National healthcare information system in Croatian primary care: the foundation for improvement of quality and efficiency in patient care

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ABSTRACT

In order to improve the quality of patient care, while at the same time keeping up with the pace of increased needs of the population for healthcare services that directly impacts on the cost of care delivery processes, the Republic of Croatia, under the leadership of the Ministry of Health and Social Welfare, has formed a strategy and campaign for national public healthcare system reform. The strategy is very comprehensive and addresses all niches of care delivery processes; it is founded on the enterprise information systems that will aim to support end-to-end business processes in the healthcare domain. Two major requirements are in focus: (1) to provide efficient healthcare-related data management in support of decision-making processes; (2) to support a continuous process of healthcare resource spending optimisation. The first project is the Integrated Healthcare Information System (IHCIS) on the primary care level; this encompasses the integration of all primary point-of-care facilities and subjects with the Croatian Institute for Health Insurance and Croatian National Institute of Public Health. In years to come, IHCIS will serve as the main integration platform for connecting all other stakeholders and levels of health care (that is, hospitals, pharmacies, laboratories) into a single enterprise healthcare network. This article gives an overview of Croatian public healthcare system strategy aims and goals, and focuses on properties and characteristics of the primary care project implementation that started in 2003; it achieved a major milestone in early 2007 – the official grand opening of the project with 350 GPs already fully connected to the integrated healthcare information infrastructure based on the IHCIS solution.

Keywords: decision support, efficient healthcare related data management, Integrated Healthcare Information System, integration platform, quality and efficiency of patient care
**Introduction**

Healthcare delivery systems today are more than ever in need of fundamental change. The expectations of citizens experiencing a dramatic demographic shift are constantly imposing new requirements and challenges on healthcare delivery systems. With the rapid increase in population mobility, life expectancy and more chronically-ill citizens, patients want to receive the best care available while at the same time experiencing a reduction in inequalities in access to good health care. At the same time, the systems are faced with strong requirements for continuous resources, waste monitoring and cost optimisation since the national budgets that fund public care system delivery are limited and under constant pressure. In addition, taking into account that the amount of medical knowledge generated by clinical trials is rapidly growing, but the same information is not being incorporated in practice with the required speed, it is quite obvious that healthcare systems today need to transform traditional ways of working. A process of restructuring is necessary, but it is essential that the changes are implemented in small and well-defined steps. Most of the transition strategies for improving quality of healthcare delivery aim to establish a new environment that will serve as the foundation for all future actions.

This paper is focused on one such project. Here we elaborate on the main targets introduced by the Croatian national public healthcare delivery system transition strategy. The paper focuses on the first of such projects, the Integrated Primary Care Information System. It will compare the project with similar activities in two developed countries, and elaborate the main similarities and differences worldwide. Finally, we will conclude on the current results and future projects that the strategy envisions as next steps.

**National healthcare system delivery in Croatia for the 21st century**

Information systems in support of the healthcare delivery environment must be carefully and consciously designed to support care processes that are effective, efficient, patient-centred, safe, and equal for all the subjects that are receiving care. Information and communications technology (ICT) solutions need to improve the availability of accurate data management services and clinical guidelines that represent an essential adjunct to healthcare providers’ practice. It is essential that the implementations comply with the national procedures and bylaws, which are in most cases transferred to different security and data confidentiality requirements. One of the most important challenges is the payment and reimbursement policy; this has been identified as one of the major obstacles in healthcare system improvements worldwide. Finally, the strategies need to include the most important stakeholders in the system – the citizens themselves. Many research studies have demonstrated that medical information is one of the subjects people look for most frequently, and enterprise solutions in that context need to look for opportunities for supporting citizens to stay informed and actively involved in medical decision making.

The Croatian national healthcare system transformation strategy has included all the challenges identified above as long-term goals. Figure 1 illustrates the high-level blueprint of the national infrastructure for health care in Croatia that identifies and positions all the stakeholders in the healthcare services provision system. The national infrastructure is founded on the Integrated Healthcare Information System solution (IHCIS), which was the first project initiated and supported by the Croatian Government.

**Integrated healthcare information system components**

IHCIS provides reliable, secure, and high-performing enterprise services that connect all the stakeholders involved in healthcare delivery to a comprehensive communication environment. Figures 1 and 2 depict the structure and components of IHCIS and illustrate the connection points with other information systems. IHCIS components include the Healthcare Resources Registry and the Electronic Patient Registry management systems, Electronic Healthcare Record (EHCR) management system, HL7 Agent, and Portal application.

The services that IHCIS is offering lie in four domains: transaction and integration services; patient administration services; healthcare resources administration services; and electronic patient records management services, with the first three domains being the primary target for IHCIS in the first delivery.

**Medical data management**

The most important assets in the IHCIS and healthcare infrastructures are the medical data representing the patients’ health status. In that sense one of the most important decision points was not to keep all the medical data centrally in the IHCIS system. There are
many discussions taking place today as to what is the best scenario for data management concepts; this is influenced by many variables and system properties. Some experts argue that storing all the data centrally is not feasible due to volumes and security regulations, and would go to the extreme of saying that medical data need to be stored on patient smart cards only. However, others might decide to manage everything centrally to increase quality, availability and data accuracy. In Croatia, IHCIS will maintain the copy of the patient’s primary care medical record in the central location: this is a subset or duplicate of the medical data stored in GPs’ offices. However, system components that are outside primary care (for example, hospital information systems (HIS), laboratory systems, etc.) currently utilise stand-alone enterprise applications. In the near future these will need to connect to IHCIS, which will enable the implementation of a reference act registry for patient medical encounters that take place outside primary care.

Primary care system deployment and project rollout

Current IHCIS deployment

Figure 2 represents IHCIS architecture as deployed in early 2007. The IHCIS primary location, fully capable of the integration of all 2600 GPs’ offices, is located in the system operator’s premises in Zagreb. A spare location, to be used only in case of a major disaster in Zagreb, is also fully functional and operates in the town of Rijeka. All connected GPs’ offices (350 at the
grand opening and all 2600 in the near future) are offered a number of customised services, such as retrieving patient administrative data, validating health insurance policy status, reporting activities performed, reporting serious infectious diseases, etc. Medical record related services such as storing and retrieving latest patient medical data, sending e-prescriptions and e-referrals, etc., are ready but will be deployed during 2007. As well as GPs’ offices, IHCIS provides services like those listed above to three other major stakeholders in the public healthcare system – the Ministry of Health and Social Welfare (MHSW), the Croatian Institute for Health Insurance, and the Croatian National Institute of Public Health.

IHCIS and future steps

In its goal to provide ICT support for business processes within the whole primary healthcare delivery system, the MHSW plans to integrate all other stakeholders within the system by the end of 2008: paediatricians, gynaecologists, dentists, school medicine doctors, primary care laboratories and pharmacies (see Figure 1).

Those plans are in line with the Ministry’s proclaimed intention to increase considerably the role of primary health care in the overall healthcare provision system. Providing ICT support, along with some other activities such as supporting additional education for healthcare professionals within the primary healthcare system, will it is hoped lead to 70–80% of medical issues being handled immediately, bringing threefold benefits: medical, financial, and management.9

New IHCIS users in 2007 and 2008 will be offered all services currently deployed including sending/retrieving e-prescriptions, making e-referrals, laboratory analysis data transfer, etc. Even more important than offering additional services is the effect achieved with every new stakeholder being integrated – that is, increased value of existing services. The most obvious example is the electronic medical record: having the medical record populated from different sources makes it more comprehensive and therefore of increased value both for care providers and the subject of care.

Furthermore, IHCIS services envisioned in the future include sending/receiving hospital referrals, discharge letters, injury at work related reports, etc., by integrating new stakeholders such as hospitals, medical universities and research organisations.

Croatian strategy in the context of European activities

The European Commission (EC) has identified the healthcare sector as one of the major public domains that needs to be improved in terms of quality, and optimised in terms of the cost of care provision. This has been influenced by demographic analysis, increased disease burden, mobility, and expectations of citizens when it comes to healthcare delivery.1,6 The Republic of Croatia, being on the path to European Union membership, has in that context set some ambitious goals within the strategy for building the information society in service for their citizens. According to the eSEEurope Agenda for the Development of the Information Society,7 signed on October 2002, the Republic of Croatia started the e-Croatia 2007 Programme8 in late 2003. Its intention was to speed up the process of employment of ICT technologies in the public sector, reconstruct state administration, and raise the quality and efficiency of civil services. The healthcare sector in Croatia, similar to the EC eHealth Action Plan, is together with the justice department one of the first such initiatives on the table. After the official primary care system launch at the beginning of 2007, we can expect the first results in a short time.

When comparing the Croatian initiative with similar projects around the globe, the primary care project in Croatia is quite similar to the NHS Connecting for Health programme in England, or Canada’s Health Infoway initiative managed by the Canadian Government. The foundation component in the English National Health Service is the Spine, which provides a similar platform, features and middleware services as IHCIS does, but on a much wider scope and level.7 The Canadian system on the other hand focuses fully on the implementation of the EHCR.10 The Canadian and Croatian strategies are adopting the same concept when it comes to the central management of the patient record in primary care on a regional level; this can be interpreted as ‘outsourcing medical record data management’, where owing to the geographic distance of support availability, data management is outsourced to the central organisation.

At the end of 2003, as the result of the assignment issued by the European Commission, HINE (Health Information Network Europe) published a review of various eHealth activities: HINE – The 2003 eHealth Report.11 The report provides a comprehensive analysis of different European healthcare projects and government initiatives, and compares the results based on a number of factors and parameters. The Croatian project
can be mapped somewhere in between a 'Big Bang' and a services-driven approach. A 'Big Bang' is characterised as having a clear central drive that aims to decentralise and optimise patient care processes, and it is usually regulated by government bodies that control and manage the entire process from the big picture perspective. The risks that are usually applicable to this type of approach (such as lack of short-term goals and long sales cycles, difficulty in managing the process, etc.) have been to some extent reduced by vendors who have pushed for a more services-driven approach, and the introduction of short-term incentives and a number of intermediary milestones into the project. Now that we have reached a major milestone, in terms of the official project start, it remains to be seen when and which benefits will be achieved in the future.

Conclusion

The IHCIS is a carefully and consciously designed integration platform that supports different care processes in a way that helps them be effective, efficient, patient-centred, safe and equal for all the patients that are receiving care. It improves the availability of accurate data management services and clinical guidelines that represent an essential adjunct to healthcare providers’ practice. In that sense, IHCIS will in years to come serve as the main integration platform for different stakeholders in the Croatian health system belonging to all levels of healthcare provision. Furthermore, integration through services directly offered by IHCIS will be strengthened and enhanced by a second integration level achieved through supporting telemedicine services, knowledge-sharing, evidence-based medicine, clinical guidelines, computer-aided support in decision making, and similar services that will be offered by IHCIS. IHCIS as such is not the ultimate solution for healthcare systems. Rather it represents an important tool that health authorities, care providers and patients can use together to accomplish a healthcare system of the highest quality.

REFERENCES


CONFLICTS OF INTEREST
None.

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