

Michel AMIEL
 Lionel BRUNIE
 André FLORY
 Tobias Rene MAYER
 Mazen SAID

Digital care in the Alpine area

The article analyses the role that new digital technologies (NDTs) can play for improving healthcare. In particular, we identify trends, challenges and success factors. In the near future, NDTs should play a profound and transformative role in healthcare by improving patient healthcare and follow-up, by enhancing health professionals' (HPs) coordination and patient record exchange, by empowering patients to upload and access their medical records and, finally, by providing personalised, timely and secure access to medical information. This ongoing revolution is dramatically changing the way HPs and patients interact and how healthcare services are organised. It

supports the emergence of the concepts of territorial healthcare organisation and a healthcare local community, which propose novel healthcare organisational plans. In this context, this article outlines the multidimensional nature of e-health solutions. In addition to technical and organisational issues, a number of other dimensions must be considered; for example, sociological and financial dimensions.

Keywords: e-health, digital health, telemedicine, territorial healthcare organisation, healthcare local community

1 Introduction

This article summarises the SPHERA regional seminar “Digital care in the Alpine space”, which was conducted at the National Institute of Applied Sciences of Lyon (*Institut National des Sciences Appliquées*; INSA de Lyon, Lyon, France) in June 2014 (see Internet 1). Funded by the Alpine Space Programme’s cooperation program, the SPHERA project aims to enhance territorial governance in the Alpine area, focusing specifically on the policy areas of health and spatial planning. The capitalisation approach of SPHERA builds on current and

finalised Alpine Space Programme projects within the thematic field of “inclusive growth”. Learning from the results of these projects, SPHERA will also help prepare the ground for the new generation of projects in the 2014–2020 programming period by identifying gaps and supporting synergies. The Lyon SPHERA seminar, which is considered in this article, specifically focused on e-health, leveraging the extensive experience of the Rhône-Alpes Region in implementing e-health and telemedicine solutions.

2 Status of e-health systems in the Rhône-Alpes region

2.1 Rhône-Alpes systems

Many e-health systems have been designed and implemented in recent years in the Rhône-Alpes region. The most important are:

- DPPR (*Dossier Patient Partagé Régional*): the Regional Shared Patient Record;
- PEPS: middleware support for healthcare networks;
- *Trajectoire*: A tool for tracking and organising patient healthcare; for example, the transfer from hospital to home care;
- *Visage*: a shared diary used by healthcare professionals involved in patient follow-up;
- OSCARS: Support for cancer follow-up and care coordination;
- ZEPRA (*Zéro Echange Papier en Rhône-Alpes*): a paperless document exchange system (see Internet 2);
- ASALEE: a cooperation protocol between health professionals (HPs) involved in patient follow-up;
- ROR (*Répertoire Opérationnel des Ressources*): a directory of all healthcare operational resources.

These tools have demonstrated their potential and effectiveness. They allow the Rhône-Alpes region to be a key player in e-health in Europe in 2014. Considered as a whole, they provide a good illustration of current trends in e-health.

2.2 Regional healthcare project

The Rhône-Alpes healthcare authorities aim to create an area of excellence in digital health services, serving all health actors for one purpose: to ensure better health and support patients throughout their treatment. In this context, the first regional healthcare project (*Projet Régional de la Santé*, PRS), which establishes key priorities for the coming years, was released. A synthesis of the plan is available online (see Internet 3).

This plan covers a period of five years (2012–2017) and is organised along three strategic priorities, which cover eighteen activities:

- Strategic Priority 1: Developing prevention, in particular towards environmental risks;
- Strategic Priority 2: Improving healthcare services;
- Strategic Priority 3: Facilitating care plan implementation.

Strategic Priority 3 concerns improving the prevention and treatment of chronic diseases (diabetes, heart or kidney failure, etc.), notably through better healthcare coordination with

special attention to be paid to the disabled and elderly.

Key aspects of this priority include:

- Access to healthcare services;
- Patient follow-up: care plan design and personalisation;
- Patient follow-up: coordination of healthcare services;
- Interoperable information systems;
- Care flow management;
- Inclusion of both social and care dimensions.

2.3 The PASCALINE project

Submitted to the “Digital Healthcare Territories” (TSN) national call, the Rhône-Alpes PASCALINE project is one of only five proposals that were selected by the French authorities for financing. The keywords of this project are available online (see Internet 4). The TSN national call focuses on e-health and territory planning. It is an opportunity to experiment with high-scale digital healthcare services planned in the Regional PRS (see Section 2.2). TSN targets accessibility to healthcare services, new healthcare models (e.g., a virtual hospital for territorial governance) and better healthcare service quality. The PASCALINE project consists of twelve work packages with a global budget of EUR 25.5 million. Two use cases will be considered during the project: breast cancer (in which general practitioners are the main actors) and severely disabled children (in which families are the main actors). PASCALINE addresses three main dimensions: sanitary, medical/social and prevention. They have in common the fact that several actors, information and needs must be coordinated, which raises technical challenges for NDTs.

PASCALINE targets five points that were identified as major challenges and needs:

- Defining a patient-centred care plan and implementing seamless care flow;
- A digital (regional) medical record that will serve as a common base of patient-related information. Note that over 60% of the patients are already registered in the regional e-health platform;
- Secure communication service between HPs (hospitals, practitioners in cities, etc.) to enable fast exchange of knowledge;
- A selection of tele-assistance and prevention services offered to patients suffering from chronic diseases;
- Innovative projects (e.g., quantified self- and sensor-based systems)

PASCALINE offers very good insight into the most promising trends in e-health. It also illustrates the need to design holistic solutions that consider all the dimensions of healthcare and integrate all stakeholders.

3 Trends and challenges

Two crucial issues can be identified that must be considered when designing e-health solutions:

- Management of patient and information flows (also referred to as the patient trajectory). Patients often move from their homes to a hospital or from a hospital to another one. The management of patients and their healthcare information is a key element in such multi-party follow-up. This seamless information exchange flow includes patients' access to their treatment history or health-related information;
- Management of the patient care plan. When multiple HPs are involved in patient care (especially when a trans-disciplinary approach is required; e.g., in cancer treatment), new coordination models are needed. Who decides what? Who is responsible for what? These questions must be answered before the care process is started.

Addressing these two issues requires solving technical, psychological, social and organisational challenges, which are addressed below.

3.1 Technical challenges

Some technical challenges can be addressed:

- Typically, current tools support only one disease, but patients may have multiple diseases or may follow multiple treatments at the same time. Tools should be adapted to cover this aspect;
- The new vision for NDTs is not one of specialised (software) tools, but transverse polyvalent tools able to adapt to the individual needs of hospital professionals, patients, and so on;
- A secured messaging service is an essential functionality for HPs. Messaging and document transfer is an efficient first step in accustoming HPs to new digital technology;
- New digital technology must be simple, easy-to-use, efficient and affordable.

3.2 Psychological challenges

An important problem is changing work habits. Training and support must be provided for several years. The length of the learning curve that has to be followed to fully implement a new way of working is about ten years. The bubble of responsibility refers to the fact that HPs may not want to be integrated into a larger (virtual) team but may prefer to stay in their own area of responsibility. For the success of NDTs, one needs to consider individual competences, needs and best working practices. A

crucial factor for success is remuneration for NDT activities, and HPs should be paid appropriately for the time they spend.

3.3 Social challenges

Social aspects are not reduced by NDTs. Interestingly, based on prior experience, the need for social contact increases with NDTs. Consequently, integrating the social dimension is indispensable for the success of any e-health solution. A social network should be created around the patient. Social workers, patient associations and relatives must become involved in the healthcare "environment". Social media and internet-based social networks should also be considered to support patient's social integration and the exchange with and among patients.

3.4 Territorial hospital organisations and healthcare local communities

New patient follow-up approaches call for a dramatic healthcare territorial organisation change in which hospitals should play a key role in coordinating healthcare actors and supervising care flow. The notions of territorial hospital organisations (THOs) and healthcare local communities (HLCs) have recently emerged and suggest organising all healthcare stakeholders (including HPS, paramedics, patients, families, associations, social workers, etc.) into a network of interactions supported by NDTs (see Sections 2.1 and 2.3). As noted, such a change requires designing coordination support and information sharing tools/systems, designing a relevant legal framework, and political and financial support. In this context, a bottom-up approach should definitely be privileged; that is, the local coordination model should be designed and implemented according to local healthcare actors' needs and context.

3.5 Success factors

Some key factors for the success of THOs/HLCs, as well as all e-health solutions, can be identified:

- A pragmatic approach: utility and pertinence must be always clear;
- Bottom-up approaches: start from the needs of users (HP, paramedics and patients);
- User-centric design of NDT tools to optimise their ergonomics and their usability;
- Integrating patient associations within development strategies;
- User support and training strategy;
- Integrating the social dimension;
- A clear and relevant remuneration framework;
- A clear and relevant legal framework.

4 Conclusion

This article addressed current trends and challenges in developing and implementing e-health solutions. A key feature that must be considered is the multidimensional nature of such solutions. In addition to technical and operational issues, designers of e-health solutions must consider psychological, sociological, training, legal, financial and organisational issues. NDTs provide tools, not solutions, and, for the success and the sustainability of e-health applications, all of these dimensions must be addressed at design time in a holistic approach. Furthermore, in the context of healthcare and spatial planning, emphasis has been placed on the emerging concepts of territorial healthcare organisations and healthcare local communities, which propose novel healthcare organisational plans. Finally, success factors have been identified that should be considered when designing and implementing e-health solutions.

.....
 Michel Amiel

ASTRHA (*Association pour la Télémedecine en Rhône-Alpes*; Rhône-Alpes Telemedicine Association), Lyon, France
 E-mail: michel.amiel@creatis.insa-lyon.fr

Lionel Brunie

LIRIS (*Laboratoire d'Informatique en Image et Systèmes d'information*), National Institute of Applied Sciences (INSA de Lyon), Lyon, France
 E-mail: lionel.brunie@insa-lyon.fr

André Flory

LIRIS (*Laboratoire d'Informatique en Image et Systèmes d'information*), National Institute of Applied Sciences (INSA de Lyon), Lyon, France
 E-mail: andre.flory@insa-lyon.fr

Tobias René Mayer

LIRIS (*Laboratoire d'Informatique en Image et Systèmes d'information*), National Institute of Applied Sciences (INSA de Lyon), Lyon, France
 E-mail: tobias-rene.mayer@insa-lyon.fr

Mazen Said

LIRIS (*Laboratoire d'Informatique en Image et Systèmes d'information*), National Institute of Applied Sciences (INSA de Lyon), Lyon, France
 E-mail: mazen.said@insa-lyon.fr

References

Internet 1: <http://sphaera.g2hp.net/sphaera-national-seminar-lyon-rhone-alpes-17th-june-2014-digital-healthcare-in-the-alpine-space> (accessed 12 Dec. 2014).

Internet 2: <http://www.ars.rhonealpes.sante.fr/Zero-echange-de-papier-en-Rhon.170391.0.html> (accessed 12 Dec. 2014).

Internet 3: http://www.ars.rhonealpes.sante.fr/fileadmin/RHONE-ALPES/RA/Direc_strategie_projets/PRS_Programmes_CNP/prs_maj_072013/20131001_Synthese_PR5.pdf (accessed 12 Dec. 2014).

Internet 4: http://www.ars.rhonealpes.sante.fr/fileadmin/RHONE-ALPES/RA/Direc_strategie_projets/TSN/20140422_DSPro_TSN__PointsFortsRA.pdf (accessed 12 Dec. 2014).