
ECONOMICS

Sociology

Marcin Kautsch,
*Institute of Public Health,
Jagiellonian University Medical
College,
Kraków, Poland,
E-mail: mckautsc@mp.pl*

Mateusz Lichoń,
*Sociology Institute,
Jagiellonian University,
Kraków, Poland,
E-mail: mateusz.lichon@gmail.com*

Natalia Matuszak,
*Dane-i-Analizy.pl sp. z o.o.,
Kraków, Poland,
E-mail:
natalia.matuszak@gmail.com*

Received: December, 2015
1st Revision: March, 2016
Accepted: June, 2016

DOI: 10.14254/2071-
789X.2016/9-3/3

JEL Classification: I11, I18,
I19, L86

Keywords: barriers, eHealth, opportunities, Poland, telemedicine.

DEVELOPMENT OF PUBLICLY FUNDED EHEALTH IN POLAND: BARRIERS AND OPPORTUNITIES

ABSTRACT. eHealth is a fast growing area of health care. Its development is strongly supported by the European Commission (EC). In Poland, eHealth is connected mainly to medical information systems. Little attention is given to its clinical aspects. The paper aims at describing barriers and opportunities of public eHealth development in Poland. It is based on desk search studies and interviews conducted in Poland in the spring of 2015. An attempt to estimate size of the eHealth market was made. In the study 227 eHealth (and related) tenders announced in 2009-2015 (first half of the year) were identified and analysed. The results show that eHealth is still underdeveloped in Poland, and that it is not effectively supported by central government and the National Health Fund, the public purchaser of health services, which still does not recognize eHealth as a medical procedure. Identified eHealth initiatives can be described as pilot projects.

Introduction

eHealth is a fast growing area of health care systems in many countries (Iakovidis *et al.*, 2004), and expectations regarding diffusion and applications of eHealth are rising due to its cost-saving potential (Bell and Thornton, 2011; Kumar and Bauer, 2011).

However, as Toomas Hendrik Ilves, the president of eHealth Task Force, stated: “*We know that in health care we lag at least 10 years behind virtually every other area in the implementation of IT solutions. We know from a wide range of other services that information technology applications can radically revolutionise and improve the way we do things*” (European Commission, 2012a, p. 5).

eHealth development is strongly supported by the European Commission (EC). This development is considered desirable because of its actual and expected impacts on public health (European Commission, 2013, 2014). The EC also funds substantial number of eHealth programmes. eHealth Network, established on the basis of the Article 14 of the Directive 2011/24/EU (European Parliament and Council of the European Union, 2011), supports

coordination among member states, while programmes like European Innovation Partnership on Active and Healthy Ageing, the *Horizon 2020* or the *Digital Agenda* provide funding for various eHealth-related ventures and investments (European Commission, 2014, 2015a), with strong hopes attached to R&D aspects (European Commission, 2013).

eHealth (*e-zdrowie* in Polish) is a term widely used in national documents like acts, bills, reports and communicates in Poland. However, its definition is nowhere to be found in official Polish legal documents. Hence the definitions included in the official European Union documents related to eHealth seem to be taken as guidance. Judging from the context in which eHealth is talked about in national documents (Ministerstwo Zdrowia, 2009, 2011a; Ministerstwo Rozwoju Regionalnego, 2012), policy makers in Poland connect it mainly to medical information systems (registration, databases etc.), while relatively little, if any, attention is given to technologies directly supporting clinical services delivery. Although it is clear that in documents issued by the European Commission telemedicine is considered a part of eHealth, in Poland the term is often used by public institutions and experts as if it were a separate category¹. In these circumstances technologies such as telecare, teleconsultation, telemonitoring are classified under telemedicine, while ePrescriptions and eReferrals fall under eHealth (European Commission, 2004). In order to avoid the confusion, in this article we will use the broad understanding of eHealth that includes using information and communications technology (ICT) in health care (European Commission, n.d.).

The aim of this paper is to establish to what extent and in what way eHealth development was taking place in Polish public health care and if there were any national policy targets or European targets influencing this development.

The paper is based on the work carried out in the framework of the project: *European Procurers Platform – eHealth – Transforming the market for eHealth Solutions (EPP-eHealth)*². The goal of the project is to transform the market for eHealth solutions through dialogue and innovation procurement. The project aims at understanding the opportunities that eHealth can offer and promotion of new approaches to collaborative procurement of eHealth solutions. The following paper is concerned with the public health care sector in Poland only.

The first step to achieve the abovementioned aim was to understand the state-of-art of eHealth in the countries participating in the project (Denmark, Poland, Spain and the UK) as well as on the EU level. The presented paper shows the results of desk research studies and 4 interviews concerning Poland, conducted in spring 2015. Those methods were used to identify barriers to and opportunities for development of eHealth market specific to this country.

An official definition of eHealth used in national documents was searched for as well as official, national laws regulating eHealth. National plans for future eHealth development were identified with their targets, strategy and timeframes. Interviews were designed to map the scope of understanding of eHealth from the demand- and supply-side perspectives. The goal was to identify the most important issues concerning eHealth, including its perceived meaning, as well as barriers and opportunities for its development. Data gathered during the interviews served as a benchmark in preparation of desk research.

Those semi-structured interviews were conducted on a non-probabilistic convenience sample which included representatives of two public hospitals, one private health care provider and representatives of private companies offering eHealth solutions. Although such sample made any kind of generalizations impossible, it enabled researchers to map out the

¹ Examples of this usage include: Łódź Province (ezdrowie.lodzkie.pl/ezdrowie/definicja-ezdrowia-i-telemedycyny), Polish Telemedicine Society (telemedycyna.org), NFZ Academy (akademia.nfz.gov.pl/telemedycyna-i-e-zdrowie).

² Grant Agreement number: 644461 – EPP-eHealth – H2020-ICT-2014/H2020-ICT-2014-1.

most important notions of eHealth. Those notions were then developed in a desk study part of the research, in which relevant data was derived from national laws, domestic and European reports, academic and news-related articles and websites.

Based on available secondary data, the most important barriers and opportunities for development of eHealth solutions were identified. There was also an attempt to estimate size of the eHealth market using number of companies offering eHealth solutions and a number of public tenders that involved eHealth solutions between 2009 and mid-2015.

As a part of the research six other studies and reports on eHealth in Poland were identified. Those documents focused mostly on stakeholders' attitudes. The ones which were in any way related to the subject of the study are cited here below.

1. Health care system in Poland – the context for eHealth development

Understanding development of eHealth, its barriers and perspectives requires a brief introduction to the health care system and decision-making processes.

The Polish health system went through political and economic reorganization from the centralized system based on the Semashko model to a decentralized system of mandatory health insurance in 1999 – the Bismarck model. However, it is still recognized as a system “in transition” (Sagan *et al.*, 2011). The ownership of most public health care facilities was transferred from the Ministry of Health and state administration to the regional and local authorities (self-governed) and medical academies. Seventeen sickness funds, created in 1999, were replaced in 2003 by a single payer – the National Health Fund (Narodowy Fundusz Zdrowia, NFZ), which since has been the main source of public health care services funding. Private spending on health care represents 29% of total health expenditure (data for 2012), 5% more than the average for OECD countries in Europe (OECD, 2015).

The stewardship, management and financing functions in the Polish health care system are divided between the Ministry of Health, the NFZ and local governments (Sagan *et al.*, 2011).

Since 1989, the role of the Ministry of Health has progressively evolved from funder and organizer to policy-maker and regulator. It holds an overall responsibility for governance of the health sector and its organization, including setting and monitoring health care standards.

The major task of the NFZ is to finance health services provided to the entitled population. It is responsible for contracting health services with public and non-public service providers, setting their value, volume and structure. The NFZ has limited regulatory powers because these are generally held by the Ministry of Health. Nevertheless, the role of the NFZ in shaping conditions for the development of eHealth is hard to overestimate.

Three levels of local governments are responsible for health tasks defined in the legislation with no direct influence on eHealth issues. However, as the owners of public outpatient clinics and hospitals, the local governments are responsible for making capital investments and performing a range of supervisory and control functions. Although they have such power (Sejm Rzeczypospolitej Polskiej, 2002), in reality the local governments have no influence on contracts health care units under their jurisdiction sign with the NFZ. Bober *et al.* (2013) claim that local governments have very limited capacities compared to responsibility they bear to enact health policy.

Decision-making process that is in the scope of interest of the paper can be described in the following way:

- Health care units are responsible for their financial standing and have to cover expenses from income they generate (if they fail to do so, their debts are to be paid by their owners – local governments). Public units contract their services with the NFZ in the first place –

more than 90% of their budgets comes from these contracts (Centrum Systemów Informacyjnych Ochrony Zdrowia, 2009), and offer their services (for instance diagnostic ones) to other health care units, companies or individuals. The offer to the latter is strongly limited.

- The NFZ sets very detailed requirements for health services and contracts them in a way that does not allow for any deviations. It is resources-/process-, not effect-/outcomes-based contracting. So if a health care unit wishes to improve quality and effectiveness of service which would be in any way different from what is being described in a contract (contracts are unified for all services), this health care unit will not be reimbursed for providing such a service. This is generally the biggest barrier for any kind of innovation in health care provision (including eHealth).
- The NFZ does not recognize eHealth services and therefore does not contract them due to stringent interpretation of the Medical Profession Act (see below).
- Health care services provided under contract with the NFZ may use eHealth technologies within limited scope. Consequently, eRegistration is the only widely accepted technology, eDescription of radiological images seems to have gained some popularity, probably because this service is not contracted directly by the NFZ. Services provided outside the public health care system (to individuals, private insurers etc.) are not subject to similar limitations.

2. Targets and regulations influencing eHealth development

Development of eHealth in EU Member States' public sector is driven by European targets, which determine national legislation. The most significant goal put forward by the *eHealth Action Plan 2004* (European Commission, 2004) was interoperability of health care information systems to allow for patient cross-border mobility. To reach this goal, integration of health care information systems has to happen on a national scale first, supported by adequate financial investment and legal adjustment.

The 2004 document was followed by *eHealth Action Plan 2012-2020* (European Commission, 2011). The vision involves using eHealth for addressing some pressing public health issues like multimorbidity, prevention, sustainability in health care, patient empowerment and cross-border health care. Technically, it presupposes achievement of 2004 infrastructure goals (like interoperability) and their deployment for dealing with higher-level issues. Poland still struggles with digitalisation of medical records and compatibility of computer systems, despite having a special ministerial agency responsible for most of computerisation – the Centre of Health Information Systems (Centrum Systemów Informacyjnych Ochrony Zdrowia, CSIOZ).

With the need to adapt national targets to EU regulations (Kowalska *et al.*, 2007), Polish national policy from 2009 (Ministerstwo Zdrowia, 2011a) concentrated on the following goals selected from the European eHealth Action Plan:

- Patient's access to medical information,
- Improvement in medical records circulation,
- Medical information system modernisation,
- Practical implementation of medical information systems according to EU's recommendations, so that Poland would be a part of interoperational European electronic health record (EHR) system.

The national action plan included preparing the ground for development of telemedicine, mainly in terms of creating legislation and technical requirements related to data protection. The Ministry of Health seems to concentrate still on introduction of information systems and integration of medical registers, while struggling with deadlines. For example,

the deadline for total computerisation of records has been postponed due to medical doctors' requests. ePrescriptions, eRegistration and full access for patients to their medical records are still planned for. *Computerisation Strategy for 2011-2015* (Ministerstwo Zdrowia, 2009) reiterates these goals, emphasizing future international interoperability.

Telemedicine and innovative eHealth solutions develop somewhat independently of national goals. Although there is lack of quantitative data, it can be observed through Internet research (telemedicine solutions offered, number of companies etc.), conference materials (Glinkowski, 2014) and reports (Bujok *et al.*, 2014) that telemedicine is getting ground in Poland, mainly thanks to associations (clusters, societies and alike) and private companies.

eHealth is regulated in a number of legal documents. These include acts, resolutions and strategic papers which are presented in *Table 1*.

Table 1. Documents regulating eHealth issues in Poland

| Name of the law (translated into English) | Date of introduction / amendments | Most important aspects of this law |
|--|-----------------------------------|--|
| Ustawa o systemie informacji w ochronie zdrowia (Act on the System of Information in Health Care) | 28 April 2011 / 13 April 2015 | Deadlines and legal ramifications for keeping medical records, dispensing prescriptions etc. in an electronic form (Ministerstwo Zdrowia, 2011b). |
| Uchwała Nr 157 Rady Ministrów w sprawie przyjęcia Strategii Rozwoju Kraju 2020 (Council of Ministers' resolution no 157 regarding Country's Development Strategy 2020) | 25 September 2012 | Introduced the <i>Development Strategy 2020 (Strategia Rozwoju 2020)</i> (Ministerstwo Rozwoju Regionalnego, 2012) as the official strategic plan (Rada Ministrów, 2012). <i>Strategy</i> presents plans for country-wide access to the Internet and implement use of IT technologies in the public sphere, eHealth being one aspect of it. |
| Kierunki informatyzacji „e-Zdrowie Polska” na lata 2011-2015 (Direction of computerisation "eHealth Poland" for years 2011-2015) | 2009 | This document (not a law strictly speaking) outlines targets (Ministerstwo Zdrowia, 2009) for computerisation of the National Health care, including: <ul style="list-style-type: none"> • Interoperable systems, • Improved patient access, • Integration with European systems, • Implementation of European standards, • Investment in ICT and innovation. |
| Ustawa o prawach pacjenta (Act on Patients' Rights) | 2008 | Regulates what personal and medical data can and must be kept by health care providers. Guarantees patient's access (Adamski, 2014). |
| Ustawa o ochronie danych osobowych (Act on Personal Data Protection) | 1997 | Regulates record administrator's liability for violation of or failure to protect privacy of personal data (Sejm Rzeczypospolitej Polskiej, 1997). |

Source: compiled by the authors.

Interestingly, the law most often cited as hindering spread of eHealth does not deal with technology; as mentioned above, Medical Profession Act (Sejm Rzeczypospolitej Polskiej, 1998) demands that a doctor examine a patient in person in order to decide about

state of his/her health. Interpretation and potential ramifications of this clause deter doctors from using telemedicine, and the NFZ – from reimbursing eHealth services in general³.

3. National plans and cases of eHealth development

Within the public sector, targets are clearly driven by EU vision and priorities. Targets include (Ministerstwo Zdrowia, 2009):

- Improved patient's access,
- Improved circulation of the Electronic Health Records and medical data,
- Creation of Medical Information System (System Informacji Medycznej, SIM) with a view of improving control over public health spending,
- Introduction of IT solutions that would make Polish system interoperable with other European systems,
- Promotion of telemedicine.

These targets are supposed to be executed through various programmes. Multiple central registers (equipment, health care units' location, etc.) are being planned. On-line education of doctors and the public also features in the programme (Ministerstwo Zdrowia, 2009). CSIOZ is responsible for the following projects (NIK, 2012):

- 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 health care,
- P4: Teleinformation systems destined to improve management, e.g. continuous education of medical staff, public health dangers, medical products trade,
- P5: Electronic platform for telemedical consulting services,
- P6: Reinforcement of the strategy of public information and connecting with foreign health care systems.

As of spring 2015, P1, P3, P4 are still being implemented (Sejm Rzeczypospolitej Polskiej, 2015), P2 has been completed. P5 and P6 have not been mentioned in CSIOZ's reports in the last year, 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 health care), launched in 2013, and web portal ezdrowie.gov.pl has been launched, informing of the services that are planned to be made available to the public, like ePrescriptions, EHRs etc. (autumn 2015).

Deadlines for eHealth development are driven mainly by European Union policies. As mentioned above, there are numerous delays, e.g. projects included in P1 should have been completed by 2011 in preparation for *eHealth Action Plan 2012-2020*). The programme of health care computerisation – financed by the EU – has been conducted since 2008. The Supreme Audit Office (Najwyższa Izba Kontroli, NIK) negatively evaluated the process of computerisation in Polish hospitals. Around 30% of the systems, including those financed through EU funds, were incompatible with each other. Similar percentage did not use any medical documentation software. The NIK (2012) pointed out insufficient funding for already financially strained hospitals, conflicting regional and national programmes, and again – a delayed legislative reaction on the part of the Ministry. The Ministry of Health planned to

³ At the moment of this article submission for publication, substantial changes in the legislation have taken place. At the end of 2015, amendments were made to *Act on the System of Information in Health Care* that made telemedicine “legal” and clarified rules around storing and processing patient's records, among other. However, as of April 2016, no changes in NFZ's policy or the e-health market in general were observed.

introduce EHR by July 2011, making CSIOZ responsible for it. The project proved to be a failure: health care institutions (hospitals, private practices, primary care) either did not start using electronic records or continued using the systems that they had implemented before, which were incompatible with each other. At the request of health care professionals, deadline for implementation of ePrescriptions, eReferrals and EHR was moved to 2017 (Adamski, 2014). Hence the perspective of interoperability of systems on the national level was significantly delayed. The NIK pointed out several reasons for the lack of success (NIK, 2012); lack of cooperation between Ministry, the CSIOZ and the NFZ was the main cause, while a failure to recognize a need for adapted legal regulations closely followed. Full digitalisation and integration of medical registers as well as full integration of SIM is still awaited. Although recent (summer 2015) reports about pilot telemedical services (NFZ, 2015a; NFZ, 2015b) may signal a change, practical results of these initiatives remain to be seen. In October 2015, the Polish Parliament amended the Act on the System of Information in Health Care in preparation for launch of P1 and Patient's Internet Account (Internetowe Konto Pacjenta, IKP – countrywide EHR accessible for patients online). However, the Medical Profession Act remains unchanged (PAP/RynekZdrowia, 2015) and launch of IKP remains delayed despite CSIOZ's declarations.

It is noteworthy that there are also (rare) cases of successful implementation of eHealth solutions on a regional scale, independently of the central government's efforts. For instance, Holycross Cancer Centre (Świętokrzyskie Centrum Onkologii)⁴ built an electronic platform of medical data exchange, a teleradiological communication node and patient's history including medical and prescription history in a project lasting 2007-2013. Not only data safety is ensured, but also patients are treated by multiple units at the same time (Karlińska *et al.*, 2014), reducing waiting times and increasing treatment efficiency.

4. eHealth market in Poland

As there is no national statistical data describing eHealth market in Poland, assessing its size and growth requires especially dedicated research. Such data is also not available in any public information bulletins. Search conducted using business classification codes in National Court Register (Krajowy Rejestr Sądowy, KRS) was rejected by authors as a way to acquire such data, since in Poland companies can register all kinds of business activities without actually undertaking them. That is why all companies operating in the IT area are potential eHealth providers. Therefore authors decided to analyse tenders for eHealth issued by public health care units and their governing bodies in the period of 2009-2015 (mid-year). Initially, researchers were seeking for phrases "eHealth" and "e-health" on Electronic Tenders Daily (electronic version of Supplement to the Official Journal of the EU). Only tenders of value exceeding EU thresholds (European Commission, 2015b) have to be published on this site. Therefore the search is by no means exhaustive, although it certainly captured biggest investments. Searches for related terms *eRegistration*, *e-registration*, *eService* and *e-service* were added to capture tenders that might be of interest, but did not include the word *eHealth*. Searches with equivalent Polish phrases were repeated in Biuletyn Informacji Publicznej (Bulletin of Public Procurement) and on two websites that collect public and private tenders from all over the country: przetargi.egospodarka.pl and bzp.pl. It may be therefore reasonably assumed that an overwhelming majority of eHealth-related tenders was captured in these searches. Out of 227 tenders identified, 50 were eliminated, because they concerned only basic IT infrastructure.

⁴ Official name of the programme: "e-Zdrowie w Województwie Świętokrzyskim, rozbudowa i wdrażanie systemów informatycznych w jednostkach służby zdrowia – etap I".

Analysis of results of the tender procedures showed that the contracts were awarded in 116 cases. In 25 cases, the procedure was cancelled, while results of the remaining 35 procedures were not accessible. Further analysis demonstrated multiple instances of tender procedure being repeated; 21 tenders were repeated 25 times. Repeated postponements of tender submission deadlines alongside multiple changes to Terms of Reference prompted by questions from contestants were observed almost universally, suggesting that the buyers are learning effective eHealth procurement by trial and error.

However, some of analysed tenders were clearly parts of a single eHealth initiative, and other consisted of many parts. On average, one healthcare unit opened 1.79 tenders, but there were significant differences in number of tenders announced. Usually these were just single tenders – just 12% of the units announced at least 3 tenders. However, there were units which announced a number of them. The leader (Holycross Cancer Centre) announced 12 of them. There were also significant regional differences, with an average of 11.06 per province. Health care units and public authorities of Podlaskie Province lead with 27 tenders, followed by Łódzkie and Mazowieckie with 17. Pomorskie and Lubelskie published only 1 each.

Most tenders included substantial basic IT infrastructure investments (servers, computers, wiring) alongside actual eHealth software. This points to a widespread absence or obsolescence of IT infrastructure in hospitals. In-depth analysis of these results exceeds the scope of the paper.

Analysis of the tenders' winners suggests a market dominated by 3 suppliers with experience in customised systems in hospitals. Many minor players usually take on implementation of standard systems. Ninety-five firms were identified. Three mentioned above won 31% of the contracts. The remaining 102 procedures were won by 92 companies, which formed consortia 20 times. However, since – as mentioned – a lot of tenders actually focused on servers, computers and wiring, it is quite difficult to assess the supplier side of eHealth. It also requires more in-depth analysis.

5. Barriers and opportunities of eHealth development in Poland

As far as medical information systems in the public sector are considered, barriers include (Ministerstwo Zdrowia, 2009):

- Fragmentation and low quality of the introduced systems,
- Lack of integration of databases,
- Unaccomplished digitalisation: a lot of documentation still exists only in paper form,
- Lack of engagement of the final user, especially patient, in planning and development stages.

Legal constrains are considered the biggest obstacle to development of eHealth. Despite some efforts on part of the government in this area, a need for more legal regulation facilitating introduction of these services is often voiced (Bujok *et al.*, 2014; Najbuk, 2014; Zgliczyński *et al.*, 2013). While some solutions already function at the local level, like teleconsultation for cardiovascular patients in ambulances in Lesser Poland (Pasek, 2013) or distance description of scans by radiologists, issues like prescribing medication without actual meeting with the patient, cause some controversies from the legal and professional points of view (Najbuk, 2014). Telemedicine suffers from insufficient governmental funding and is not a subject of central government's development plans: therefore, initiatives remain local (Bujok *et al.*, 2014; Zgliczyński *et al.*, 2013). These barriers affect to some extent suppliers of eHealth solutions (private companies) as well as private health care providers.

Opportunities depend on the support from the government, and include (Ministerstwo Zdrowia, 2009):

- 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.

Contemporary health care challenges, including ageing of the society and medical staff shortage will likely increase demand for eHealth solutions, if accompanied by acceptance of eHealth technologies by doctors (Zgliczyński *et al.*, 2013) and patients (Duplaga, 2013). Hope that the public health care will take example from the private one in efficient and cost-saving use of eHealth solutions was also expressed in the conducted interviews.

Solutions for financing of eHealth services and co-financing by private insurers are also considered (Najbuk, 2014) since, as mentioned, strict reimbursement rules used by the NFZ may exclude additional financing of that kind of services by this institution.

Though the government does not stimulate innovation in eHealth, it occasionally supports it, as evidenced, for instance, by Excellence Centre “Teleorto”. Established by the Ministry of Science and Computerisation in 2004 and run by the Clinic of Orthopaedics and Musculoskeletal System Traumatology of the Medical University of Warsaw (Klinika Ortopediii Traumatologii Narządu Ruchu Akademii Medycznej w Warszawie). It combines ongoing research with technological innovation (Glinkowski and Czyżewska, 2014; Glinkowski *et al.*, 2010), focusing on products used in functional and motor rehabilitation coupled with biomechanical evaluation based on data transferred from the product to computer.

One may hope that expected launch of P5 (electronic platform for telemedical consulting services) may rise already substantial interest in eHealth, stimulating country-wide and transnational solutions.

Since in Poland the concept of eHealth is related mostly to computerisation within health care and it is a requirement of the EU that it is implemented, it does not have particularly strong supporters or opponents. At most, the costs and the efficiency of the responsible institutions are debated.

Telemedicine enjoys strong support from several prominent figures in the medical community. For instance Witold Rużyło, a pioneer of interventional cardiology in Poland, often promotes its use as a time- and money-saving measure necessary in health care of the future (Najbuk, 2014). There is no, however, reliable evidence for such support among other representatives of this professional group.

A study by Duplaga and Grysztar (2013) showed that physicians strongly (~90%) support eHealth 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±1,22 on 5-item Likert scale). Distance communication between them and patients was also viewed unfavourably (mean level of acceptance 3,28±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 paternalistic attitudes may play a role. Interviewees also observed this resistance on the physicians' side. Interestingly, a study (Duplaga, 2013) on attitudes of patients suffering from chronic respiratory diseases revealed a similar pattern to that of physicians.

Conclusions

Strategy for eHealth development came into being largely because of EU requirements. Actions undertaken by the state and its institutions (NFZ, Ministry of Health, CSIOZ) are the main factors in eHealth development as far as legislation and standard-setting are concerned. Regrettably, these institutions have so far failed to deliver. They have also

been unable to fulfil planned goals, of which incompatible computers systems seem to be the best example. The most important barriers to development of eHealth in the public sector are of legal nature, yet the Ministry of Health does surprisingly little to address the well-known problems, rendering many eHealth solutions unusable in the public health care system. Implementation of comprehensive P1-P6 projects continues to experience considerable delays and setbacks; what is more, some of them have not been launched. Although exact causes are hard to pinpoint, persistent miscommunications and failure to define clear areas of responsibility between the Ministry of Health and its own agency CSIOZ have largely contributed to the situation. This may be the result of lack of a long-term governmental strategy concerning not only eHealth, but simply health, with quantifiable goals, time-scale and priorities. It can be said that solution that the Ministry is minded to introduce are not supported by scientific research and evidence-based proves showing clinical and cost effectiveness of these particular eHealth solutions in the Polish context. Final outcomes of the implementation of the strategy therefore remain somewhat unpredictable.

Considering the current underdevelopment, unless substantial strides are made towards reaching national goals, Polish public health care system is bound to find itself struggling to meet European standards and requirements in this area on time. Although the recent legislative moves facilitating eHealth implementation are encouraging, completion dates put forward by the CSIOZ should be taken with a grain of salt. Failure to meet deadlines and resulting loss of EU funding for the computerisation are now real possibilities. In the meantime, regional eHealth programmes continue to develop somewhat independently, providing valuable lessons for the central government.

Though it was not directly found in the Polish literature, there are some other factors, which can enhance eHealth development. Aging societies and (global) shortages of medical personnel (European Commission, 2012b) should force seeking for other options to improve effectiveness of health care services delivery and may be an opportunity to employ eHealth in order and reduce workload of medical personnel. eHealth development can be also induced by aging of generations, which were “brought up” on ICT and which uses it in all areas of their lives. These generations, independent from political constrains, may press for wider introduction of ICT in health care – just as it is used in other sectors of economy.

Funding acknowledgments

This work was supported by the European Commission [Grant Agreement number: 644461 – EPP-eHealth – H2020-ICT-2014/H2020-ICT-2014-1] as part of European Procurers Platform – eHealth – Transforming the market for eHealth Solutions project.

Conflict interests

The authors declare no conflicting interests.

References

- 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 (referred on 01/03/2015).
- Bell, B., and Thornton, K. (2011), From promise to reality achieving the value of an EHR, *Health care Financial Management*, Vol. 65, No.2, pp. 51-56.
- Bober, J., Hausner, J., Izdebski, H., Lachiewicz, W., Mazur, S., Nelicki, A., ... Zawicki, M. (2013), *Narastające dysfunkcje, zasadnicze dylematy, konieczne działania. Raport o*

- stanie samorządności terytorialnej w Polsce*, Krakow, Małopolska Szkoła Administracji Publicznej, http://www.msap.uek.krakow.pl/doki/publ/raport_dysfunkcje.pdf (referred on 01/03/2015).
- Bujok, J., Gierek, R., Olszanowski, R., and Skrzypek, M. (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) (referred on 01/03/2015).
- Centrum Systemów Informacyjnych Ochrony Zdrowia (2009), *Sytuacja finansowa samodzielnych publicznych zakładów opieki zdrowotnej – analiza wskaźnikowa*, <http://www.csioz.gov.pl/publikacja.php?id=1> (referred on 09/08/2015).
- 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*, Vol. 19, No. 9, pp. 683-691, //doi:10.1089/tmj.2012.0306 (referred on 01/03/2015).
- Duplaga, M., and Grysztar, M. (2013), Poglądy lekarzy na temat przydatności systemów e-zdrowia, *Hygieia Public Health*, Vol. 48, No. 4, pp. 553-559, <http://www.h-ph.pl/pdf/hyg-2013/hyg-2013-4-553.pdf> (referred on 01/03/2015).
- European Commission (n.d.), eHealth: Policy, http://ec.europa.eu/health/ehealth/policy/index_en.htm (referred on 22/04/2015).
- European Commission (2004), *E-Health – making health care better for European citizens: An action plan for a European e-Health Area*.
- European Commission (2011), *Commission Staff working document eHealth Action Plan 2012-2020 – innovative health care for the 21st century*, doi:SWD(2013) 527 (referred on 01/03/2015).
- European Commission (2012a), *eHealth Task Force Report – Redesigning health in Europe for 2020*, Luxembourg: Publications Office of the European Union, doi:10.2759/82687 (referred on 01/03/2015).
- European Commission (2012b), Commission Staff Working Document on an Action Plan for the EU Health Workforce, http://ec.europa.eu/health/workforce/docs/staff_working_doc_healthcare_workforce_en.pdf (referred on 18.04.2016).
- European Commission (2013), Horizon 2020 calls for eHealth projects launched, <http://ec.europa.eu/digital-agenda/en/news/first-horizon-2020-calls-ehealth-projects-launched> (referred on 30/08/2015).
- European Commission (2014), European Innovation Partnerships – Innovation Union – European Commission, http://ec.europa.eu/research/innovation-union/index_en.cfm?pg=eip (referred on 23/05/2015).
- European Commission (2015a), Health, demographic change and wellbeing (Revised), *Horizon 2020 Work Programme 2014 – 2015*, http://ec.europa.eu/research/participants/data/ref/h2020/wp/2014_2015/main/h2020-wp1415-health_en.pdf (referred on 01/03/2015).
- European Commission (2015b), Single market and Standards. Current rules, thresholds and guidelines, http://ec.europa.eu/growth/single-market/public-procurement/rules/current/index_en.htm, (referred on 14/05/2015).
- European Parliament and Council of the European Union (2011), *Directive 2011/24/EU of the European Parliament and of the Council of 9 March 2011 on the application of patients' rights in cross-border health care*, *Official Journal of the European Union*, pp. 45-65.
- Glinkowski, W., Cabaj, D., Kostrubała, A., Krawczak, K., and Górecki, A. (2010), Pre-surgery and post-surgery telerehabilitation for hip and knee replacement treatment

- options review and patient's attitudes towards telerehabilitation, *eChallenges e2010 Conference*, pp. 1-10.
- Glinkowski, W. (2014), *Telemedycyna i eZdrowie 2014. Streszczenia*, <http://www.e-zdrowie.org/Book-of-Abstracts-Telemedicine-eHealth-2014-September-24th-2014.pdf> (referred on 01/03/2015).
- Glinkowski, W., and 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> (referred on 02/03/2015).
- Iakovidis, I., Wilson, P., and Healy, J. C. (2004), *Introduction: How We Got Here, E- health: current situation and examples of implemented and beneficial e-health applications*, Amsterdam: IOS Press.
- Karlińska, M., Masiarz, P., and Mężyk, R. (2014), *Przyspieszenie wdrażania technologii w regionalnej ochronie zdrowia dzięki finansowemu wsparciu UE – przykład województwa świętokrzyskiego*, *Collegium of Economic Analysis Annals*, Vol. 35, pp. 207-218.
- Kowalska, I. and Mokrzycka, A. (2007), *E-health in Poland*, *Health Policy Monitor*, No. 10, pp. 1-9, <http://www.hpm.org/pl/a10/1.pdf> (referred on 01/03/2015).
- Kumar, S., and Bauer, K. (2011), *The business case for implementing electronic health records in primary care settings in the United States*, *Journal of Revenue and Pricing Management*, Vol. 10, No. 2, pp. 119-131, doi:10.1057/rpm.2009.14 (referred on 01/03/2015).
- Ministerstwo Rozwoju Regionalnego (2012), *Strategia Rozwoju Kraju 2020*.
- Ministerstwo Zdrowia (2009), *Kierunki informatyzacji „e-Zdrowie Polska” na lata 2011-2015*, Warsaw, http://www2.mz.gov.pl/wwwfiles/ma_struktura/docs/kierunki_e_zdrowie_09022011.pdf (referred on 01/03/2015).
- Ministerstwo Zdrowia (2011a), *Strategia e-Zdrowie Polska na lata 2009-2015*, http://www2.mz.gov.pl/wwwfiles/ma_struktura/docs/projekt_sezdrowie_16042009.pdf (referred on 01/03/2015).
- Ministerstwo Zdrowia (2011b), *Ustawa z dnia 28 kwietnia 2011 o systemie informacji o ochronie zdrowia*, <http://isap.sejm.gov.pl/DetailsServlet?id=WDU20111130657> (referred on 01/03/2015).
- Najbuk, P. (2014), *Telemedycyna – aktualny stan prawny i perspektywy zmian w przyszłości*, <http://blog.dzp.pl/pharma/telemedycyna-aktualny-stan-prawny-i-perspektywy-zmian-w-przyszlosci/> (referred 08/03/2015).
- NIK (2012), *Informacja o wynikach kontroli. Informatyzacja szpitali*, <http://www.nik.gov.pl/plik/id,4849,vp,6462.pdf> (referred on 01/03/2015).
- NFZ (2015a), *Telemedycyna i e-zdrowie. Akademia NFZ*, <http://akademia.nfz.gov.pl/telemedycyna-i-e-zdrowie> (referred on 17/09/2015).
- NFZ (2015b), *Projekt zarządzenia – warunki zawierania i realizacji umów – świadczenia zdrowotne kontraktowane odrębnie*, <http://www.nfz.gov.pl/zarządzenia-prezesa/projekty-zarządzen/projekt-zarządzenia-warunki-zawierania-i-realizacji-umow-swiadczenia-zdrowotne-kontraktowane-odrebnie,6385.html> (referred on 17/09/2015).
- OECD (2015), *Health Status*, http://stats.oecd.org/index.aspx?DataSetCode=HEALTH_STAT (referred on 01/03/2014).
- PAP/Rynek Zdrowia (2015), *Sejm przyjął poprawki Senatu do ustawy ws. platformy e-zdrowie. Technologie informacyjne. Rynek Zdrowia*.

- <http://www.rynekzdrowia.pl/Technologie-informacyjne/Sejm-przyjal-poprawki-Senatu-do-ustawy-ws-platformy-e-zdrowie,155714,7.html> (referred on 10/10/2015).
- Pasek, A. (2013), Małopolska: 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> (referred on 10/03/2015).
- Rada Ministrów (2012), Uchwała Nr 157 Rady Ministrów z dnia 25 września 2012 r. w sprawie przyjęcia Strategii Rozwoju Kraju 2020, Monitor Polski. Dziennik Urzędowy RP, http://g.ekspert.infor.pl/p/_dane/akty_pdf/MPO/2012/170/882.pdf (referred on 01/03/2015).
- Sagan, A., Panteli, D., Borkowski, W., Dmowski, M., Domański, F., Czyżewski, M., ... Busse, R. (2011), Poland Health system review, *Health Systems in Transition*, Vol. 13, No. 8, http://www.euro.who.int/__data/assets/pdf_file/0018/163053/e96443.pdf (referred on 01/03/2015).
- Sejm Rzeczypospolitej Polskiej (1997), *Ustawa z dnia 29 sierpnia 1997 r. o ochronie danych osobowych (tekst ujednolicony)*, <http://isip.sejm.gov.pl/Download;jsessionid=663103722BA8323FC52A589F5FE459F6?id=WDU19971330883&type=3> (referred on 01/03/2015).
- Sejm Rzeczypospolitej Polskiej (1998), *Ustawa z dnia 5 grudnia 1996 r. o zawodach lekarza i lekarza dentystry (Dz.U. 1997 Nr 28 poz. 152)*.
- Sejm Rzeczypospolitej Polskiej (2002), *Ustawa z dnia 5 czerwca 1998 r. o samorządzie powiatowym (tekst jednolity z 2001r Dz.U. Nr 142, poz. 1592 ze zmianami)*, <http://isap.sejm.gov.pl/DetailsServlet?id=WDU20011421592> (referred on 31/08/2015).
- Sejm Rzeczypospolitej Polskiej (2015), *Informacja o posiedzeniu Komisji Innowacyjności i Nowoczesnych Technologii*, <http://www.sejm.gov.pl/sejm7.nsf/komunikat.xsp?documentId=5AB1A022D207AE84C1257DCF00481B20> (referred on 10/03/2015).
- Zgliczyński, W., Pinkas, J., Cianciara, D., Sitarek, M., Berdyga, T., Nowicka-Wasilewska, J., and Kawwa, J. (2013), Telemedycyna w Polsce – bariery rozwoju w opinii lekarzy, *Medycyna Ogólna i Nauki o Zdrowiu*, Vol. 19, No. 4, pp. 496-499, <http://jml2012.indexcopernicus.com/fulltxt.php?ICID=1096968> (referred on 01/03/2015).