



SmartPersonalHealth

Interoperability of connected Personal Health Systems (PHS) with the wider eHealth domain –
Promoting the smart delivery of health services

Support Action FP7-248419

Enabling *integrated* care: *harnessing personal health systems for better outcomes across the care continuum*

Workshop Report

18 March 2010

CCIB Barcelona



Table of contents

1	Agenda	2
2	Goals and objectives	4
2.1	Introduction to SmartPersonalHealth and the workshop for the clinical community.....	4
2.2	Conceptual background	4
2.3	Realising the benefits of eHealth – the need for interoperability	5
2.3.1	Personal Health Systems as integral part of eHealth	5
2.3.2	The ecosystem of connected health: seamless exchange of data	6
2.4	Key challenges for physicians and other healthcare professionals	8
2.4.1	Organisational framework challenges	8
2.4.2	Technical framework challenges.....	8
3	Workshop presentations	9
3.1	Challenges of PHS interoperability in daily practice: what are the key issues?.....	9
3.2	Telemedicine solution for treatment of patients with chronic ulcers	9
3.3	The English Whole System Demonstrator -- interoperability experience and lessons learned.....	10
3.4	Personal health systems and COPD – how to integrate into routine service delivery?.....	12
4	Discussion	14
5	Outlook.....	17
6	List of participants	18
	Links to presentations	19

1 Agenda

Enabling *integrated* care: Harnessing personal health systems (PHS) for better outcomes across the care continuum

A workshop

to discuss challenges and opportunities in integrating personal health applications into routine healthcare services

Thursday, 18 March 2010, 13:00 – 17:00

CCIB Barcelona, Room M1 VIP

Objectives: presentation of good practice cases, highlighting challenges, identifying solution approaches for integrating PHS into routine healthcare

13.00–13.45 Networking lunch

Chair: Petra Wilson, Continua Health Alliance

13.45–13.55 Welcome from European Commission

Benoit Abeloos, Project Officer

Welcome from TicSalut

Joan Cornet, Fundació TicSalut

**13.55–14.05 Challenges of PHS interoperability in daily practice -
what are the key issues?**

Karl Stroetmann, empirica

(A concept paper is distributed with the

agenda)

14.05–15.05 Presentations:

- **Personal health systems interoperability in wound care**
Claus Pedersen, Odense University Hospital
- **English Whole System Demonstrator - Interoperability experience and lessons learned**
Dr Atul Kumar, Newham Primary Care Trust
- **Personal health systems and COPD - how to integrate into routine service delivery?**
Dr Josep Roca, Hospital Clinic University of Barcelona

15.05–15.15 Coffee break

15.15–15.45 Small group and exchange of experience of benefits realised from interoperable PHS

- Reduced ED attendance, reduced repeat hospitalisation
- Improved patient compliance

- Extended staff capacity
- Other

15.45–16.15 Small group discussion key interoperability challenges

- 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
- Other

16.15–17.00 Report from breakout sessions

17.00 Closing

Note: The project will feedback to the participants the outcomes of its workshops and invite comments for the finalisation of the respective reports. These reports will provide input to recommendations to stakeholders as well as national governments and the EC on how to address the challenges of interoperability in realising benefits of Personal Health Systems in integrated care.

2 Goals and objectives

2.1 Introduction to SmartPersonalHealth and the workshop for the clinical community

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. These are the key considerations driving the *SmartPersonalHealth* activities. This Support Action promotes interoperability among Personal Health Systems (PHS) and between eHealth systems – in the landscape of continuous care, across multilingual and multi-cultural environments in Europe.

Key activities include three thematically focused regional stakeholder workshops, one central pan-European PHS Interoperability Conference, and further promotion, networking and dialogue. Finally, a concise report on key outcomes from all promotional activities and stakeholder dialogues will be compiled, highlighting the current status, concerns, barriers and incentives to accelerate the development and adoption of interoperable PHS systems. Further recommendations for interoperability promotion will be proposed to the European Commission, national governments, stakeholder groups and industry.

This first *SmartPersonalHealth* Workshop entitled *Enabling integrated care: harnessing personal health systems (PHS) for better outcomes across the care continuum* focussed thematically on challenges and benefits for the community of healthcare providers and took place 18 March 2010 during the “eHealth week 2010” at the CCIB in Barcelona. The workshop gathered a number of clinical experts, healthcare providing organisations, and practitioners from the broader area of telehealth.

Drawing on the experience of healthcare providers who are already using personal health systems to support home care for chronic disease management, the workshop provided 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 discussed key issues of interoperable PHS integrated into care processes. Speakers and participants presented 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

2.2 Conceptual background

In preparation of the workshop, a background paper was circulated to the participants. This first section provides a summary thereof.

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 stake-holders 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 all three workshops will feed into policy recommendations to be presented at a conference at the end of the project.

2.3 Realising the benefits of eHealth – the need for interoperability

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.

2.3.1 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/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.

2.3.2 The ecosystem of connected health: seamless exchange of data

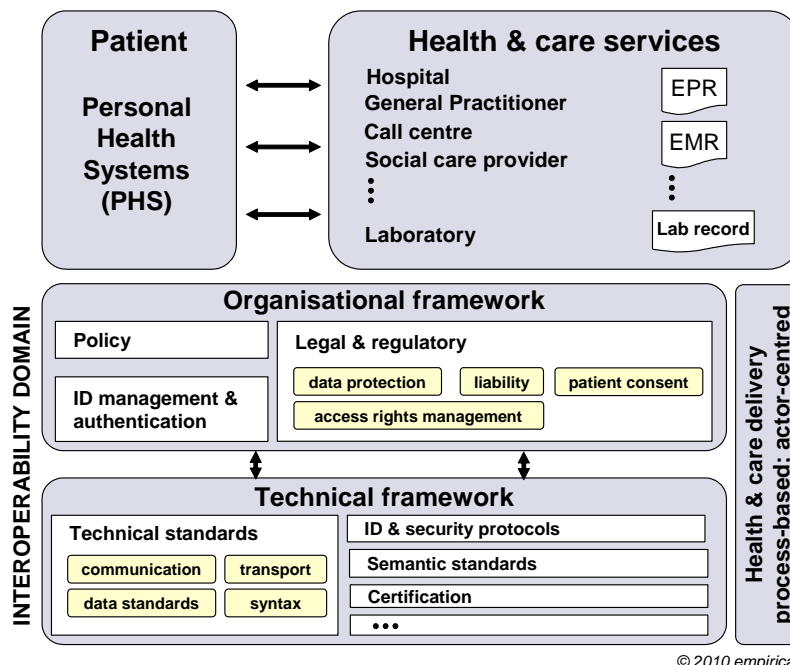
In a *generic scenario* we encounter two broad segments of interoperability:

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

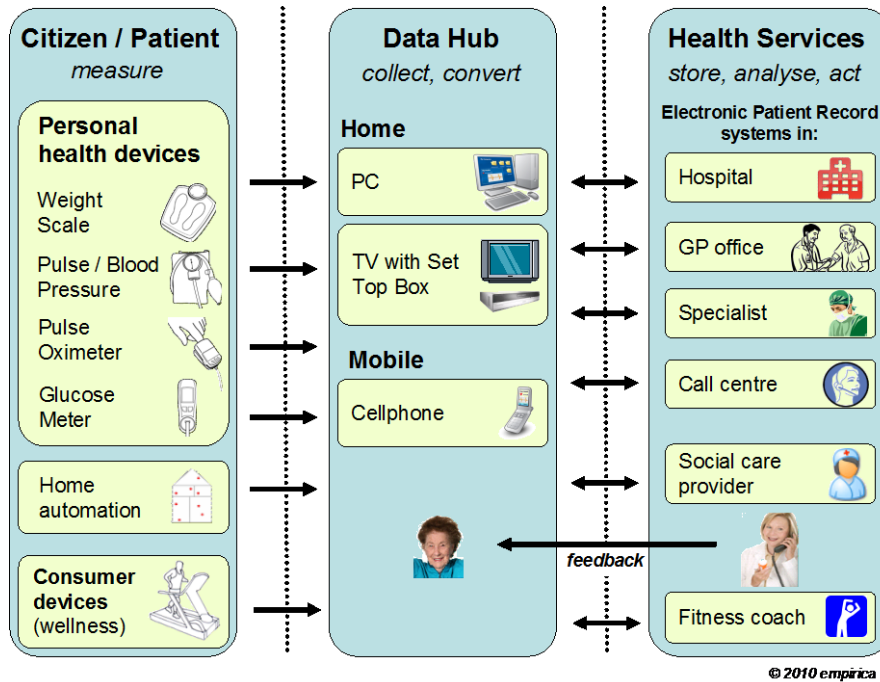


As illustrated by *Figure 2*, and to reduce the overall complexity of interoperability issues, we differentiate only among *three major areas* of data measurement, collection, transfer and analysis:

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



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.

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. Today, each of these devices from each of these vendors communicates in a different way. 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* 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 were 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.

3 Workshop presentations

The chair of the workshop, **Petra Wilson**, Chair of the EU Policy Group with the Continua Health Alliance and director in the Healthcare team of Cisco's Internet Business Solutions Group, **Benoit Abeloos**, Project Officer at the European Commission, and **Joan Cornet**, Executive Chairman of Fundació TicSalut, welcomed the participants.

3.1 Challenges of PHS interoperability in daily practice: what are the key issues?

As the first speaker, **Karl Stroetmann**, Senior Associate with empirica Communication and Technology Research, briefly introduced into the workshop's topic by presenting the conceptual framework paper that the SmartPersonalHealth project produced.

The presentation, entitled "Challenges of PHS Interoperability in Daily Practice: What are the Key Issues?", alluded to the key challenges that healthcare professionals face in their daily clinical practice: which healthcare provision needs can PHS devices and associated interoperability/ integration into other health information systems support in order to improve patient care and reduce resource consumptions? In more practical terms, from the view of a clinician, which interoperability issues need to be tackled – and in which order of priority?

The two figures above in this workshop summary summarised the presentation of the ecosystem of connected health and the related seamless exchange of data.

3.2 Telemedicine solution for treatment of patients with chronic ulcers

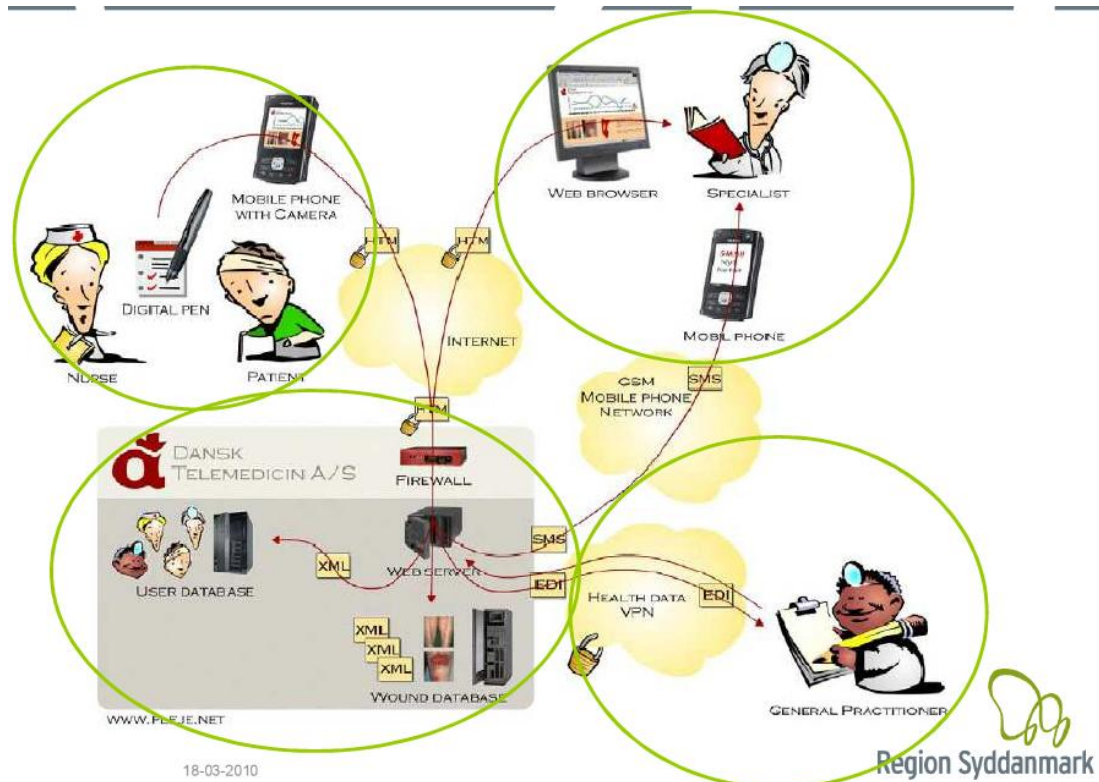
Claus Pedersen from the Odense University Hospital in Denmark presented interoperability at work along with a successful telemonitoring of patients with chronic ulcers project in Southern Denmark.

The solution originated from a clinical decision-making dilemma: to transport a patient to a clinic or not, and whether a clinical specialist is required or a nurse providing a service is sufficient. Ultimately, the objectives encompassed wider goals: to improve the service for a group of patients that have a low status in the health care system; to improve co-operation between primary and secondary care; and to reduce costs for both the health care system and the patients.

The previously existing underlying structural and organisational misfit in the treatment of chronic ulcers results in a gap of communication and exchange between the home visiting nurse and the expert. By closing this gap, as depicted in the below figure, the triangle between patient, visiting nurse and expert could be completed. The solution to have the nurse use mobile phones for remote imaging and transfer of the photos taken to an online connected expert meant for health professionals that they have access to immediate and current information and images, that an interdisciplinary and cross-sectional collaboration is established, which, in turn, leads to fast and coherent treatment, with fewer amputations, and the release of manpower.

For the patient, the telemedicine solution meant faster healing processes, improved quality of life, and the release of him being no longer the sole "information carrier". Treatment can now take place at home, with more and better information being available to both patient and relatives.

FIGURE 3: SETUP TELEMEDICINE SOLUTION OF REGION OF SOUTHERN DENMARK



3.3 The English Whole System Demonstrator – interoperability experience and lessons learned

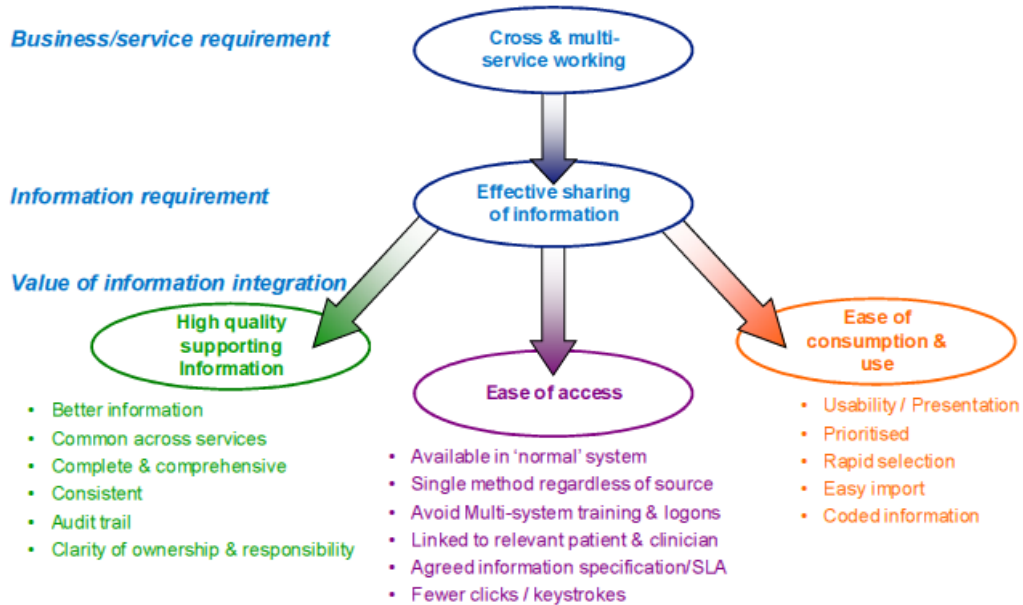
Atul Kumar, Clinical Director of the Newham Whole Systems Demonstrator, Newham Primary Care Trust, discussed in his presentation “English Whole System Demonstrator – interoperability experience and lessons learned” the process of how in the Newham primary care trust data sharing goals between telehealth systems and the GP system as well as the patient record were tackled.

In order to avoid “redundancy”, “inefficiency”, “non-usability”, and “ineffectiveness”, options for sharing data must take account of the following considerations:

- Capital costs – software licenses, installation engineers
- Training costs – all staff in the care pathway
- Workflow costs – ongoing double login, manually re-enter
- Multiplicity – next system after present GP system?

The integration of telehealth information needs to be governed by the particular values the integration approach provides for users, from business/service requirements over information requirements to the value of the information integrations as such. The graph below describes and summarises the path towards identifying values to users.

FIGURE 4: INTEGRATION AND VALUE TO USERS



The identification of user values is certainly also preceded by addressing the fears of potential users (see figure below). Real world considerations such as a GP consultation force strategic thinking about message forms and contents, message presentation, message importation, and medico-legal as well as other issues. Medico-legal issues thereby carry often potential tension with business implementation rules.

FIGURE 5: ADDRESSING USER FEARS



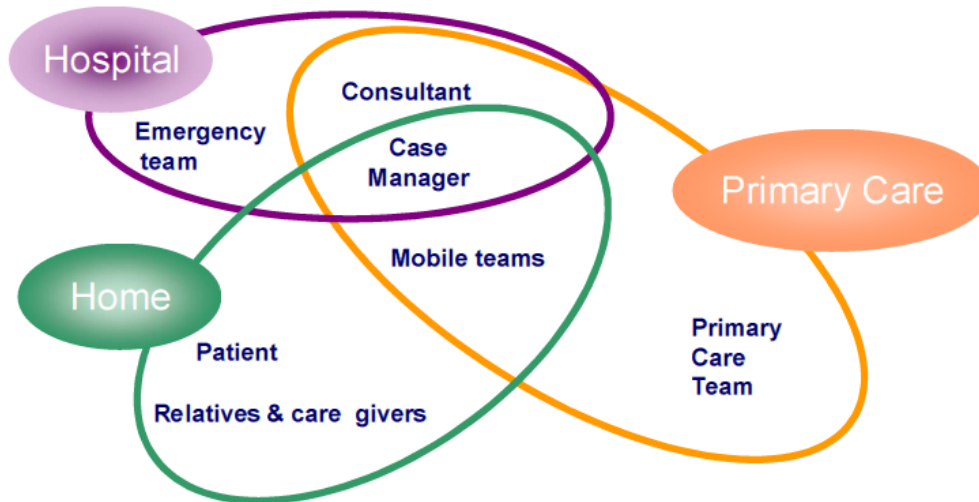
Key messages to take home from the English Whole System Demonstrator in Newham are: (1) that a capability for moving data should already exist, (2) the use of standards meant that for the overarching organisation, the NHS, much greater flexibility was built into the systems, (3) user adoption will succeed through usage guidelines (control of data, volumes, etc) and practical implementation rules (clarity and filling in gaps). Practical implementation rules are as important as technical standards. Ultimately, key is certainly to understand that only live pilots can clarify requirements and user value.

3.4 Personal health systems and COPD – how to integrate into routine service delivery?

The third speaker, **Josep Roca**, from the Hospital Clinic of the University of Barcelona, presented, based on the Catalonian healthcare system, the realisation of personalised care models for chronic patients with ICT supported services.

Central to this realisation was to understand how structures and processes had to be changed in order to arrive at shared care across the system, as depicted in the below figure.

FIGURE 6: SHARED CARE ACROSS THE SYSTEM



Interoperability challenges need to address political processes and organisational implementation through supporting services that facilitate between the patient, on the one hand, and, on the other hand, the providers’ network. In the Catalonian healthcare system, a support center provides services that encompass the targeting of patients, management of programs, designing of well standardized interventions and, ultimately, induce patient-centred care. With the patient in the centre, the services include support for triage, self-management and remote monitoring.

The relevance of interoperability is effectively allotted through standardised interventions which were evaluated through pilot project and pilot services. They range from home hospitalisation, prevention of hospitalisations, home monitoring, home rehabilitation, high quality spirometry in primary care to tele-dermatology and sleep studies.

Integrated care strategies for chronic patients can be the result of information technologies that support enhanced citizen life style and well standardized care paths. The deployment plans are actively organised by care programs that include clusters of diseases such as cardiovascular, respiratory or diabetes. Overall, experience from many years of pilots and services show that, to actually achieve interoperability, the challenges are not of technological nature, but are predominantly organisational challenges.

For this reason, interoperability was approached at different levels – organisationally this included primary care, the hospital, and the home with both patient and relatives or care givers, while territorially, two levels among the providers were considered:

- Level A: hospitals and primary care facilities in Barcelona Esquerra
- Level B: providers in Spain and the rest of Europe

The deployment plan additionally relied on the experiences based on the recommendations by the EpSOS project on datasets describing the accepted terms of electronic patient summaries, as well as the minimum data set required for countries to connect to the services and on basic datasets and requirements for ePrescriptions.

Current deployment already includes a range of main services like wellness and rehabilitation, frailty, transitional care and palliative care, home hospitalisation, and general support services.

The deployment at Barcelona Esquerra connects to the wider vision of a) problem oriented health records with an integral view across time and levels of care and b) the realisation of chronic care management through cooperation and coordination among professionals – including health and social care – and an active involvement of patients and carers.

4 Discussion

The discussion was organised into small group discussion, with two sessions focusing on, respectively,

- (1) the exchange of experience of benefits realised from interoperable PHS, and
- (2) on key interoperability challenges.

The discussion was then summarised with a final reporting from the break-out session.

In the first session on ***the benefits realised from interoperable PHS***, participants highlighted the following issues, concerns, and ideas:

Under the heading of “**patient empowerment**”, there was common agreement that PHS solutions can indeed improve patient engagement, compliance, adherence, motivation and create a sense of “ownership” of health. The concept of patients becoming “co-producers” of their healthcare challenges the existing top/down model in healthcare provision. Portability of data further allows for patient mobility and improves patient behaviour near their environment of choice. In this sense, interoperable solutions can change patient behaviour by giving them more information and thus engaging patients more directly.

Another aspect derives from the fact that patients more easily have their data “with them”; it lowers the patients’ cost of changing providers and adds freedom of choice of GPs to the patients. Studies have shown that indeed patients want to have access to their health data. Equally, interoperability improves access to healthcare: data is being transported, and not patients. Particularly expert care is often denied due to geographical constraints.

Yet, many participants raised doubts behind the concept of patient empowerment. Bluntly speaking, there are patients, after all, who **refuse to take responsibility**. The engagement of patients is also a challenge for those who do not want to be empowered and involved. Often, at the late stage of life, patients also disapprove of being taken care of at home and prefer hospital stays for its social factor.

For many, at the core of benefits is the **collaboration** between health professionals, which is facilitated by interoperability. New clinical path ways and work flows increase flexibility in relations among players in healthcare system. The richness of data allows training, auditing, and research for better public health decision. Aspirations behind achieving personalised medicine through interoperability are financial savings, and that it creates an internal market and, consequently, that eHealth could help to contain cost increases: interoperability will lead to competition and **economies of scale**.

Richer, integrated information makes data more powerful, while more, new, and different data produces better **access, quality**, and collaboration – among actors and between organisational units, ranging from both social and healthcare services. With integrated information, decision support for doctors and patients as well as better quality of prevention is possible, i.e. the delivering better care. On the other hand, it was noted that, if merged, social and health care policies still require personal checks and visits even if telehealth has rendered these obsolete.

In all the benefits discussed, and as depicted above, interoperability, however, is taken for granted – otherwise the benefits will not be realised. Interoperability “is something like a basic condition”, at least when it comes to scaling up. Ultimately, most evidence that exists on benefits now comes from non-interoperable systems, most of them which are small and local. Eventually, we should talk about **creating value**, and not benefits.

The group discussions on ***key interoperability challenges*** were motivated, among others by the following topics which the workshop organisers prioritised:

- 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

A common thread of most of the participants' discussion points was that many of the challenges behind interoperability relate to the **leveraging between the technical and organisational levels**. The issues behind achieving technical and organisational interoperability, as expressed by the workshop's participants, can be mainly grouped along the following items.

Trust in the system and the perceived **need for security and privacy** ranked very high in the contributions made in this session. How can confidence in the equipment and, moreover, in the data and information being produced be strengthened? Obviously, there is a need for more context of the information as current evidence is based on a different model. In general, "trust" depends on the subsequent dimensions:

- Consistency of device – what is the device and calibration?
- Confidence of appropriate use – how can we ensure that users know how to use correctly?
- Consensus of medical science – does medical science and evidence-based medicine support the use?

Closely related, a host of **legal issues** needs solving, e.g. regarding the trust and reliability of the data and the use of devices by non-trained professionals. Privacy and confidentiality of data, incl. defining control rules, but also the identification of patients, professionals and other actors of the care system, requires a tight governance regime. In particular the correct and secure identification of patients is of paramount importance: one error here "is a disaster". Even human rights issues touch the use of integrated PHS solutions, as one cannot force the patient to take responsibility and as there must be respect for the decision to withdraw from a programme.

Key for harnessing personal health systems certainly is to propagate the need for good **business cases**. This requires defining and consultatively drawing up use cases, and also designing "educational packages". Many business cases though have a flaw. They are characterised by inherent "discontinuities" in the business model, namely that suppliers have to invest a lot in order to provide the scale of solutions required, yet governments and other buyers or procurers do not have the resources to cover all expenditure right now. Another point within this context is the lack of sufficient skills on the side of buyers, as they frequently cannot judge thoroughly enough which device really is interoperable and which is just a "shiny box". The lack of awareness about interoperability issues and standards requires educating buyers.

From a different angle, one participant pointed out the misleading perception that the focus of many business models is purely on economics – but the focus needs to be kept on the patient. In the same vein, there is a danger with business models that are too much *finance*-driven rather than *care*-driven. **Strategic business planning** also involves considerations for the fact that investments are long-term and thus must provide for the payment responsibilities. This is exacerbated by expected poor developments of revenue stream for suppliers, as it is not immediately the payer who earns the savings. On the demand side, better incentives are missing for users and developers to respect solutions that were invented elsewhere.

There can be no doubt that **scaling up** from pilots is impossible without proper interoperability. It is not only that process implementation per se is difficult, i.e. the defining of what needs to change and how it needs to change. But also the socio-cultural aspects behind organisational interoperability constitute major challenges. To cite only a few, organisational interoperability requires close teamwork; cultural change is needed among stakeholders: for example, the physician loses power to nurses or patients (which is, of course, the flipside of patient empowerment).

Central to the notion of interoperability between the technical and organisational levels are instances of **usability**. Usability addresses requirements pertaining to both levels, and to the merging of both levels. On a more general level, at stake is to avoid data and information overload, with the challenge being to collect the right amount of data at the right time and going to the right physician. Direct usability concerns the man-machine interface and interoperability that takes into account impairment and languages. As interfaces between patients and devices are often too complicated and user unfriendly, a clear need arises for common user interfaces; patient and doctor interface should be the same, too. Common user interfaces use similar views for instrumentation so that all have common understanding of outputs. Arriving at user friendliness underlies avoiding the lure of one-size fits all, which is a matter of equity or failure to personalise.

5 Outlook

The SmartPersonalHealth Workshop entitled *Enabling integrated care: harnessing PHS for better outcomes across the care continuum*, as part of its promotional activities, identified the major benefits of interoperable PHS systems for the healthcare provider organisations and healthcare professionals and, as part of its policy developing task, explored the key challenges for integrating personal health applications into routine healthcare services.

Recommendations to policy makers will be proposed after detailed analysis of the entire series of SmartPersonalHealth workshops, the final conference and further consultations. The Barcelona Workshop underlined a need for further policy actions, community building and awareness-raising, if interoperability among personal health systems and with EHRs is to become reality in daily clinical routine.

Main conclusions can be summarised as follows:

- As policy makers on regional and national levels lack awareness about challenges and virtues, they themselves need more awareness and evidence for the effectiveness of PHS system and the role of interoperability in realising health benefits.
- The European Commission can help with technical challenges by asking for one single standard and one testing procedure, with the showcase example being the development of GSM in mobile communication.
- A collection and publication of good practice cases would facilitate strategic planning in the direction of integrated care.
- Recognition is needed that some groups of citizens are not ready for a ICT enabled health systems and technology; eHealth can widen existing socio-economic gaps. Such digital divide, to some degree also reflects a lack of interoperability between health- oriented policies and business driven policies.
- Consultations with the wider community, and guided exchange and networking are a central tool to extract and promote expertise and success factors.
- Similarly, community building efforts are a central tool to impact on the developments 'in the field'. Many lone-fighting proponents for interoperability are in desperate need of allies, in order to set agendas and gain credibility.
- There is a concrete need for better concertation and exchange of results from similar workshops and projects.

Participants of the workshop voiced the need for more, and explicit, "community building" – for the promotion of interoperability, in general, and, in particular, for a project such as the SmartPersonalHealth support action. Many of the experts and practitioners face similar questions like "who is working on similar issues as me in other countries, how do they feel, what are their problems and how can we join forces? Is there an international forum for my concerns? Where are decisions happening? Who is influencing them and can I join forces into those efforts?" Having a better overview about who, on a European scale, actually forms and represents the community might assist to assemble critical masses for moving the agenda of interoperable eHealth technologies, both nationally in the member states and at the EU level.

6 List of participants

Markku **Äärimaa**, HIMSS programme advisory committee

Benoit **Abeloos**, European Commission

Fernando **Alegría**, Health solutions

Rossana **Alessandro**, TelemedicineClinic

Belinda **Alvarez**, Health solutions

Ivan **Arrow**, Intel

Paul **Atkin**, Telemedicine Nurse

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Links to presentations

[Challenges of PHS interoperability in daily practice - what are key issues?](#)

Karl Stroetmann, empirica

<http://sph.continuaalliance.org/docs/SPHBCNStroetmann.pdf>

[English Whole System Demonstrator - Interoperability experience and lessons learned](#)

Dr Atul Kumar, Newham Primary Care Trust

<http://sph.continuaalliance.org/docs/SPHBCNKumar.pdf>

[Personal health systems interoperability in wound care](#)

Claus Pedersen, Odense University Hospital

<http://sph.continuaalliance.org/docs/SPHBCNPedersen.pdf>

[Personal health systems and COPD - how to integrate into routine service delivery?](#)

Dr Josep Roca, Hospital Clinic University of Barcelona

<http://sph.continuaalliance.org/docs/SPHBCNRoca.pdf>

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