



Enabling Integrated Care

Harnessing personal health systems for better outcomes across the care continuum

Briefing Note for a *SmartPersonalHealth* Workshop
WoHIT, Thursday 18 March 2010, 13:00-17:00, Barcelona

This briefing note introduces the concepts of the European Commission co-funded support action *SmartPersonalHealth* and the objectives of this workshop, the first in a series of events, with the aim to promote the interoperability among Personal Health Systems (PHS) and between PHS and other eHealth systems.

1 SmartPersonalHealth goals and objectives of the workshop

The goal of the *SmartPersonalHealth* initiative is to raise awareness of

1. the need for and benefits of interoperable eHealth systems, in particular personal health systems (PHS), and
2. the existence and scope of various European and international interoperability initiatives, guidelines and standards,
3. by engaging, educating and leveraging the competencies and roles of a multiplicity of stakeholders collectively (European SME's, systems integrators, eHealth industry at large; current and future potential procurers of PHS and other eHealth systems in the EU; health-care providers and patients)
4. to positively influence the deployment of interoperable PHS and other eHealth systems.

Initial concepts, like those presented here, will be discussed with stakeholder representatives and the outcomes of three workshops will feed into policy recommendations to be presented at a conference at the end of the project.

Drawing on experience of healthcare providers who are already using personal health systems to support home care for chronic disease management, the workshop will provide a forum to explore opportunities and identify solutions for integrating such systems in routine healthcare. *Focusing on the hands-on experience of clinicians*, the workshop will discuss key issues of interoperable PHS integrated into care processes. Speakers and participants will present how they have overcome (or intend to overcome) some of the key interoperability challenges inherent in using personal health systems as part of routine healthcare, such as:

- integration of PHS into the wider clinical service process
- human resource organisation and co-operation with informal care providers
- patient rights (consent, privacy, access)
- professional liability and insurance
- identification and authentication of patients and professionals
- interoperability in a multi-vendor environment

2 Realising the benefits of eHealth – the need for interoperability

2.1 The overall benefits of eHealth and Personal Health Systems

The overall benefits of eHealth solutions can only be realised if all stakeholders involved fully understand and support the fundamental importance of interoperability of eHealth infrastructures and applications. Awareness and understanding are key initial steps towards requiring and implementing such concepts when establishing national, regional or individual solutions and applications. And it is interoperability in all its facets (at the political, organisational, semantic or technical levels; appropriate leadership by health policy makers and key executives; legal and regulatory framework; etc.) that will eventually allow individuals as well as our health systems and societies to reap the full benefits of eHealth. These are the key considerations driving the SmartPersonalHealth activities.

The ultimate goal of promoting interoperability in general, and here for personal health systems in particular, is to contribute to comprehensive, easy and collaborative access to and sharing of a patient's health data for all authorised health professionals, family carers and ultimately the patient itself. Thus they will gain managed access to essential health information about patients, subject to the patients' consent.

2.2 Personal Health Systems as integral part of eHealth

The European Commission co-funded project *PHS2020* has come to a consensual vision of future PHS during its work with various stakeholders. This implies a holistic health system view and is guided by a business value chain framework:

Personal Health Systems (PHS) assist in the seamless provision of quality controlled, and personalised health services to individuals regardless of location. They consist of:

- Ambient and/or body devices (wearable, portable or implantable), which acquire, monitor and communicate physiological parameters and other health related context data of an individual (e.g., vital body signs, biochemical markers, activity, emotional and social state, environment).
- Intelligent processing of the acquired information and coupling of it with expert biomedical knowledge to derive important new insights about an individual's health status.
- Active feedback based on such new insights, either from health professionals or directly from the system to the individuals, assisting in diagnosis, treatment, rehabilitation and social care as well as in disease prevention and lifestyle management.

Personal health systems can play a central role in ICT supported solutions for chronic disease management and integrated care. With the central component health monitoring devices, they form an integral part of telehealth. *Telehealth*, using ICT-enabled applications to provide services related to health and care at a distance, is an area of eHealth which can be expected to become a major component of future *integrated care information systems (ICIS)*. Policy makers around the globe have vested high expectations in telehealth for quite some time now. It has been expected that telehealth services will help European health systems to better cope with growing demands arising from an ageing population, increasing consumerism, and limited supply of funding.

In broad terms, *health system interoperability* is the ability, facilitated by ICT applications and systems,

- To exchange, understand and act on citizens/patients and other health-related information and knowledge
- Among organisationally, linguistically and/or culturally disparate health professionals, patients and other actors and organisations
- Within and across health system jurisdictions and administrations in a collaborative manner.

2.3 The ecosystem of connected health: seamless exchange of data

In a *generic scenario* we encounter two broad segments of interoperability:

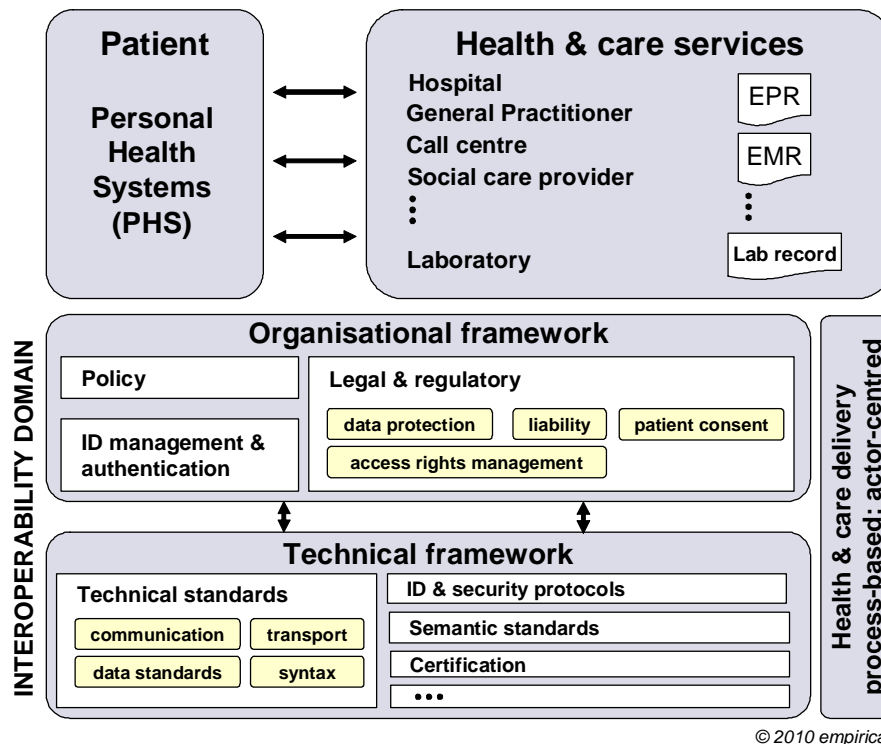
1. PHS devices to data hub
2. Data hub to health service provider system, e.g. EPR, EMR, a hospital information system (HIS) or a GP patient system.

As can be deduced from *Figure 1*, already this rather simple scenario introduces a vast number of specific interoperability issues which, depending on the maturity of

- the devices, hubs and provider information systems used
- the local, regional or national eHealth infrastructure components and services available

need an integrated approach by all concerned in order to become solved and maintained in a sustained manner for many years to come. It needs first of all awareness raising - what this initiative is all about - but next it needs agreement on the policies to be pursued, the measures to be taken, and funding and organisational structures like CONTINUA to become successful in the longer term.

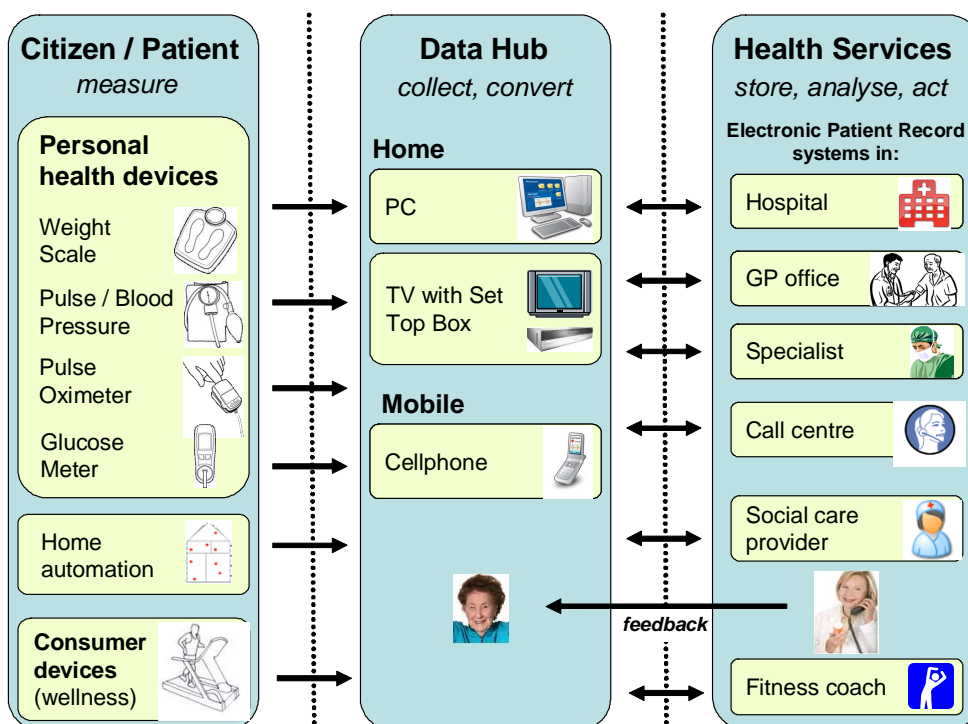
Figure 1: Challenges of PHS interoperability



As illustrated by *Figure 2*, and to reduce, for the time being, the overall complexity of interoperability issues, we differentiate only among *three major areas* of data measurement, collection, transfer and analysis:

1. Applying PHS devices for measurement of vital data and person activities
2. Collecting and converting these data via a data hub which may be in the home or mobile
3. Analysing the data provided and acting upon the results by health service providers

Figure 2: Examples for data exchange in PHS-based health and care services



© 2010 empirica

When considering the major building blocks as illustrated in *Figure 1*, a wide variety of scenarios and combinations into concrete, more detailed use cases can be imagined. When introducing additional actors like the patient/person himself, informal carers, community nurses, case management, a specialised remote management organisation or a pharmacist, the integration and service process becomes more complex. And the respective concrete organisational and process structure will furthermore heavily depend on the peculiarities of the local, regional and national healthcare and social care systems. Therefore, to allow for an initial approach to key interoperability issues, we will abstract from these further details and focus at the generic level.

As a good example of cooperation, we propose to consider measurement devices used in telehealth systems.

Interoperability between device and data hub: In order to support a wide range of diseases, it is necessary for such a telehealth system to work with a large variety of measurement devices, such as blood pressure monitors, weighing scales, glucose meters, pulse oximeters, ECG monitors, peak flow meters, etc. For each of these measurement device types there are a number of companies making them, but none of the companies manufactures all of these devices. So a telehealth system vendor will need to work with different suppliers to provide a complete set of measurement devices to its customers.

Today, each of these devices from each of these vendors communicates in a different way. Even if some devices use the same transport mechanism, such as Bluetooth, USB, Infrared or a serial cable, each of them will still use a different way of transmitting the data over that transport mechanism. It becomes clear very quickly that it is a daunting task for a telehealth system vendor to make its system work with all of these different devices from different vendors

Interoperability between data hub and health service provider ICT application: A complementary need for cooperation emerges at the interface of the hub transferring personal telehealth data into electronic patient or medical records (EPR/EMR). Often the supplier of a telehealth system is not the supplier of the EPR or EMR system that is used to store, integrate, analyse and display health data about the patient. Since there were no proper standards in place yet to transfer health data from a telehealth system into such a health service provider system,

the telehealth vendor had to work with all major EPR or EMR system providers to develop custom interfaces for transferring this data. Again a huge amount of work that created a significant barrier for proper integration of telehealth data into other systems and thus limiting the potential health benefits and efficiency improvements that personal telehealth could offer.

2.4 Key challenges for physicians and other healthcare professionals

Interoperable technologies will offer patients and their supporting carers/family timely, convenient access to personal health information and decision support and enable providers to track the patient's condition.

What are key issues and challenges for physicians and all other care professionals and staff to make better informed decisions with the help of interoperable PHS and other eHealth systems? In the following sections, some of the key *questions*, divided into organisational and technical challenges, are pointed out. But initially, this basic issue should be discussed:

- Which of their *healthcare provision needs* - in order of priority - can PHS devices and associated interoperability and integration into other health information systems support, in order to improve patient care and reduce resource consumptions?

Only then it becomes sensible to look at the further question of

- which interoperability issues need to be tackled in which order of priority to indeed achieve these objectives?

Figures 1 and 2 above will help to structure the domain for detailed discussions.

2.4.1 Organisational framework challenges

In terms of interoperability levels, the issues to tackle with clinicians span a wide range of organisational, legal and semantic challenges. At the *organisational level* for instance, the integration of PHS into clinical workflow implies also organising processes for reaction / acting on data and signals from PHS such as alerts in cases of, e.g., a decompensation of a patient or other emergencies. This means that detailed guidelines need to be prepared for action and follow up, protocols for physicians, nurses or other health professionals as well as call centres, patients and carers need to be designed and all actors involved must be well informed and trained.

Integrated workflow processes need to be studied in thorough detail, understood and optimally supported by the ICT solution.

2.4.2 Technical framework challenges

In the workshop, *technical* issues will be addressed only indirectly as far as the full integration of PHS into daily routine and the seamless exchange of patient data presume an underlying ICT infrastructure with regulated access, identity management (IDM), authentication, security, audit trail and further rules. This will enable also consistent and transparent data collection and analysis for, e.g., outcome measurements which can eventually provide the basis for outcome oriented reimbursement.

Semantic issues need to be addressed in relation to a specific domain, for example telehealth and diabetes management, in languages to be understood both by professionals and by lay persons. Capabilities of integrated PHS-EHR solutions for providing decision support or data analysis for population health may also be discussed.

Different *types of health professionals* may have different needs and requirements to PHS design and integration, and also different "business" interests.