

Regional eHealth experience and concepts in Austria

Dr. Werner Leodolter

Steiermärkische Krankenanstaltengesellschaft m.b.H, Graz, Austria

By the example of the Austrian province of Styria the prerequisites, status and possible future developments for a possible structure of Healthcare portals as access points for citizens and patients as well as Healthcare professionals are evaluated. Integration aspects between the inpatient sector with its HIS, PACS, EPR etc. and the outpatient sector with its heterogenous structures are elaborated, demonstrating the role of PACS as driver in these developments - referring also to the benefits of all that as well as to the aspects of an EHR, telemedicine etc..

INTRODUCTION

Web-based healthcare information and healthcare services play an increasing role. HIS and PACS are already well established IT-services in hospitals and outpatient / extramural radiological institutes. The strategies, concepts and first results are evaluated based on the **experience of KAGes**, a hospital group in the province of Styria (1.2 million inhabitants), where KAGes covers nearly 90% of hospital beds and offers a wide range of ambulatory services and where KAGes tries to establish better integration to the outpatient sector.

Radiological services with its long tradition in information technology and as a very “networked” service in terms of referring and reporting workflows between self employed doctors and hospitals are a key driver for new structures. These **experiences** in the Austrian healthcare system and the conceptional experience of the author as one of the leading authors of the Austrian eHealth strategy serve as a basis for conclusions beyond the local and national aspects.

TYPES OF eHEALTH PORTALS

3 main types of eHealth portals seem to emerge from the variety of web-based healthcare information services:

- **Personal Information and Prevention Portals (PIPP)**, e.g. run by government agencies or public health insurance agencies, with the ability for healthcare campaigning (e.g. diabetes, high blood pressure, etc.). These can be drivers and motivators for interested people to establish their own personal EHR in a
- **Personal Privacy Portal for Citizens**

(PPPC) These portals can be run by highly trustworthy healthcare service provider organisations with high competence in terms of standardisation, integration, data security, data privacy, service availability etc. They will be paid either by patients themselves or the insurance industry. They will also include some sort of a personal Electronic Health record (EHR)

- **Healthcare-organisation-portals (HCOP)**, where patient related data (referrals, discharge letters, medications etc.) are exchanged with the approval of the patient. These portals are often formed as “doctor’s intranets” or hospital-intranets based on virtual private networks and other IT-security concepts.
- All three types of portals use health-related information offerings in the internet, what can be summarized as **Public Health Information and -services (PHIS)**. Quality assessment of these information and services is and will be a very important task.
- To be able to use these eHealth opportunities in an efficient and effective way we need a consistent and easy to use **personalised access for**
 - **citizens and patients and**
 - **health care Professionals**

This requires highly secure identification and role-based authentication services as well as easy to use single-sign-on features (probably ecard- and HPC- (health care professional card) based) for the different types of eHealth portals.

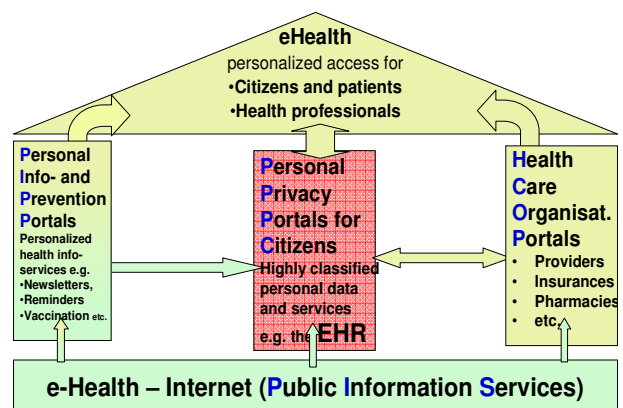


Figure 1. Structure and typology of eHealth portals

CONCEPTS AND SOLUTIONS IN AUSTRIA

The underlying basic concepts and solutions in Austria are:

- **The master patient index (MPI)**, which is evolving - supported by the already widely implemented **e-card** -, is an **enabler to integrate the health care sector** . But they also could be enablers for “big brother watching” and be perceived as a threat.
 - **status:** e-card in operation, additional ecard based services in implementation, MPI’s in implementation
- Many **supporting information offerings** via internet e.g. medical publications should be searched automatically with keywords and context from patient letters, pharmacy information portals, healthcare accompanying services (“guide through the jungle of information”), medical consulting services, (medical call centers, red cross etc.).
 - **status:** little experience
- The Austrian eHealth Initiative has developed a concept for a national **e-Health strategy** (1), based on a decentralized model, due to data privacy arguments and the historical structure of the Austrian healthcare system
 - **status:** just starting
- ELGA – the **electronic health record** has been made a matter of legislation. That means strong emphasis on its implementation
 - **status:** feasibility study is starting
- **standardised communication** between different actors is a prerequisite for implementation and usability of the portals as well as the secure exchange of patient related data between healthcare professionals. IHE seems most promising. As a proof of concept for the implementation of an integrated patient centered longitudinal health record in Austria (ELGA) a system architecture conformant to **IHE XDS** for cross enterprise document sharing is being constructed and evaluated
 - **status:** in implementation

INFLUENCE OF THE STRUCTURE OF HEALTHCARE SYSTEMS

AUSTRIA has two different sectors in public healthcare:

- hospitals as main part of the **inpatient sector** including specialised and emergency ambulatory care services also for outpatients and
- established, self employed doctors in the **outpatient sector**. They work on the basis of contracts with the public health insurance agencies or are paid directly by the patient or the patient’s private health insurance.

In SPAIN for example a province is operating ambulatory care centers and hospitals under one consistent organisation.

Therefore different **IT structures** are emerging. For example in a Spanish province one system is covering ambulatory care centers and hospitals. In Austria these are very separated heterogeneous systems. Therefore in Austria new organisational settings try to bridge the gap between the hospital sector and the outpatient sector (with its self-employed doctors). So **regional health care platforms** - partly under control of the federal government and partly under control of the public health insurance agency and other stakeholders - have been established. They focus first on organisational issues by financing cross-sector “reform pool”-projects. More homogeneous IT-infrastructures would clearly support and enable such projects, but still have to be established.

DATA PRIVACY ASPECTS

Aside the often discussed data privacy agenda from the **patients** view, - that won’t be discussed in this paper - there is another aspect:

Traditionally the self employed doctors consider their patient documentation as their professional domain and most **self employed doctors** in Austria have their data locally in their office. Therefore many - mostly small - IT-providers have emerged for this market with little standardisation. Application service providers have not been very successful in this market segment up to now.

EXPERIENCE BY THE EXAMPLE OF THE PROVINCE OF STYRIA

Inpatient sector

The IT of the rather homogeneous hospital sector (nearly 90% of hospital beds operated by one state owned company “KAGes”) has developed a highly **standardised and consistent application architecture** for a big part of the inpatient sector.

The scope of the application architecture covers the whole HIS (Hospital Information system) functionality as well as the PACS, Lab and archiving functionality, thus offering a widely complete workflow support and the electronic patient record (EPR). **PACS and RIS** as first systems to be implemented offered a learning opportunity for improved clinical workflow and helped to prevent too big problems when implementing complex workflows in a **HIS** project afterwards. The evidence of integration issues with a Radiology information system (RIS) helped to prevent to a large degree the implementation of only poorly integrated “islands of information” in other areas. Thus it is possible to give the staff a taste of the benefits of an integrated HIS and EPR and the experience of organisational changes involved with the intense use of IT in a health care organisation. Especially **telerradiology** between KAGes-hospitals proved to have significant benefit.(2) This helps to **increase the motivation for later integration efforts with the outpatient sector.**

Outpatient sector

The patient documentation of the self employed doctors is very **heterogeneous** - every doctor having his patient data still on paper or on a server “under his desk”.

Again radiologists are - due to their high affinity to technology - the pioneers in using IT in their daily business, having widely implemented their local PACS and RIS systems when they use CT and MRT modalities. With the ongoing investments in digital radiography the pressure to invest in PACS solutions is increasing even for small radiological institutes of self employed doctors in the outpatient sector. (3)

IT-supported transmural cooperation

The inpatient and outpatient sector are more and more forced into (“transmural”) cross-sector coop-

eration with

- **IT** being the **main enabler** and
- the **restricted financial resources** for the healthcare sector being the **main driver** for this development.

Again radiology is a pioneer in this development due to the high level of already done IT investments and due to its pioneer role in standardisation with DICOM. The most advanced implementations of IHE standards can be found in the radiology area.

In **Styria** the PACS-investments of KAGes - the company operating nearly 90% of the acute care hospital beds in 20 hospitals ranging from the university hospital in Graz to small standard hospitals in rural areas - were the driver to develop a short-term and longterm **radiological picture archiving** service thus enabling also the “transmural” **exchange of pictures and findings between the outpatient sector and the inpatient (hospital) sector.**

The **benefits** are thus

- saving double exams
- exchanging knowledge
- saving patients exposure to radiation
- saving money

This archiving and communication business is being operated by “marc”, a daughter company of KAGes as operating and Siemens as marketing and technology partner with about 40% of its revenue already coming from the outpatient sector.

The next step already in operation is the **electronic exchange of discharge letters** with actual more than 200 self employed doctors – the number constantly increasing.

Already in pilot operation is a “**styrian medical portal**” with the discharge letters available on a secure internet-based portal for the referring self employed doctors.

It is planned – in coordination with the Austrian eHealth strategy being still in development -

- to offer this portal as a service also to other healthcare providers in Styria for exchanging patient related information with a top level of data privacy - fully compliant to legislation.
- to enrich this portal for doctors with picture information - beginning with radiology again.

- to offer electronic referral with the possibility for scheduling
- to offer disease management capabilities e.g. for diabetes
- to offer telemedicine workflows
- to offer eMedication services
- to offer data for cross sector quality management
- to offer access for patients to view his personal data and maybe download it in his personal archive - eventually offered by his chosen EPR provider in a Personal-Privacy Portal for Citizens (PPPC).

In a **mid- and longterm perspective** future steps could be

- to enrich the discharge letters with relevant specific information adopted to the level of knowledge for
 - a self employed doctor
 - a Care provider (e.g. home care service)
 - the patient
- to offer call center services for these specific groups

CONCLUSION

Facing the dilemma between too many hospitals offering medical services on the one hand and the advantage of services offered close to where people are living on the other hand, there is one way to manage such a hospital group as KAGes: **Build a virtual hospital organisation.** Uniform and inter-linked hospital Information systems (HIS) with a single master patient index as access point to an electronic patient record (EPR) and a “common language” are a prerequisite to offer **patient related information exchange** and **telemedical services** from centralized competence centers to local hospitals. PACS helps to enable the EPR, a HIS and especially teleradiology as a driver for a virtual hospital organisation. Teleradiology is the most advanced field in telemedicine within KAGes.

The experience of integration of the ordering-workflow from referring departments and the viewing of pictures in the yard as well as the experience of the organisational changes involved with the intense use of EDP in the hospital organisation enforces teleradiology and other telemedical services as an **extension beyond the borders of the hospital organisation** towards “healthcare unbound” and “ehealth” - bridging the gaps between the different sectors of the healthcare system.

It is obvious, that the structures in healthcare industry are under enormous strain - especially caused by given financial restrictions and the opportunities offered by information and communication technology. Legislation and structural reforms are already considering that. Standardisation efforts are obvious. Data volume and bandwidth requirements e.g. of PACS will be one of the driving technological challenges for better IT-architectures (and standardisation) in order to enable **eHealth** and **more effective and efficient patient oriented workflows between the different sectors** of the healthcare systems. The easy and secure access of citizens and healthcare professionals to the relevant parts of this IT-architecture via the different - specifically focused - portals will help to offer good healthcare service within the given financial restrictions.

References

- (1) e-Health-Initiative (2005) The Austrian eHealth initiative, an information and communication strategy for a modern healthcare system; <http://ehi.adv.at>,
- (2) Leodolter, ECR 2005, march 2005; Pitfalls when integrating HIS with PACS
- (3) Leodolter, 16. Grazer Fortbildungstage der steiermärkischen Ärztekammer Oktober 2005; Bestehende Möglichkeiten und Zukunftsaspekte in der intra-extramuralen Kommunikation