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RETHINKING HEALTHCARE IN SLOVENIA: AN ANALYSIS OF THE CHALLENGES AND OPPORTUNITIES OF EHEALTH

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Most industrialized countries, such as Slovenia, are working hard to apply technology to improve healthcare. Faced with rising costs of patient care and unfavorable demographic changes because of an aging population, these countries are focusing their attention on finding ways to efficiently reduce costs while continuously improving healthcare quality. Increases in efficiency can be achieved by applying information and communications technologies and digital tools to the health sector, which will increase both the quality of services offered and the number of people who have access to specialized healthcare. In 2006, Slovenia began its major eHealth strategy to develop a modern and efficient national healthcare informatics system. The strategy was the result of a series of internal healthcare reforms as well as input from the European Union.

eHealth is a blanket term that covers all of the electronic interactions between patients and healthcare providers and the sharing of data from one healthcare institution to another. By having a seamless transition of healthcare data, eHealth allows for the use of electronic health records and other technologies that can help the diagnosis, treatment, and prevention of diseases while also reducing the potential for medical errors. The safety of each patient increases as the complete treatment and medication history becomes easily accessible to all current and future health providers before they make a diagnosis or suggest a treatment plan. If it is successfully implemented, eHealth will eventually benefit doctors by decreasing the paperwork they have to manage while also increasing overall organization and communication among the healthcare providers of an individual patient. Patients will benefit because they will have increased awareness of their health through access to information about disease prevention. Patients will also have access to expert diagnosis and treatment from healthcare specialists over the Internet if they are unable to come to an office in person due to distance, health, or financial reasons.
This article describes the movement of Slovenia toward an effective eHealth system. I first outline the current structure, successes, and shortcomings of Slovenia’s original healthcare system. I then discuss the current reforms and the major technical, economic, and political factors involved with eHealth developments in the country and address the main drivers and hurdles faced. I conclude that by establishing a more structured technological framework, maintaining consistent financial support and promotional techniques, and reforming current personal data laws, Slovenia will be able to reap the social and economic benefits promised by eHealth.

Establishing the Framework: The Slovene System Prior to 2005

Following its independence from Yugoslavia in 1991, Slovenia took dramatic steps in reforming its healthcare system from a large centralized system to a more decentralized system. The major reforms included the introduction of a two-pillar (compulsory and voluntary) health insurance system, the introduction of some privatized healthcare practices to increase efficiency and implement better management practices, and the creation of two chambers to manage professional administrative roles of the healthcare system (Markota et al.). The purpose of the two chambers is to serve as independent regulators to help promote the rights of medical professionals and patients while fostering high standards of care. One of the most significant parts of the initial reform was the creation of a healthcare budget outside of the state budget, which allowed the healthcare budget to be more controllable and enabled it to be used only for its primary intention, instead of being shuffled around for another purpose.

The healthcare capacity of Slovenia is divided into three levels: primary, secondary, and tertiary. Primary healthcare at the local level delivers basic and preventive care. Secondary care occurs primarily in hospitals as inpatient or outpatient care and provides patients with specialist care and diagnostic services. The tertiary level of care occurs only in national university hospitals and institutes and provides highly specialized services, such as oncology. The federal government or the municipalities finance most doctors and primary care facilities, with the exception of a few practices that are funded by the private sector. This system has allowed Slovenia to rank in the top half of the EU countries with respect to such health indicators as life expectancy, infant birth weights, and vaccination rates for diphtheria, tetanus, pertussis, and measles (“Practicing Doctors…”).

Individuals pay for most of these and other healthcare services by using health insurance. The health insurance system is made up of compulsory and voluntary insurance. All employed and self-employed adults, retired individuals receiving a pension, and all children until the end of their regular education are insured. Additionally, adults can become insured if they are permanent residents of Slovenia and have a family member who is currently insured. These regulations allow for virtually 100 percent of the population to be covered by the compulsory health insurance. Compulsory health insurance covers a select set of services in their entirety, including all services for children, emergency medical treatment, and the treatment of infectious diseases. All other services are covered only in part by compulsory health insurance. If purchased, the voluntary health insurance covers the remaining cost of the service.

Although Slovenia had an affordable health insurance system and provided its citizens with high-quality aid from its doctors, it was not succeeding in all areas of healthcare prior to 2006. The quality of eHealth services was fundamentally lacking. The information technology (IT) funding was not focused, and there was a slow development of IT infrastructure. There was no separate budget to promote the development of eHealth. Individual hospitals and doctors had to rework their annual budgets in order to allot funds toward eHealth programs if they wanted the services in their facilities. Because of the lack of financial motivation, the exchange of medical data nationwide primarily occurred through paper documents. The official websites of national healthcare institutions provided users with digital copies of important forms and documents. However, these forms had to be printed and delivered in person to the proper institution to be manually...
approved or confirmed through a stamp or a signature. Doctors were also not commonly using computers in consultations with patients, despite their availability (Dobrev et al.).

The one exception to the allegation that eHealth services in Slovenia were lacking was the creation and distribution of health insurance cards in 2000. Slovenia was one of the first countries in Europe to introduce microprocessor-based health insurance cards to its population. The nationwide card system was directed by the Health Insurance Institute of Slovenia (HIIS) and offered secure patient identification, accurate and up-to-date personal data in the cards, and a significant reduction in fraud and administrative work (Bolka). The network created by the HIIS with these cards is seen as the fundamental base for the Slovene national healthcare information system. While these cards were a signal of true progress when they were first distributed, the benefits of the cards were limited. Their main purpose was to serve as patient identification, proof of valid health insurance, and an off-line source of limited personal data. However, the lack of unified data formats and communication protocols kept this proactive system as simply a database instead of allowing it to evolve into a data communication system.

In 2000 Slovenia also attempted to make progress in the field of eHealth by working with funding from the World Bank to launch the Health Sector Management Project. The project was broken up into three sections. The first two sections involved health policy support and health information standards formulation. The objectives of these sections were to improve healthcare management and other elements that would improve the efficiency and effectiveness of Slovenia’s healthcare sector, but they were not directly related to eHealth. The third component of the project focused on developing the eHealth sector and creating the National Health Information Clearinghouse (NHIC) that would act as the central core for the inter-agency exchange of health-related information. This central resource would ideally simplify relationships between each of the health sector entities. The only result of the project in terms of the third component was the introduction of the Health Information Systems Architecture Standards. It also allowed for an agreement among stakeholders on the need for a National Health Informatics Institute agency, which would serve as a center for information exchange among health sector entities. Other than these minor accomplishments, the ultimate goal of establishing an NHIC was not attained, because the other components of the larger project, which were not specifically eHealth related, seemed to take priority (World Bank; Albreht et al.).

Despite the lack of established eHealth services and little or no general progress in the area of eHealth, Slovenia still has many elements that make it an ideal country for the successful implementation of eHealth developments. First, in 2000 the Slovene government passed the Healthcare Data Collections Act, which requires all health data and information be stored at the site where it is collected. Data are then reported to the Institute of Public Health of the Republic of Slovenia (Albreht et al.). Because of this act, Slovenia has successfully developed a strategy for the storage of administrative data and has at least 14 years of electronic data to immediately start using as it transitions to electronic health records. Second, 74 percent of Slovenes have access to a computer in their homes, and the number continues to grow as evidenced by the 28 percent increase in home computer access over the past nine years (“Level of Internet...”). Most importantly, there has been no shortage of support of eHealth from the Slovene population. A survey performed in 2001 showed that more than 60 percent of the total Slovene population between the ages of 15 and 64 were interested in receiving health advice or help in interpreting a diagnosis through online means. Fifty-eight percent of Internet users also expressed an interest in using eHealth services. These numbers are relatively high in comparison to the EU-15 average from an analogous study (Krapež and Konegger).

**Establishment of eHealth2010**

In 2004, the same year that Slovenia joined the EU, the European Commission presented its eHealth action plan to the EU Council (“Communication...”). This action plan was the first formal commitment shown by the EU member states to work together in improving
the area of eHealth. In response, the Slovene Ministry of Health established the Slovenian strategy for eHealth, called “e-Zdravje2010” (eHealth2010), in 2006. The primary purpose of this program was to modernize and enhance the efficiency of the national healthcare system. It planned to 1) offer all healthcare providers and pharmacists secure and reliable access to all key patient information via a standardized electronic health record, 2) help with the management of the national healthcare system on the basis of explicit administrative, economic, and medical data, and 3) encourage citizens to actively participate and assume responsibility for their health and healthcare services. The eHealth2010 implementation was scheduled to occur from September 2008 to June 2015. The projected cost was €67 million, which was to be funded by the Slovene Ministry of Health, the European Social Fund, and other Slovene public funds (“eHealth Project in Slovenia”).

The stakeholders of the Slovenia eHealth program can be divided into three major groups: patients, care providers, and healthcare managers. Care providers include all doctors and nurses and their respective organizations that provide healthcare services. The healthcare managers group encompasses all of the authorities and policy makers at the Ministry of Health, insurance organizations, the national government, the EU, and medical researchers. The Healthcare Informatics Council was created as a working body that could unite representatives of each stakeholder group and serve as the advisory board to the Slovene Ministry of Health.

The first area that needed to be established was a national information system comprised of an electronic health portal, electronic health records, and a health network (Stanimirović and Vintar). Health portals allow for patients to interact with their healthcare providers through a healthcare-related online application. In 2006, the program officially started and began focusing on the creation of a comprehensive national information system. National groups in charge of planning, coordination, and enforcement of healthcare informatics were created, in addition to the Council for Healthcare Informatics, the Committee for Healthcare Informatics Standards, and the Committee for Teleradiology. By 2007 the Ministry of Health began several IT development projects, including

1) The regulation of electronic registration of births and deaths in exclusively electronic data
2) The development of a unified system that takes data from hospitals and sends the data to a central database managed by the Institute of Public Health of the Republic of Slovenia
3) The development of a national waiting list system (Albreht et al.)

A majority of eHealth efforts made during the first years of the eHealth2010 program were directed toward developing the systems that store patient and administrative data. By 2007 Slovenia was slightly above the EU27 average for storage of administrative patient data but fell significantly below average for the storage of medical patient data, the integration of computers into patient consultations, the use of a decision support system, and the transfer of laboratory results from the laboratory to healthcare providers. Also, neither Slovenia nor the EU27 average made progress in the fields of e-prescribing—the transfer of medical patient data or administrative data to other caregivers.

Key Issues Concerning eHealth2010

As of 2014, the progress of the Slovenian eHealth initiative has been slower than anticipated. Part of the delay can be attributed to the program being halted between 2008 and 2010 in order for an internal audit to be performed. Other reasons for the lack of results stem from insufficient funds due to the recession and the severe banking crisis as well as frequent changes of political parties in the leadership of the government. However, other problems can also explain the delays.

Legal Roadblocks

The legal regulations that were established to supplement general health reform did not focus on the development of eHealth. The laws that are currently in place are too strict to allow efficient growth of certain areas of eHealth. For example, the Personal Data Protection Act, enacted in 1999, makes it
compulsory to protect the privacy and dignity of an individual from unconstitutional, unlawful, and unjustified encroachments during the processing of personal data (“Personal Data Protection Act...”). In the field of healthcare, this law can prevent a variety of tasks, such as delivering test results or prescription renewal, from being available online or through email. To circumvent this problem, an exception to the Personal Data Protection Act adopted by Parliament was implemented but it still serves as a barrier in certain applications of eHealth, such as online interaction with a family doctor. Another out-of-date law concerned with personal privacy was the Healthcare Databases Act of 2000, which requires each new electronic database that works with sensitive health data to have a basis in a legal act. Legal acts can only be adopted by Parliament. Consequently, this step dramatically increases the time it takes for databases to be developed, and it even prevents some eHealth projects from beginning at all (Krapež and Kronegger). Although these laws can delay the speed at which the eHealth system is set up, they are helpful because they encourage people to actively participate in and assume responsibility for their health and healthcare services, which is the third goal of the eHealth2010 plan. For example, the Personal Data Protection Act gives people the right to see a copy of their electronic health records, and, if they find an error, the healthcare institution must correct it. This method allows people to increase the accuracy of their records, which could have an impact on their medical treatment in the future.

Lack of Accessibility and Maintenance

eHealth services are designed with the goal of providing patients with answers to their questions and information about how to attain medical treatment and about providers. However, Slovenia has not done a satisfactory job of educating its population about the newly available services. Over the past five years, there has been an increase in information about healthcare options, but the average user is still unaware of what is actually available (Kalan). The lack of awareness is due to the fact that a majority of services being developed are back-end services, which are not visible to the average user. More public relations efforts could be spent on clarifying what is being done and why. There is also a general concern and confusion about security issues involving private data and the maintenance of confidentiality. These problems could be solved through educational programs that increase the knowledge about online services and that show the preventative measures that are put in place to ensure that privacy is maintained. Another issue that needs to be addressed is the maintenance of health websites. Without consistent, up-to-date information, these websites are of little use to patients (Krapež and Kronegger).

Lack of Cohesive Technical Infrastructure

As a remnant of the original decentralization of the healthcare industry following Slovenia’s independence, most of the existing technical infrastructure that supports healthcare systems only meets the needs of individual healthcare institutions on the local level. Over the past few years, individual hospitals and outpatient practices have begun collecting health data on their patients, including diagnoses and medicines prescribed, and creating individual databases of healthcare service providers and registers of general practitioners. However, the developed systems lack standardization on a national level because the government did not establish common standards immediately. These healthcare institutions were not initially expected to work with one another, which explains why their technology systems are not compatible now. One key problem that needs to be addressed is how to make individually functioning networks combine into a national eHealth system.

In the process of trying to solve the problem, key program designers have also failed to fully communicate and engage with existing IT stakeholders when designing plans for implementing the national eHealth infrastructure. Health information is sensitive personal information, so it is necessary that the data collection, data processing, and data storage all maintain a high level of security. The results need to be in accordance with all current regulations in Slovenia that concern personal
data, such as the Personal Data Protection Act, Electronic Communications Act, and Patients’ Rights Act. Currently, a private network infrastructure for the national eHealth telecommunications is the proposed means of making sure that all of the security concerns are addressed. However, with new technologies based in encryption rapidly entering the market, data can be equally protected by alternative and less expensive technologies. For example, cloud computing technologies would eliminate the need to maintain expensive in-house hardware, software, and network infrastructures. They would also reduce the need to recruit technical support professionals to operate the private infrastructures. By sticking with the original plan of developing a private network infrastructure, the eHealth program is limited to larger healthcare institutions, such as hospitals, that are equipped with modern IT and large budgets. Individual general practitioners would not be able to integrate into the eHealth program because they are not as well equipped or financially prepared to absorb the hefty price tag of private network infrastructure (Krapež and Kronegger; Hatzaras and Dowdeswell).

Increased Strain on Doctors and Staff

In addition to the technological and legal problems, there is also a current shortage of physicians within Slovenia. There are 2.4 practicing physicians per 1,000 people, in comparison to the EU average of 3.4 physicians per 1,000 people. Although this difference alone is not worrisome, the fact that Slovenia is adding physicians at a slower rate in comparison to the EU means that the problem is expected to worsen. Despite the lower number of physicians, the number of doctor consultations per capita in Slovenia is 0.1 consultations over the EU average (“Practicing Doctors…”). Together these data reveal that the average Slovene doctor is doing more consultations than the average doctor practicing in the EU. Because doctor workload is already higher than average, adding additional administrative work is not providing an incentive for current doctors to remain in their profession or for students who are considering becoming doctors. Furthermore, according to the staff in hospitals, the implementation of new technology causes the number of administrative tasks to double initially while over time it gradually decreases (Krapež and Kronegger). The current view among doctors is that information technologies should be tools that make their jobs easier or better. But if the systems do not function, they do not see the point in using the technology or trying to improve the system because the changes to the system will just add to their already busy workload. With regard to eHealth2010, the program is seen by many as an under-delivering activity with significant delays.

In an attempt to increase the number of medical students to alleviate the physician shortage, the procedure for gaining accredited medical degrees has recently been amended, which has resulted in an inflow of applicants from Bosnia and Herzegovina, Macedonia, Croatia, and Serbia (Krapež and Kronegger). However, the Medical Chamber, an independent professional organization of medical doctors that all doctors must join before they are allowed to have direct contact with patients in Slovenia, requires incoming applicants to have a good understanding of the Slovene language, which most foreign applicants do not have. As a result, the probability of integrating many foreign physicians into the healthcare system is not high. Therefore, Slovenia needs to make medical professions more desirable to Slovene students and to reduce the stress and workload of the job, rather than adding extra administrative work to the role. The Medical Chamber could also forgo the language requirement in order to increase the number of eligible applicants, especially in specialties where patient communication is not as important, such as pathology or anesthesiology.

Addressing the Problems

Most of the problems discussed previously should be solved with time if the eHealth2010 continues making significant progress in meeting its original goals. The first problem that needs to be resolved is that of frequent leadership turnover. For example, one of the project managers for the eHealth initiative, Dr. DeLeonni-Stanonik, served in the role for less than a year before she left the job due to
disagreements with the Health Minister. Each time a new project manager is selected, the path of the eHealth program is re-examined and changes in priorities are the result. One director should be elected and remain in the position for the rest of the project. If the leadership stays constant, the program will be able to make significant progress in the near future.

After the departure of Dr. DeLeonni-Stanonik from her position as project manager for the eHealth initiative, the Ministry of Health decided to change the organization of the program leadership by creating a new Secretary of eHealth, who will be responsible for the operation of the eHealth program. When the position was first created in July 2011, mechanical engineers, economists, and mathematicians with an IT background were the only eligible candidates. By not including health professionals in the list of those who could apply for the position, the Ministry of Health ignored a crucial skill set and illustrated its lack of understanding of the needs of the eHealth program. Because one of the key responsibilities of the position is to facilitate communication between health professionals and other stakeholders, it makes sense to hire an individual who can relate to and has experience working with health providers. This oversight drew attention to the general lack of understanding and vision for the role that was being created. Fortunately, after criticisms from many health providers, the Ministry of Health quickly reconsidered and expanded the list of eligible candidates to include medical doctors, nurses, and pharmacists for three new positions within the Sector of eHealth.

A second problem that must be quickly addressed is the negative opinion of health providers of the eHealth2010 program. Incentives need to be given to Slovene students to study medicine and to seek careers as doctors or nurses. Adding more doctors will reduce their workloads and give them time to incorporate the national eHealth technologies into their practices. Once doctors see the value of the program, they can help educate the general public about the eHealth services that are available. By having doctors transmit high-quality and accurate information to their patients, the accessibility and public approval of the program will increase.

A third problem that needs to be addressed is the lack of communication and understanding among the stakeholders. The money that was allocated to fund eHealth2010 came with a cut-off date of 2015, and this looming deadline seemed to provide a slight increase in the rate of progress in the program in its final years. The increased risk of failing to use the structural funds allocated to the eHealth project in time has resulted in more political support for the new eHealth project manager. A team was built at the Ministry of Health to support these projects. This urgency has provided for some resolution between politicians and the program coordinators. Positive steps are also being taken by IT workers who are beginning to focus on communicating with doctors because they realize that they need to build the system around the health protocols that are already in place. Meanwhile, the government is considering new legislation that will maintain patient privacy while also allowing eHealth technologies to expand. As of 2012, the increased communication between the stakeholders has helped Slovenia to develop or partially develop several components that fall under the eHealth2010 plan. For example, a fully functional insurance/health card has now been created and distributed, and significant strides have been made to integrate stakeholders, establish data standards, and meet healthcare system performance indicators. Despite this recent progress, cooperation has come too late for certain components. This is the case for e-prescription and telemedicine, whose development is still in the conceptual stage (Stanimirović and Vintar).

**Conclusion**

The Slovenian eHealth reforms are the result of years of effort to change the ways people can access and have control over their healthcare. The reforms seek to provide faster, safer, and more accessible healthcare to patients while keeping costs low. When the program began, expectations were that eHealth2010 would quickly boost Slovenia’s eHealth system to the average level of its EU counterparts. When the eHealth2010 project reaches its projected end date in 2015, it will have reached some of its goals, especially in terms of infrastructure, but will have failed in
others, such as advanced services and reshaping healthcare provision. As the current phase of eHealth programs comes to a close, it is time for all stakeholders to embrace the idea of eHealth and the new technologies that are associated with it. Even though Slovenia is currently performing reasonably well according to a variety of health indicators, its future success will depend on how well it is able to compete with other EU countries and the rest of the world, especially in terms of cost. In a world in which the popularity of eHealth is skyrocketing, alternatives could be just a click away for patients.
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