain: A Strategy for a Decentralised National Health Service*, <http://www.europarl.europa.eu/document/activities/cont/201309/20130923ATT71806/20130923ATT71806EN.pdf>.
- Najbuk, P., 2014. *Telemedycyna – aktualny stan prawny i perspektywy zmian w przyszłości*. *DZP Life Sciences Law Blog*, <http://blog.dzp.pl/pharma/telemedycyna-aktualny-stan-prawny-i-perspektywy-zmian-w-przyszlosci/>, access: March 2015.
- National Archives. Access to Health Records Act 1990, <http://www.legislation.gov.uk/ukpga/1990/23/contents>, access: 2 May 2015.
- National Archives. Access to Medical Reports Act 1988, <http://www.legislation.gov.uk/ukpga/1988/28/contents>, access: 2 May 2015.
- National Archives. Data Protection Act 1998, <http://www.legislation.gov.uk/ukpga/1998/29/contents>, access: March 2015.
- National Archives. Electronic Communications Act 2000, <http://www.legislation.gov.uk/ukpga/2000/7/contents>, access: March 2015.
- National Archives. Freedom of Information Act 2000, <http://www.legislation.gov.uk/ukpga/2000/36/contents>, access: March 2015.
- National Archives. Public Records Act 1958, <http://www.legislation.gov.uk/ukpga/Eliz2/6-7/51/contents>, access: March 2015.
- National Information Board, 2014. *Personalised Health and Care 2020. Using Data and Technology to Transform Outcomes for Patients and Citizens. A Framework for Action*, [http://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/384650/NIB\\_Report.pdf](http://www.gov.uk/government/uploads/system/uploads/attachment_data/file/384650/NIB_Report.pdf).
- Newham Council, 2013. *Newham Telehealth and Hospital In-reach Service. What is telehealth?*, <http://adultsocialcare.newham.gov.uk/pages/telehealth.aspx>, access: 3 March 2015.
- NHS Greater Glasgow and Clyde. *Strides forward in cancer care*, <http://www.nhsggc.org.uk/our-performance/celebrating-success/medical-advances/strides-forward-in-cancer-care>, access: 4 March 2015.
- NIK, 2012. *Informacja o wynikach kontroli. Informatyzacja szpitali*, <http://www.nik.gov.pl/plik/id,4849,vp,6462.pdf>.
- Nøhr, C. et al., 2006. *EPJ-Observatoriet. Statusbeskrivelser for EPJ i amterne 2006*, [http://www.epj-observatoriet.dk/publikationer/Statusbeskrivelser2006\\_WEB.pdf](http://www.epj-observatoriet.dk/publikationer/Statusbeskrivelser2006_WEB.pdf).
- Nyczaj, K., 2014. *Byliśmy pierwsi. Wywiad z Markiem Nowakiem, dyrektorem Regionalnego Szpitala Specjalistycznego w Grudziądzu. Blog Krzysztofa Nyczaja*, <http://nyczaj.blog.onet.pl/2014/10/30/bylismy-pierwsi-wywiad-z-markiem-nowakiem-dyrektorem-regionalnego-szpitala-specjalistycznego-w-grudziadzu>, access: 3 March 2015.

- Nyczaj, K., 2015. *Elektroniczna dokumentacja medyczna – ciąg dalszy nastąpił*. Blog Krzysztofa Nyczaja, <http://nyczaj.blog.onet.pl/2015/01/17/elektroniczna-dokumentacja-medyczna-ciag-dalszy-nastapil/>, access: March 3, 2015.
- Okoniewska, M., 2014. *Grudziądzki szpital Liderem Informatyki 2014*. [zdrowie.abc.com.pl](http://www.zdrowie.abc.com.pl/czytaj/-/artykul/grudziadzki-szpital-liderem-informatyki-2014), <http://www.zdrowie.abc.com.pl/czytaj/-/artykul/grudziadzki-szpital-liderem-informatyki-2014>, access: 3 March 2015.
- Onet Biznes, 2015. *CSIOZ: zakończenie budowy platformy e-zdrowie nadal możliwe w tym roku – Biznes*, <http://biznes.onet.pl/wiadomosci/kraj/csioz-zakonczenie-budowy-platformy-e-zdrowie-nadal-mozliwe-w-tym-roku/zkpe7>, access: March 2015.
- Pasek, A., 2013. *Małopolska: system telemedycyny ratunkowej usprawni leczenie chorych na serce*. [zdrowie.abc.com.pl](http://www.zdrowie.abc.com.pl/czytaj/-/artykul/malopolska-system-telemedycyny-ratunkowej-usprawni-leczenie-chorych-na-serce), <http://www.zdrowie.abc.com.pl/czytaj/-/artykul/malopolska-system-telemedycyny-ratunkowej-usprawni-leczenie-chorych-na-serce>, access: March 2015.
- Payne, J., 2013. *SPICe Briefing eHealth in Scotland*, [http://www.scottish.parliament.uk/ResearchBriefingsAndFactsheets/S4/SB\\_13-10.pdf](http://www.scottish.parliament.uk/ResearchBriefingsAndFactsheets/S4/SB_13-10.pdf).
- Pędziński, B. & Sowa, P., 2014. *Stopień wdrożenia elektronicznej dokumentacji medycznej w placówkach podstawowej opieki zdrowotnej w Polsce*, <http://www.telemedycyna.org/wp-content/uploads/2014/10/20-B.P%C4%99dzinski-Stopie%C5%84-wdrozenia-EDM-w-POZ-w-Polsce.pdf>.
- Polish Telemedicine Society, Polskie Towarzystwo Telemedycyny. E-Zdrowia. Polish Telemedicine Society, <http://www.telemedycyna.org>, access: 22 April 2015.
- Rada Ministrów, 2012. *Uchwała Nr 157 Rady Ministrów z dnia 25 września 2012 r. w sprawie przyjęcia Strategii Rozwoju Kraju 2020*, [http://g.ekspert.infor.pl/p/\\_dane/akty\\_pdf/MPO/2012/170/882.pdf](http://g.ekspert.infor.pl/p/_dane/akty_pdf/MPO/2012/170/882.pdf).
- Ramesh, R., 2015. *NHS disregards patient requests to opt out of sharing medical records*. *The Guardian*, <http://www.theguardian.com/society/2015/jan/22/nhs-disregards-patients-requests-sharing-medical-records>, access: April 2015.
- Red.es, 2012. *TIC Y Salud: Aplicaciones Móviles, Redes Sociales E Iniciativas Públicas*, *Ministerio de Industria, Energía y Turismo*. <http://www.red.es/redes/sala-de-prensa/reportaje/tic-y-salud-aplicaciones-moviles-redes-sociales-e-iniciativas-publicas>, access: 2 May 2015.
- Roig, F. & Saigó, F., 2011. *Barreras para la normalización de la telemedicina en un sistema de salud basado en la concertación de servicios*. *Gaceta Sanitaria*, 25(5), pp.397–402.
- RynekZdrowia.pl, 2008. *Dr Wojciech Glinkowski z Centrum Doskonałości Tele Orto: Telemedycyna ma wypełniać luki*, <http://www.rynekzdrowia.pl/rynek-zdrowia/dr-wojciech-glinkowski-z-centrum-doskonalosci-tele-orto-telemedycyna-ma-wypelniac-luki,51043.html>, access: March 3, 2015.
- Scottish Government & NHS Scotland, 2012. *eHealth Strategy 2011-2017 (Revised July 2012 to include a Sixth Strategic Aim)*, *Edinburgh: the Scottish Government*, <http://www.gov.scot/Resource/0040/00409128.pdf>.

- Sejm Rzeczypospolitej Polskiej, 2015. *Informacja o posiedzeniu Komisji Innowacyjności i Nowoczesnych Technologii*, <http://www.sejm.gov.pl/sejm7.nsf/komunikat.xsp?documentId=5AB1A022D207AE84C1257DCF00481B20>.
- Statens Serum Institut, 2015. Shared Medication Record, [http://www.ssi.dk/English/HealthdataandICT/The National eHealth Authority/FMK.aspx](http://www.ssi.dk/English/HealthdataandICT/The%20National%20eHealth%20Authority/FMK.aspx), access: 3 May 2015.
- Summaries of EU Legislation, 2010. eEurope 2005, [http://europa.eu/legislation\\_summaries/information\\_society/strategies/l24226\\_en.htm](http://europa.eu/legislation_summaries/information_society/strategies/l24226_en.htm), access: April 2015.
- Sundhedsstyrelsen, 2008, Informationssikkerhed – vejledning for sundhedsvæsenet, [http://sundhedsstyrelsen.dk/publ/Publ2008/SDSD/Infosikkerhed\\_vejl08.pdf](http://sundhedsstyrelsen.dk/publ/Publ2008/SDSD/Infosikkerhed_vejl08.pdf)
- Sundhedsstyrelsen, 2014. Telemedicin, [http://sundhedsstyrelsen.dk/da/uddannelse-  
autorisation/autorisation/autorisation-og-pligter/telemedicin](http://sundhedsstyrelsen.dk/da/uddannelse-autorisation/autorisation/autorisation-og-pligter/telemedicin), access: 1 May 2015.
- Telecare Services Association. *What is Telecare?*, <http://www.telecare.org.uk/consumer-services/what-is-telecare>, access: 3 March 2015.
- TerMedia.pl, 2013. Instytut Kardiologii stawia na telemedycynę, [http://www.termedia.pl/Instytut\\_Kardiologii\\_stawia\\_na\\_telemedycyne-2013](http://www.termedia.pl/Instytut_Kardiologii_stawia_na_telemedycyne-2013), access: March 2015.
- Version2, 2012. Her er 5 kendte problemer med sundheds-it anno 2012, <http://www.version2.dk/galleri/sundheds-it-dummies-her-er-de-5-store-problemer-anno-2012-48252#5>, access: April 2015.
- Whitehouse, D., Giest, S. & Artmann, J., 2010. *eHealth Strategies. Country Brief: Scotland*, [http://ehealth-  
strategies.eu/database/documents/Scotland\\_CountryBrief\\_eHStrategies.pdf](http://ehealth-strategies.eu/database/documents/Scotland_CountryBrief_eHStrategies.pdf).
- Whole System Demonstrator. *Home*, <http://www.newhamwsdtrial.org>, access: 3 March 2015.
- Zgliczyński, W. et al., 2013. Telemedycyna w Polsce – bariery rozwoju w opinii lekarzy. *Medycyna Ogólna i Nauki o Zdrowiu*, 19(4), pp.496–499, <http://jml2012.indexcopernicus.com/fulltxt.php?ICID=1096968>
- Zhuang, C.-L. et al., 2013. Enhanced Recovery After Surgery Programs Versus Traditional Care for Colorectal Surgery. *Diseases of the Colon & Rectum*, 56(5), pp.667–678, <http://content.wkhealth.com/linkback/openurl?sid=WKPTLP:landingpage&an=00003453-201305000-00018>.

## Appendix

### E-health success stories – case studies

#### Denmark

##### Imatis

A regional PPI-project (Public-Private Innovation) – all departments in the 9 hospitals of Region Zealand now have Imatis<sup>115</sup>. The development phase was a 2 year period and the implementation period lasted for 3 years (the last 3 years). Imatis is a digital solution that gives healthcare professionals an overview of their admitted or awaited patients – it takes the whiteboard overview a step further and can help communicate between departments, so that healthcare professionals prioritize and follow up on their patients.

##### Shared Medication Record

The Shared Medication Record<sup>116</sup> is a national service that enables healthcare providers to see patients' complete and current medication information at any point of care. The Project started in 2009 and was fully implemented in 2014.

#### Poland

Although there are many e-health solutions introduced by private companies (based on overview of the offer, conference presentations<sup>117</sup> & reports<sup>118</sup>), the results and evaluations are not available. It is also impossible to reliably estimate how many of specific services are offered country-wide on a regular basis. As was already pointed out during introductory research, many Polish case studies are based on pilot projects. Even if they turn out successful, due to lack of financing, they are not economically sustainable in public healthcare. Hence, once the pilot project ends along with external funding, so can the project itself.

##### Telerehabilitation platform Excellence Centre 'Teleorto'

Established by the Ministry of Science and Computerisation in 2004, and run by the Clinic of Orthopaedics and Muscoskeletal System Traumatology of the Medical University of Warsaw

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<sup>115</sup> Imatis : *Integrated Healthcare*. Products. Imatis Visi, [http://www.imatis.com/imatis/Visi\\_product.html](http://www.imatis.com/imatis/Visi_product.html), access: 2 March 2015.

<sup>116</sup> Statens Serum Institut, 2015. *Shared Medication Record*, [http://www.ssi.dk/English/HealthdataandICT/The National eHealth Authority/FMK.aspx](http://www.ssi.dk/English/HealthdataandICT/The%20National%20eHealth%20Authority/FMK.aspx), access: 3 May 2015.

<sup>117</sup> Glinkowski, W., 2014. *Telemedycyna i eZdrowie 2014. Streszczenia*, <http://www.e-zdrowie.org/Book-of-Abstracts-Telemedicine-eHealth-2014-September-24th-2014.pdf>

<sup>118</sup> Bujok, J. et al., 2014. *Uwarunkowania Rozwoju Telemedycyny w Polsce. Potrzeby bariery, korzyści, analiza rynku, rekomendacje. Raport*, Economic Chamber Medycyna Polska, [http://izbamedpol.pl/data/Pliki/94/Plik/Raport---telemedycyna-\(fin\)22.07.2014.pdf](http://izbamedpol.pl/data/Pliki/94/Plik/Raport---telemedycyna-(fin)22.07.2014.pdf).

(Klinika Ortopedii i Traumatologii Narządu Ruchu Akademii Medycznej w Warszawie), the Excellence Centre combines ongoing research with technological innovation<sup>119</sup>.

The Centre implemented and tested effectiveness of various physical therapy products that allow for functional and motor rehabilitation coupled with biomechanical evaluation based on data transferred from the product to computer. Those include Hand Tutor, Leg Tutor, Arm Tutor and 3D-Tutor (for various body parts)<sup>120</sup>.

Moreover, the Centre took part in CLEAR Project<sup>121</sup>, where an Internet communication platform *Habilis* was launched to enable patients not in a position to travel to their therapist to exercise under on-line supervision and communicate with their physical therapist.

The projects are mainly of regional scale, albeit conducted as part of international cooperation.

Although no official evaluations of the Centre exist, it enjoys a good opinion and widens its operations. The success was attributed by dr Wojciech Glinkowski<sup>122</sup> to interdisciplinary approach. It is also visible that the Centre engaged the patients, evaluating their subjective satisfaction alongside collecting hard medical data. Active cooperation with international telemedicine bodies, enabling Polish specialists to draw on the experiences of their colleagues is also likely to have contributed to the overall success of the institution.

### **Świętokrzyskie Province Oncology Centre (Świętokrzyskie Centrum Onkologii)**

Official name: *e-Zdrowie w Województwie Świętokrzyskim, rozbudowa i wdrażanie systemów informatycznych w jednostkach służby zdrowia - etap I*. It involves multiple institutions (Oncology Centre, Regional Hospital in Kielce, Świętokrzyskie Centre of Emergency Medicine and Sanitary Transport and Regional Hospital of St Rafael in Czerwona Góra), and is co-financed by EU. The project encompassed development of:<sup>123,124</sup>

- An electronic platform of medical data exchange,
- A teleradiological communication node,
- A patient's platform – including medical history, prescription history etc.

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<sup>119</sup> Glinkowski, W. & Czyżewska, A., 2014. *Rehabilitacja zdalnie nadzorowana u pacjentów ze zmianami zwyrodnieniowymi stawu biodrowego*, <http://www.telemedycyna.org/wp-content/uploads/2014/10/16-A.Czy%C5%BCewska-Rehabilitacja-zdalnie-nadzorowana....pdf>

<sup>120</sup> Ibidem.

<sup>121</sup> Glinkowski, W., 2014. *Telemedycyna i eZdrowie 2014. Streszczenia*, <http://www.e-zdrowie.org/Book-of-Abstracts-Telemedicine-eHealth-2014-September-24th-2014.pdf>

<sup>122</sup> RynekZdrowia.pl, 2008. Dr Wojciech Glinkowski z Centrum Doskonałości Tele Orto: *Telemedycyna ma wypełniać luki*, <http://www.rynekzdrowia.pl/rynek-zdrowia/dr-wojciech-glinkowski-z-centrum-doskonalosci-tele-orto-telemedycyna-ma-wypelniac-luki,51043.html>, access: March 3, 2015.

<sup>123</sup> Masiarz, P., Karlińska, M. & Mężyk, R., 2014. *Regionalne Systemy Informacji Medycznej – przykład z województwa świętokrzyskiego*, <http://www.telemedycyna.org/wp-content/uploads/2014/10/06-P.Masiarz-Regionalne-Systemy-Informacji-Medycznej.pdf>.

<sup>124</sup> Mężyk, R., Karlińska, M. & Masiarz, P., 2014. *E-Zdrowie w Województwie Świętokrzyskim, rozbudowa i wdrażanie systemów informatycznych w jednostkach służby zdrowia - etap I*, <http://www.telemedycyna.org/prezentacje-konferencji-telemedycyna-i-e-zdrowie-2014>, access: 3 March, 2015.

The project resulted<sup>125</sup> in shorter registration waiting periods and cost rationalisation. Laboratory and pharmacy systems were modernised as well, leading to faster work. It lasted 2007-2013. One of the more remarkable achievements was medical records exchange system that guarantees data safety. Increased cooperation in terms of mutual services between involved healthcare facilities resulted in cost reduction: patient was treated by multiple units at the same time<sup>126</sup>.

### **Regional Specialised Hospital in Grudziądz**

The hospital is one of the best computerised in Poland<sup>127</sup>. The process started in 2008 and, although never really completed, achieved its goals in 2014. Through its close cooperation with Poznan University of Technology, it served as a testing ground for some solutions later implemented elsewhere. Health records are kept in solely electronic form since 2010. It has systems of monitoring, patient band identification, equipment monitoring. Its EHR are shared with rescue services.

Computerisation included pharmacy as well: drug preparation is performed by robots and supervised by special system. This minimises mistakes and gives more time to nurses.<sup>128</sup> Last but not least, since all tests are recorded, abuse of the system has been eliminated. The hospital is widely praised for its commitment to its pioneering spirit and good implementation. It provides an example of how computerisation can benefit healthcare financially and in human terms. Notably, the projects are not prompted by national policies, but initiated by the hospital itself.

## **Spain**

### **Unique Health History of Andalusia (Electronic Health Record of Andalusia)**

Unique Health History of Andalusia, is a regional project that aims to get a unified EHR (Electronic Health Record) along all regions in Andalusia, so that from all primary consultations and hospital within the region, EHR from patients can be accessed. This regional project<sup>129</sup> was initiated in 2000 and is still on-going. Spain began its electronic health record (EHR) initiative in the region of Andalusia, implementing EHRs for 8 million people.

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<sup>125</sup> Mężyk, R., Karlińska, M. & Masiarz, P., 2014. *E-Zdrowie w Województwie Świętokrzyskim, rozbudowa i wdrażanie systemów informatycznych w jednostkach służby zdrowia - etap I*, <http://www.telemedycyna.org/prezentacje-konferencji-telemedycyna-i-e-zdrowie-2014>, access: 3 March, 2015.

<sup>126</sup> Ibidem.

<sup>127</sup> Nyczaj, K., 2014. *Byliśmy pierwsi. Wywiad z Markiem Nowakiem, dyrektorem Regionalnego Szpitala Specjalistycznego w Grudziądzu. Blog Krzysztofa Nyczaja*, <http://nyczaj.blog.onet.pl/2014/10/30/bylismy-pierwsi-wywiad-z-markiem-nowakiem-dyrektorem-regionalnego-szpitala-specjalistycznego-w-grudziadzu>, access: 3 March 2015.

<sup>128</sup> Okoniewska, M., 2014. *Grudziądzki szpital Liderem Informatyki 2014. zdrowie.abc.com.pl*, <http://www.zdrowie.abc.com.pl/czytaj/-/artykul/grudziadzki-szpital-liderem-informatyki-2014>, access: 3 March 2015.

<sup>129</sup> Junta de Andalucía, 2015. *Diraya - Historia clínica electrónica*, [http://www.juntadeandalucia.es/servicioandaluzdesalud/principal/documentosacc.asp?pagina=pr\\_diraya](http://www.juntadeandalucia.es/servicioandaluzdesalud/principal/documentosacc.asp?pagina=pr_diraya), access: 4 March 2015.

This effort has since then been expanded to other regions of the country, and the regional health records are now being integrated at a federal level. By 2010, more than 95% of primary healthcare providers across Spain used the electronic records, and this EHR has been successfully deployed in all hospitals in Andalusia region. The system is integrated in a project with a wider scope called DIRAYA, which covers the EHR, electronic prescription and access via Internet to other healthcare services for the citizen. So, the EHR is connected also to electronic prescription, which was started In 2005, when Spanish government began implementing electronic prescriptions as well, and by 2010 more than 250 million prescriptions were submitted electronically to pharmacies, placing Spain among the top nations in the world for utilization of these technologies. In the regions where the e-prescriptions are employed, visits to primary care physicians have decreased by about 15%.

### **Receta XXI** (Prescription XXI)

Receta XXI is a system of prescription and distribution of drugs and medical products covered by public funding that was implemented in the years 2005-2013 in the province of Andalusia. Public health authorities involved in this project are SAS (Servicio Andaluz de Salud, meaning Andalusian Healthcare Service) and Junta de Andalucía (Regional authorities in Andalusia). Taking advantage of the possibilities that current information technology and telecommunications offer, it has advantages over traditional paper prescription.<sup>130</sup> This solution provides benefits to citizens, healthcare professionals and pharmacists. Some of the expected advantages are the following<sup>131</sup>:

- It improves treatment compliance.
- It facilitates patient's access to the pharmaceutical service, as they could obtain full prescribed treatment by using the pharmacy service. Going to their primary care centre just to get the prescriptions will not be anymore needed. This will be specially useful in the case of chronic diseases patients.
- Medical doctors will be able to prescribe, just by one action and prescription, all medications needed for their patients and the quantity patient is going to need to assure guideline and length of the treatment they are prescribing.
- It will improve treatment management along other hospitals and primary care centres, by using the information system provided with electronic prescription.
- Medical doctors can check medicines dispensing in pharmacy offices and getting information about treatment adherence.
- Paperwork is reduced. Only when a new treatment is prescribed, new authorization will be requested. Traditionally, an authorization for every prescription was needed.
- Facilitates pharmacist and medical doctor's communication about treatment.
- It provides an important tool for pharmacovigilance.

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<sup>130</sup> Junta de Andalucía, 2015. *Receta Electrónica. FAQs*,  
[http://ws027.juntadeandalucia.es/principal/documentosacc.asp?pagina=gr\\_farmacia&file=/contenidos/gestioncalidad/gasistencial/farmacia%5CqueesRecetaElectronica.html#diez](http://ws027.juntadeandalucia.es/principal/documentosacc.asp?pagina=gr_farmacia&file=/contenidos/gestioncalidad/gasistencial/farmacia%5CqueesRecetaElectronica.html#diez), access: 4 March 2015.

<sup>131</sup> Junta de Andalucía, 2015. *Receta Electrónica. FAQs*,  
[http://ws027.juntadeandalucia.es/principal/documentosacc.asp?pagina=gr\\_farmacia&file=/contenidos/gestioncalidad/gasistencial/farmacia%5CqueesRecetaElectronica.html#diez](http://ws027.juntadeandalucia.es/principal/documentosacc.asp?pagina=gr_farmacia&file=/contenidos/gestioncalidad/gasistencial/farmacia%5CqueesRecetaElectronica.html#diez), access: 4 March 2015.



The success of the project may be attributed largely to efficient deployment by the public health authorities and a solid legal basis, with Decree 181/2007, 19<sup>th</sup> June regulating its use.

### **InterS@S**

InterS@S is a system allowing the Andalusian Public Health System (APHS) provide services via Internet. InterS@S was implemented in 2002.

It was intended to work as 'virtual/electronic office', and aims to provide the Andalusian citizens with information and on-line transactions of their relationship with healthcare.<sup>132</sup>

Some of the actions that can be performed electronically using this system are the following: It allows patients access to their personal data, arrange doctor appointments, schedule vaccinations appointments, request the healthcare services card, access their Electronic Health Record (via ClicSalud, an web service provided with this aim), choose their medical doctor and centre, to shift temporarily to other location, to change their contact data, as well as requesting a Medical Second Opinion and look up Waiting List for Surgeries.

### **UK**

#### **CEPAS**

A Chemotherapy Electronic Prescribing and Administration System (CEPAS)<sup>133</sup> began operation at the Beatson West of Scotland cancer hub in December 2010, beginning a roll-out programme that will see implementation across four west of Scotland Boards in 2011.

CEPAS is an on-line system prescribing system which allows patients from across the west of Scotland to receive chemotherapy in their local hospital, albeit prescribed by their doctor based at the Beatson in Glasgow. The scope of the project is regional, and now other regional cancer networks are also implementing regionally networked CEPAS systems. Benefits of CEPAS include: improved patient safety; more people-centred delivery of services locally; improved communication; and effective use of resources

#### **COPD home-monitoring**

The chronic obstructive pulmonary disease (COPD)<sup>134</sup> home-monitoring initiatives carried out in Scotland mainly use 'pods' or 'hubs', which are pieces of equipment placed in a patient's home allowing them to measure things such as their breathing and pulse rate. The data measured using this technology are transmitted from the patient's home to a health professional, such as a GP or respiratory nurse specialist, via broadband or a mobile phone, so they can review it and take any necessary action. There are currently 36 home pods in Argyll & Bute NHS with plan for a further 40.

Home-monitoring technology is designed to enable a patient to remain at home and be confident that they will receive prompt attention from a healthcare professional when needed.

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<sup>132</sup> Junta de Andalucía, 2015. *Oficina Virtual*,

[http://ws003.juntadeandalucia.es/pls/intersas/servicios.acceso\\_portal](http://ws003.juntadeandalucia.es/pls/intersas/servicios.acceso_portal), access: 4 March 2015.

<sup>133</sup> NHS Greater Glasgow and Clyde. *Strides forward in cancer care*,

<http://www.nhsggc.org.uk/our-performance/celebrating-success/medical-advances/strides-forward-in-cancer-care>, access: 4 March 2015.

<sup>134</sup> Argyll and Bute Community Planning Partnership. *Argyll and Bute Community Plan and Single Outcome Agreement 2012-2013*, <http://www.argyll-bute.gov.uk/sites/default/files/CP%20SOA%2012-13.pdf>.

It can help patients to look after their health more effectively and take more control over their own treatment. Other potential benefits of the telehealth approach include reductions in emergency hospital admissions and earlier discharge from hospital for patients.

### **Newham Telehealth Services Whole System Demonstrator**

Newham Telehealth Services Whole System Demonstrator<sup>135</sup> (WSD) is a trial project conducted in Newham, Kent and Cornwall. Newham Council and Primary Care Trust were successful in their bid to become one of three sites to take part in the trial. Around 2000 local residents are taking part and have the opportunity of using either the TeleCare<sup>136</sup> (the use of communication technology to offer support and assistance from a distance) or TeleHealth<sup>137</sup> (technology to support people diagnosed with a long term medical condition to monitor, manage and control their own health) systems in their homes. Two-year research project funded by The Department of Health to find out how technology can help people manage their own health while maintaining their independence, the WSD was launched in 2008. The results of the trial show that, if delivered properly, telehealth can substantially reduce mortality, reduce the need for admissions to hospital, lower the number of bed days spent in hospital and reduce the time spent in A&E. The early indications from the trial show that if used correctly telehealth can deliver a 15% reduction in A&E visits, a 20% reduction in emergency admissions, a 14% reduction in elective admissions, a 14% reduction in bed days and an 8% reduction in tariff costs. More strikingly they also demonstrate a 45% reduction in mortality rates.

### **E-health failure stories – case studies:**

#### **Poland**

Small-scale projects are rarely if ever described when unsuccessful. No systematic study of e-health projects has been conducted so far. National, government-led projects are subject to much scrutiny and sometimes deemed unsuccessful.

#### **Electronic Health Records**

Keeping patient's health records in an electronic form is a prerequisite for efficient national e-health system. The Ministry of Health set a deadline for July 2011, making Centrum Systemów Informacyjnych Ochrony Zdrowia (Centre of Health Information Systems, CSIOZ) responsible for implementation. After this date, all health records would have to be kept in electronic form only.

The project proved to be a failure: healthcare institutions (hospitals, private practices, primary care) either did not start to use electronic records or continued to use the systems that they

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<sup>135</sup> Whole System Demonstrator. *Home*, <http://www.newhamwsdtrial.org>, access: 3 March 2015.

<sup>136</sup> Telecare Services Association. *What is Telecare?*, <http://www.telecare.org.uk/consumer-services/what-is-telecare>, access: 3 March 2015.

<sup>137</sup> Newham Council, 2013. *Newham Telehealth and Hospital In-reach Service. What is telehealth?*, <http://adultsocialcare.newham.gov.uk/pages/telehealth.aspx>, access: 3 March 2015.

had implemented before, which were incompatible one with another. At the request from the healthcare professionals, the deadline had to be moved to 2017, significantly pushing into the future achievement of interoperability of systems on the national level.

NIK (Najwyższa Izba Kontroli, the Supreme Audit Office) pointed out in its report several reasons for lack of success<sup>138</sup>:

- Lack of cooperation among the Ministry, CSIOZ and NFZ (National Health Fund),
- Resulting failure to recognise a need for adapted legal regulations,
- Failure to publish templates for documents and system requirements on time,
- Failure to provide on time technical solutions that would remove often prohibitive costs for some healthcare units.<sup>139</sup>

### **Introduction of computerisation in hospitals**

Computerisation of hospitals is necessary for implementation of e-health solutions on the national scale. The programme of computerisation has been realised since 2008, financed from EU budget. Responsibility for the programme lies with CSIOZ.

NIK negatively evaluated the process of computerisation in Polish hospitals. Around 30% of the systems, including those financed by EU funds, were incompatible with one another. Similar percentage of hospitals did not use medical documentation software. Main reasons were<sup>140</sup>:

- Failure to examine in sufficient detail the status of computerisation on the part of the Ministry of Health and CSIOZ,
- Underfunding of the computerisation agenda coupled with general financial hardship of Polish hospitals,
- Introduction of regional e-health programmes simultaneous to CSIOZ's programme, but not necessarily compatible with it,
- Delayed legislative reactions of the Ministry.

### **Integration of registers**

There are many independent persons and phenomena registered within Polish healthcare: nurses, doctors, facilities, analytical laboratories, blood donors, malignant neoplasms, etc. For historical reasons, these registers were fragmented, non-interoperable and usually not digitalised. They were kept by various bodies all around the country. It was one of objectives of P1 to gather and computerise them. However, there were both significant delays and gross inaccuracies in the data handed over to CSIOZ. According to NIK's report<sup>141</sup>, there were several causes for this:

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<sup>138</sup> NIK, 2012. *Informacja o wynikach kontroli. Informatyzacja szpitali*, <http://www.nik.gov.pl/plik/id,4849,vp,6462.pdf>

<sup>139</sup> Nyczaj, K., 2015. *Elektroniczna dokumentacja medyczna – ciąg dalszy nastąpił. Blog Krzysztofa Nyczaja*, <http://nyczaj.blog.onet.pl/2015/01/17/elektroniczna-dokumentacja-medyczna-ciag-dalszy-nastapil/>, access: March 3, 2015.

<sup>140</sup> NIK, 2012. *Informacja o wynikach kontroli. Informatyzacja szpitali*, <http://www.nik.gov.pl/plik/id,4849,vp,6462.pdf>

<sup>141</sup> NIK, 2012. *Informacja o wynikach kontroli. Informatyzacja szpitali*, <http://www.nik.gov.pl/plik/id,4849,vp,6462.pdf>

- Delay in creating executive laws on the part of the Ministry,
- Failure on the part of the Minister to enforce the law and make the bodies responsible for keeping the registers to hand over the data,
- Lack of communication between the Ministry and CSIOZ; while the Ministry expected full action plan, CSIOZ delivered a report.

## Spain

### NHS Electronic Health Record System

The EHR System was set up<sup>142</sup> to guarantee citizens' access to their own health data and to the health data of those they represent that are available in digital format at any of the health services centres that make up the NHS. Additionally, it was supposed to ensure healthcare professionals' access to specific personal health data sets generated by a regional authority. The project ran from 2006 to 2013. Second phase has not been completed yet, because not all the regions that have taken part in the project yet. The project has not finished yet, as there are regions willing to join it. Project is not either closed or completed, it is just taking longer than expected initially. One of the aspects that has contributed to this delay, could be the different level of development of the EHR in the different regions.

### Fast-Track

The project was supposed to set up a communication system between the doctor and patients after colorectal surgeries<sup>143</sup>. The surgeon would have video calls with the patient and records of vital signs (temperature, oxygen saturation, blood pressure, etc.) available in real time. This system would reduce hospitalisation time from 12 to 6 days, together with the associated economic impact. Moreover, faster return home was assumed to improve quality of life and reduce post-surgery infection risk.

A multinational company was going to develop the software and perform a pilot programme in one of the reference hospitals specialising in colorectal surgery, La Paz University Hospital. With this proof of concept, it would be commercialized country-wide in three years. This protocol is already working in other countries with great success<sup>144,145,146,147</sup>.

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<sup>142</sup> HealthInformation Institute. *NHS Electronic Health Record System*,  
[http://www.msssi.gob.es/organizacion/sns/planCalidadSNS/docs/HCDNSNS\\_English.pdf](http://www.msssi.gob.es/organizacion/sns/planCalidadSNS/docs/HCDNSNS_English.pdf)

<sup>143</sup> Hospital La Paz Institute for Health Research, 2011. *Home*, <http://www.idipaz.es>, access: 3 April 2015.

<sup>144</sup> Fearon, K.C.H. et al., 2005. *Enhanced recovery after surgery: a consensus review of clinical care for patients undergoing colonic resection*. *Clinical nutrition (Edinburgh, Scotland)*, 24(3), pp.466–77, <http://www.sciencedirect.com/science/article/pii/S026156140500023>.

<sup>145</sup> Zhuang, C.-L. et al., 2013. *Enhanced Recovery After Surgery Programs Versus Traditional Care for Colorectal Surgery*. *Diseases of the Colon & Rectum*, 56(5), pp.667–678, <http://content.wkhealth.com/linkback/openurl?sid=WKPTLP:landingpage&an=00003453-201305000-00018>.

<sup>146</sup> Charua-Guindic, L., 2009. *A fast track program reduces complications and length of hospital stay after open colonic surgery*. *Rev Gastroenterol Mex*, 74(2), pp.141–142, <http://www.ncbi.nlm.nih.gov/pubmed/19666302>.

The project was one of the selected in the I Pasion >ie Call.<sup>148</sup> Due to the legal restrictions to creation of spin-outs in Hospitals in the Madrid Autonomous Community, it was not possible go on with the development (2012). Last year another multinational company was interested in the project and they are developing it right now.

## UK

In 2002 the National Programme for IT for the NHS was launched. The programme included the use of the Lorenzo patient records system to facilitate the storage of data for 220 trusts in the north, eastern England and the Midlands at a cost of £3.1bn. However, the project ran into difficulties which resulted in the system only covering 22 trusts. The Lorenzo project was launched in 2002 but faced challenging including changing specifications, technical challenges and disputes with suppliers which resulted in it falling behind schedule and over budget. Consequently, the rate of technological development externally meant that the project was not only running behind schedule, but was also no longer state of the art as new technologies were coming onto the market. In September 2011 ministers announced they would dismantle the National Programme but in an effort to salvage something from the failure said they would keep the component parts in place with separate management and accountability structures.<sup>149</sup> As a result the Public Accounts Committee (PAC) concluded that the attempt to upgrade NHS computer systems in England had become one of the ‘worst and most expensive contracting fiascos’ in public sector history<sup>150</sup>.

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<sup>147</sup> Counihan, T.C. & Favuzza, J., 2009. Fast track colorectal surgery. *Clinics in Colon and Rectal Surgery*, 22(1), pp.60–72.

<sup>148</sup> Pasion>ie (Passion for Innovation and Entrepreneurship) is a program launched for its first edition in 2011 by Accenture and IE Business School. Its main objective is to narrow links between innovative community and industry and to support new projects through a competition (in May the 4<sup>th</sup> edition winners will be announced).

<sup>149</sup> Gothard, P., 2013. Abandoned NHS IT project costs taxpayers £10bn - and there may be more to come - 18 Sep 2013 - Computing News. *Computing*, <http://www.computing.co.uk/ctg/news/2295455/abandoned-nhs-it-project-costs-taxpayers-gbp10bn-and-there-may-be-more-to-come>, access: 4 May 2015.

<sup>150</sup> BBC News, 2013. NHS IT system one of worst fiascos ever, say MPs, <http://www.bbc.com/news/uk-politics-24130684>, access: 4 May 2015.