IIP HealthSupport Inventory report on international eHealth communities

Release, December 2008

IIP HealthSupport
Inventory report on international eHealth communities

ICT Innovation Platform HealthSupport

The ICT Innovation Platform HealthSupport (in short IIP HealthSupport) brings together researchers, companies, institutes and care providers that engage in ICT solutions in healthcare and well-being. The HealthSupport solutions aim to improve the quality of life and quality of care, support human persons in self management and provide individually tailored care and lifestyle recommendations at any location.

Table of Content

Authors

This document has been written by:

Author	Affiliation
Herma van Kranenburg	Telematica Instituut
Mortaza S. Bargh	Telematica Instituut

1 Introduction and scope

The ICT Innovation Platform (IIP) HealthSupport [1] provides a basis for researchers, businesses, the public sector and healthcare providers to work together on ICT solutions to healthcare and well-being issues. These solutions aim to improve the quality of life as well as the quality of care and provide individually tailored care at any time and place to help care consumers manage their lives more efficiently. This whilst supporting healthcare professionals and voluntary care givers by creating a well organised network.

The developments of care provisioning over the past century are twofold: on one hand healthcare professionals team up to deal with complicated disorders which has led to a need of so-called networked care. On the other hand, the aging and the active lifestyle of society members calls for individual (personalized) care, where care is carefully matched to the person and tailored to his situational circumstances and patients act more like care consumers. We depict the care that will be provided in a networked system and on an individual basis as personalized networked healthcare.

From improved access and reduced costs to higher quality healthcare services in general, ICT can play a supportive and strengthening role in personalized networked healthcare. This is the emphasis of HealthSupport.

- In healthcare the resulting ICT solutions will maintain quality and accessibility of care, while (at least) stabilizing the costs of healthcare, especially for the relatively large group of the chronically ill. The HealthSupport platform will connect the medical world with technological advances in ICT and embedded systems technology.

- In well-being the resulting ICT solutions will support people in having an active lifestyle, empower them in self-management and provide access to tailored information, communities and services adapted to their needs. The HealthSupport platform aims to open up the world of lifestyle and well-being.

The HealthSupport platform places the emphasis on care consumer-centred care and well-being services that meet today's and tomorrow's social and healthcare needs. Rather than endeavouring to replace human activity with ICT, the goal is to address those activities that can be supported by innovative ICT solutions. The platform will build and maintain a Dutch community and jointly develop a research agenda aiming towards the use of ICT for personalized networked healthcare. The following strategies will be pursued:

- Strengthening care consumer self-management.

  Selfmanagement revolves round care consumers (patients, healthy persons or persons at risk) with support from relatives, friends, and others living with or nearby the care consumer . Here the goal is to provide access to communities, healthcare professionals and information and to ensure that people receive the necessary care whenever and wherever required, i.e. support with maximum freedom of mobility. The care is

personalized to the care consumer's needs, (professional) knowledge and (potential) illness situation or history.

Care also encompasses prevention, thus targeting people with an increased risk of illness, elderly persons wishing to remain independent in their normal living environments for as long as possible and persons who can benefit from active contact (those pursuing an active lifestyle or recovering from illness).

- Boosting productivity and co-ordination amongst healthcare professionals and voluntary care givers (0th line).

  This involves a restructuring of working spaces and a radical focus on an integrated 1st line healthcare support system that effectively connects care consumer needs to care provision. This integration cuts through all lines of care (0th, 1st, 2nd and 3rd).

Scope of this report

In this inventory report we provide an overview of the eHealth arena in Europe, and present specific country information where possible. The intention is to be as be as brief as possible and provided the information mostly via the list of references. Hence we will present first pointers to relevant communities and eHealth strategies. The IIP HealthSupport is of course one of them, and with this report we aim to anchor our activities in an European setting.

This report by no means intends to be complete in its overview. The interested reader is invited to provide input (via the contact details provided at the IIP HealthSupport website) to complement and improve this report.

European e-Health Area

ICT for Health is one of the focus areas for the EU. From their ICT-Health site: 'Delivering better and more efficient healthcare services. This is how Information and Communication Technologies (ICTs) are helping you, your doctor(s), your pharmacist and your hospital take better care of your health.' [2] The term eHealth covers a range of technological areas. In the fast-moving world of ICT, different names have been used for applications which are now seen as part of the eHealth field. These include medical informatics, telemedicine, health telematics, and ICTs for health.

At EU level, eHealth policy is set out in the 2004 eHealth action plan [3]. The plan aims to bring national authorities closer together in order to move towards a European eHealth Area, in which the geographical location of an individual citizen has minimal impact on the quality of healthcare they receive. eHealth is an integral component of the EU's i2010 policy framework [4] which seeks to promote an open and competitive digital economy, ICT-related research, as well as applications to improve social inclusion, public services and quality of life. Patient empowerment is one of the central elements in EU health strategy and various analysis reports from the eHealth CSA are available on the EU website [5].

The eHealth action plan covers everything from electronic prescriptions and health cards to new information systems that reduce waiting times and errors. The plan sets out the steps needed for widespread adoption of eHealth technologies across the EU by 2010. Faster rollout of high-speed internet access, on which so many of the tools are based, is a crucial development if we are to fully exploit the widespread benefits of eHealth. Those groups in society which are least likely to have easy internet access, such as the elderly, disabled or unemployed are often those who have most need of health services. This means that promoting the accessibility of eHealth services, particularly to such groups, is a top priority of the action plan [6].

The plan calls on Member States to develop tailored national and regional eHealth strategies to respond to their own specific needs. The EU encourages each health authority to learn from the experiences of others and has created several fora to encourage sharing of good practice amongst peers from different countries, regions and organisations. National competence centres have been established in each Member State, and the main body set up to bring them together is the i2010 subgroup on eHealth [7], in which government representatives meet. The work of these policy-makers is complemented by the eHealth Stakeholders' Group [8, 9], in which healthcare providers, their suppliers and users are able to share their ideas and concerns.

- The i2010 subgroup on eHealth was established in 2005, as the eHealth working group. Its mandate is to provide expert eHealth-related advice to the overarching i2010 High-Level Group. The main objectives are to improve quality and access to healthcare, while bolstering the cost-effectiveness of eHealth systems and services, stimulating European industry, and supporting European patient mobility. It facilitates and contributes to the implementation of the eHealth action plan. From the Netherlands VWS and NICTIZ participate in the eHealth working group.
- The Stakeholders' Group involves key decision-makers and leaders from European standardisation bodies (such as CEN, CEN/ISSS, CENELEC, ETSI), industry associations, health authority associations, health professional representatives, user groups involving patients and citizens and representatives of current Sixth Framework Programme research and technology development co-financed projects and studies.

Access to eHealth publications is provided via a website [10], whereas there is also European eHealth news portal [11], and reports from IPTS, Joint Research Center of the European Commision [12].

1.1 European eHealth and AAL research programs and focal points

1.1.1 Personalised healthcare and independent living

eHealth research is being tackled under "**Challenge 5 – Sustainable and Personalised Healthcare**" within FP7's Information and Communication Technologies (ICT) work programme [13]. Research on this challenge aims at the creation of an "intelligent environment" in which the health status of any given individual can be monitored and managed continuously, which will assist health professionals in addressing major health problems. Typical focal points are:

- Personal Health Systems for Monitoring and Point-of-Care diagnostics. Outcome should be personalised monitoring for chronic disease management and prevention of diseases; and point-of-Care diagnostic systems. Impact should be higher quality care at the patient location; better support and increased reassurance to people at risk; and contribution to the stabilisation of the cost of health delivery systems.
- Advanced ICT for Risk Assessment and Patient Safety. Outcome targets at tools for health professionals to manage better the risks and to minimise the chance of an error; advanced computerised adverse event systems; and new risk prediction for large scale events. Impact is expected in tools and infrastructure for achieving world-leading levels of patient safety with fewer medical errors and optimising medical interventions; early alerts and improved management of large scale health-related crises; and acceleration and wider adoption of future electronic health record systems.

- Virtual Physiological Human. Outcome aims for patient-specific computational modelling and simulation; data integration and new knowledge extraction; models demonstrated on clinical applications for either medical simulation for surgery, prediction of disease or early diagnosis and assessment of safety of drugs. Impact is expected at predictive, individualised and safer healthcare; reduced medical errors, improved patient safety; and development of safer drugs and medical devices.

Research especially targeted at support for elderly is addressed in "**Challenge** 7 - **Independent living and inclusion"** [14]. Between now and 2025 the proportion of the population over 65 will increase from 20% to 28%, and by 2050 the old-age dependency ratio will have risen by over 160% from the 1985 level. The fastest growing group of the elderly population is the very old (over 80 years old). This new age pyramid has enormous socio-economic implications and demands a paradigm shift in social and health care while creating new requirements for social inclusion and access to public services. At the same time, the complexity and lack of accessibility and usability of many ICT-based products and services is a major barrier for many people. Currently 30% of the European population is not actively participating to the information society. Typical focal points are:

- ICT and Ageing. Outcome targets advanced prototypes of systemic solutions for independent living and active ageing, building on novel approaches; open systems reference architectures, standards and platforms; RTD roadmaps and socio-economic research. Impact aims at increased personal independence, prolonging active participation in society; new markets for independent and active living products and services.
- Accessible and Inclusive ICT. Outcome should be new approaches and solution for deeply embedding generalised accessibility support in mainstream solutions; computer simulation of the user interaction and computer-based validation frameworks for accessibility features; advanced self-adaptive ICT-based enabled assistive systems based on non-invasive Brain to Computer Interaction (BCI); innovative communication and creative environments facilitating social inclusion of marginalised young people. Impact targets mainstreamed accessibility of ICT; facilitated development and production of accessible ICT products and services; wide spread practical use of BCI-based assistive technologies.

Further, so-called flagship initiatives have been launched under the Commission's i2010 initiative to underline the full potential of ICTs to improve quality of life in Europe. One of them is ICT for Independent Living in an Ageing Society: improving social inclusion by providing people, particularly the elderly, with ICT tools to support their health, well-being and mobility. The new applications will also help to substantially improve ICT take-up across Europe.

1.1.2 Ambient Assisted Living

An ambient assisted living program (R&D funding activity) is initiated by 20 European Member States and 3 Associated States [15]. The overall objective of the program is to enhance the quality of life of older people and strengthen the industrial base in Europe through the use of Information and Communication Technologies (ICT).

The motivation of the new funding activity is in the demographic change and ageing in Europe, which implies not only challenges but also opportunities for the citizens, the social and healthcare systems as well as industry and the European market. The understanding of "Ambient Assisted Living" (AAL) is that it aims:

- to extend the time people can live in their preferred environment by increasing their autonomy, self-confidence and mobility,
- to support maintaining health and functional capability of the elderly individuals,
- to promote a better and healthier lifestyle for individuals at risk
- to enhance the security, to prevent social isolation and to support maintaining the multifunctional network around the individual
- to support carers, families and care organisations
- to increase the efficiency and productivity of used resources in the ageing societies.

1.1.3 CIP

The Competitiveness and Innovation Framework Program (CIP) aims to encourage the competitiveness of European enterprises [16]. The program supports the aims of the integrated strategy i2010 - European Information Society 2010. With small and medium-sized enterprises (SMEs) as its main target, the program will support innovation activities (including eco-innovation), provide better access to finance and deliver business support services in the regions. It will encourage a better take-up and use of information and communications technologies (ICT) and help to develop the information society. Focal areas include eHealth and eInclusion.

1.2 European eHealth projects and initiatives

1.2.1 eHealth ERA project

The ERA project [17] aims at fostering the establishment of an effective European Research and innovation Area (ERA) in eHealth. The European Commission, Directorate General Information Society and Media, supports this project to contribute towards greater transparency across Member States and other participating countries on eHealth strategies as well as innovation-oriented research and technology development (RTD) initiatives, including the coordination of Member States' eHealth strategy formulation and implementation. Several national eHealth strategies are currently available on the project website. Participating countries include the Netherlands (VWS), Finland (STAKES), Germany

(empirica GmbH), Poland (CITTRU), Spain (ISC III), Italy (CNR), United Kingdom (EPSRC and Imperial College). Funding of the ERA project is based on a Coordination Action contract with the European Commission. An analysis of stakeholders and programs in the eHealth arena is presented in a project report [18], and recently the full report on priorities and strategies on eHealth in several European countries became available [19]. Selected eHealth themes are:

- infrastructure: dedicated network infrastructure connecting health service providers and others relevant stakeholders (Scandinavian countries are among the most advanced here),
- electronic health records (development being evident in 25 European countries,
- interoperability (both technical and semantic),
- patient and health professional mobility (in most countries addressed indirectly; usually tackled via electronic identity and/or health cards and/or web-based health records that allow location independent access to certain services),
- legal and regulatory framework (wrt data protection, confidentiality and telecommunications, digital signatures and medical device liability; and in some countries also specific Acts on eHealth related matters, like ePrescribing in Finland, medical privacy and data ownership rights in France, legal framework for health ICT standards in France, and Health Telematics in Austria).

1.2.2 Smart Open Services

One of the eHealth initiatives is the Smart Open Services project (S.O.S.) which is an open eHealth initiative from a European large scale pilot of patient summary and electronic prescription. It intends to remove linguistic administrative and technical barriers, by making it easier for people to receive medical assistance based on their medical history, even when they are away from their home. The S.O.S. project [20] is carried out under the ICT Policy Support programme under the Competitiveness and Innovation Framework Programme (CIP), with direct Dutch participation.

The SOS project is a first step in addressing problems faced by doctors treating patients who seek health treatment when abroad. These problems include re-supplying essential medication that a patient has lost or forgotten, communicating medical situations to foreign-language doctors, diagnosing illness and prescribing proper medication with little knowledge of patient history.

1.2.3 Electronic health records

Another ehealth proposal covers detailed recommendations for developing interoperable cross-border electronic health records (EHRs) [21]. The EHR project is intended to provide EU countries with basic principles and guidelines for ensuring that doctors can gain access to vital information on patients that they are trying to treat, wherever the information is located in Europe. The Recommendation on cross-border interoperability of (EHR) systems is the first EC document to set out the steps EU countries should take to establish compatible

EHR system. The key objective is to allow patient choice to access his/her important information stored in electronic health record systems anywhere at any time.

1.2.4 E-Inclusion; Senior CSA

Within the e-Inclusion theme a consorted action funds a roadmap project on ICT for elderly called 'senior' [22]. From their website an overview report can be downloaded that contains an environmental scan on FP5, FP6 and FP7 projects, and key themes identified for independent living, e-Inclusion, and ICT and ageing.

1.2.5 AALIANCE

The AALIANCE (European ambient assisted living innovation alliance [23]) is a EC funded project that has involved networking. Its focus is on Ambient Assisted Living (AAL) solutions based on advanced ICT technologies for ageing at work, ageing at home and ageing in society. It aims among others to provide a framework for stakeholders to define research and development priorities in the field of ambient assisted living and to set up a sustainable network.

1.2.6 EHTEL

The European Health Telematics Association (EHTEL [24]) contributes to the implementation of information and communication technologies in the health and social domain. EHTEL believes that eHealth tools offer substantial benefits in terms of improving the quality of health for patients and citizens, the access to services and the efficiency of care. A relevant report for instance is their publication on 'sustainable telemedicine: paradigms for future-proof healthcare' [25].

1.2.7 Inclusion Alliance for Europe

The Inclusion Alliance for Europe [26] is an independent non profit Network born with the aim to gather together all eInclusion and eHealth stakeholders to support their full participation in the FP7 Programmes of the European Commission and World Bank programmes. The activity areas of IAE include eInclusion and eHealth, see Figure 1.

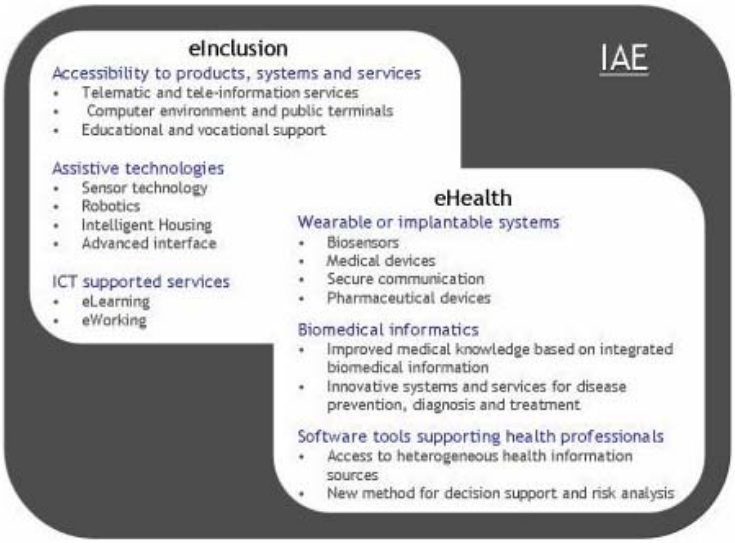

Figure 1: Activity areas of the Inclusion Alliance for Europe [26]

1.2.8 Continua Health Alliance

The Continua Health Allinance [27] is a non-profit, open industry alliance of healthcare and technology companies that via collaboration aim to improve the quality of personal healthcare. Their objectives include:

- Developing design guidelines that will enable vendors to build interoperable sensors, home networks, telehealth platforms, and health and wellness services.
- Establishing a product certification program with a consumer-recognizable logo signifying the promise of interoperability across certified products.
- Collaborating with government regulatory agencies to provide methods for safe and effective management of diverse vendor solutions.
- Working with leaders in the health care industries to develop new ways to address the costs of providing personal telehealth systems.

2 Dutch eHealth Area

2.1 VWS

In the Netherlands healthcare resides under the responsibility of the Ministry of Health, Welfare and Sport (Volksgezondheid, Welzijn en Sport, VWS). VWS considers the government's role to determine the framework, policy and boundary conditions; whereas innovation is considered the responsibility of caregivers, insurers, companies and science.

VWS develops policy in the fields of health care, social care and sports, under the motto "Caring for people in a healthy. According to their vision technological developments and innovations can lead to better diagnoses and efficient treatments by caregivers and can further save costs and work forces. As they consider ICT as a main enabler of innovation in healthcare and prevention, the vision of VWS for 2008 innovation policy includes making better use of ICT and technology in healthcare.

The ministry envisions ICT healthcare applications that enable patient information sharing among healthcare centers. This contributes to providing the right information on the right moment and at the right location over a patient's critical situation, especially if there are multiple caregivers involved. Hereby it helps to contribute to location-independent healthcare, which will result in improving healthcare services and paving the way for competition among caregivers. In addition to patient data exchange between healthcare organizations and institutes, the ministry seeks for ICT solutions to optimize the workflow and process management in its intern units (e.g., hospitals).

Together with Nictiz (see section 2.2), VWS has set up the ICT and innovation platform (ZIP, see section 2.3). VWS puts out to ZonMw (see section 2.4) to tender and supervise subsidized healthcare innovation programmes and projects.

2.2 NICTIZ

Nictiz (Nationaal ICT Instituut in de Zorg - the National IT Institute for Healthcare in the Netherlands) was established in 2002 to stimulate the use of ICT in healthcare. Nictiz is continuously developing and refining national standards for electronic communications in the healthcare sector. Furthermore, for healthcare-related IT issues Nictiz develops functional IT solutions and contributes to policy making on a national and international level.

Nictiz' mission is to act as the national coordination point and knowledge centre for IT and innovation in the healthcare sector. Nictiz manages a national switch point (Landelijk SchakelPunt, or LSP in short) that acts as the sector's main pivot for electronic communications. The goal is for any authorized healthcare practitioner to be able to connect to the switch point in order to obtain the latest and most relevant information

about a patient. The requirement is that this can be done securely at any time and from anywhere in the Netherlands.

The Nictiz organization has three clusters:

- Knowledge and advice: This cluster aims at discovering needs and questions in the sector and putting them forward for decision making, monitoring national and international developments, and coaching cluster projects whereby new applications are rolled out.
- Design and maintenance: This cluster focuses on designing, testing, and maintaining new applications nationally.
- Operations: This cluster looks at managing the national switch point for data exchange, and qualifying/certifying ICT and care providers so that they can connect to the switch point according to the standard, and offering required help for their connection to the switch point.

2.2.1 Applications

Nictiz is working on the realisation of a number of IT applications in healthcare sector. These include:

1. The National e-medication record ('Het landelijk elektronisch patiëntendossier or EPD in short') that will include a set of applications for supporting care giving, medical research, medical logistic, etc. For this Nictiz has designed a nationwide ICT infrastructure called AORTA that is currently under development. The idea is that the system will allow storing patient data in a distributed way, whereas care givers can use the system for requesting a patient's information from the database of other care givers who hold and update this information. The requirement for this exchange of information is that it needs to be secure and safe, and moreover the data should always be up to date.

2. Decision support and tele-medicine support ('Beslissingsondersteuning en zorg op afstand') that will include a number of functions needed for supporting and improving the healthcare. This set of functions will include:

    - decision support for care givers
    - patient support by doing tele-medicine
    - administrative process support
    - logistical support to make appointments and to order materials
    - workflow management support
    - information management for prevention purposes.

2.2.2 Focus areas

Currently Nictiz focuses on the following key activities for ICT and innovation in the healthcare:

- Design and maintenance of its base infrastructure AORTA;
- Specification of standards for applications;
- Qualification and certification of ICT and healthcare providers for coupling with LSP;
- Determination of focus points for ICT and innovation platform, taking into account needs and requirements in the sector and the government;
- Proving support during the first phase of execution of applications;
- Monitoring of (inter)national developments and best practices.

2.3 Innovation Platform and Healthcare; ZIP (Zorg Innovatie Platform)

The aim of the Dutch government is to position the Netherlands among the international top 5 in higher education, research and innovation. To this end, the government has set up the Innovation Platform in 2003. "The Innovation Platform aims to examine critically how the knowledge and innovation system functions and facilitates breakthroughs. The Platform is charged with the task of creating the conditions, establishing the connections and developing the vision required to stimulate innovation and entrepreneurship in the Netherlands. This is the engine that drives productivity growth and economic development, which create prosperity and well-being" [28].

For the innovation platform 6 key areas ("sleutelgebieden") are recognized, in which the Netherlands has an excellent position in terms of knowledge and industry. These key-areas are: flowers & food, high-tech systems and materials, water, chemistry, creative industry, pension & social insurance. ICT and energy play an important role for innovation in all these areas. Next to key-excellence areas, healthcare and life science was considered in [29] (from 2004) as a potential cluster for which innovation programs can be initiated. This became reality in 2008 when a large innovation program called Zorginnovatieplatform (ZIP) was initiated to address the Dutch healthcare issues and increase the competitiveness of the Dutch healthcare system.

The Dutch ministry of VWS launched ZIP on 23 April 2008. It is a spin-off of the innovation platform to stimulate and boost innovations in healthcare sector by defining the agenda and creating an environment for innovation among all parties involved (e.g., healthcare providers, companies and knowledge centres). The ZIP mission is to accelerate improvements with fewer care providers and to deliver a higher quality care. The supporting role envisioned for ICT solutions in healthcare and well-being, as addressed by the HealthSupport platform, are completely in line with the significance of innovations in healthcare, as indicated in Dutch policy documents [30,31] and addressed in Dutch programs [31,32].

There are many Dutch innovations in progress that apply ICT solutions in healthcare. Some examples innovations within the eHealth are:

- Alcoholdebaas.nl: aimed at providing treatment for alcoholic people via Internet;
- Arbopedia: aimed at investigating the relation between work and health based on collected data;

- BeterThuis: aimed at developing (ICT) services to give clients the control while they receive healthcare services;
- Cardea Internet Jeugdzorg: aimed at developing an online platform for supporting the existing childcare methods;
- Caretracker: a system aimed at continuously monitoring whether a prescribed care is realized;
- Consument en de Zorg-portaal: aimed at providing a portal for patients to access their digital healthcare services;
- Couveusecam: aimed at enabling parents to monitor their babies laying in a hospital incubator;
- De Gelderse Roos: aimed at providing support, information and advice for the caregivers of dementia patients via an interactive web site;
- Diamuraal: aimed at working as a virtual center that offers upbringing support services for children and families.

For a complete list of eHealth innovations and detailed information please refer to [33].

2.4 ZonMw

ZonMw is the Dutch organisation for health research and development ('Nederlandse organisatie voor gezondheidsonderzoek en zorginnovatie') [34]. It is a national organisation that promotes quality and innovation in the field of health research and health care, initiating and fostering new developments. ZonMw also actively promotes knowledge transfer and implementation, ensuring knowledge is exchanged between all relevant stakeholders (health researchers, health professionals, patients/consumers and the general public). This in turn facilitates the structured implementation of newly developed knowledge in the health care system and guarantees emerging healthcare issues a place on the research agenda.

One of ZonMw's key challenges is to facilitate innovation and inspiration among the various stakeholders along a single 'knowledge continuum': from basic, strategic and applied research to daily healthcare services. ZonMw acts as an intermediary between policy, research and practice. The question ZonMw faces is how to improve disease prevention and healthcare. In contributing to the knowledge needed to tackle this, and in promoting the actual usage of that knowledge, the motivation of ZonMw originates to fund and promote research, development and implementation.

The majority of ZonMw's commissions come from the Ministry of Health, Welfare and Sport (VWS, see section 2.1) and the Netherlands Organisation for Scientific Research (NWO). The Ministry's main concern is to contribute to public health, including prevention and health care services. NWO is a non-governmental organisation concerned with fundamental and strategic research. As the national research council, it plays a key role in the development of science, technology and culture in the Netherlands. In terms of health research and development NWO's main interest lies in contributing to cure, care and prevention by gaining a better understanding of disease and its underlying processes, and supporting research related to medical or health technology assessment. [34]

2.5 HealthCare & ICT initiative

A community of 800 professionals in the field of HealthCare and ICT has been established since the end of 2007 via the LinkedIn network-site. Efforts have been directed at organising a website and forum. The mission of this group is to facilitate communication and the development of ideas aimed at Healthcare in the widest perspective, with the ultimate goal of bringing professional care to the best possible level.

The facilities that the "Healthcare & ICT group" will offer in the startup phase are a LinkedIn group for purpose of identifying members and for advertising the fact that this group exists. Next an informative website and a forum, with a primarily closed character, will support communication between members of the group [35].

2.6 TiGO; Institute for Healthy Aging

In 2008 TiGO [36] the Institute for Healthy Ageing ('Top Instituut Gezond Ouder worden') started. Many institutions are involved and highly expertised in certain aspects of research in the area of ageing. TiGO aims at added value by combining this distributed expertise, and joining forces by strategic planning, common objectives and cooperative research directed at issues linked to (healthy) ageing. This integral approach is aims at improving the health and well-being of elderly, both from a medical-technical as from social-economical perspective.

In order to translate scientific knowledge into relevant applications for senior citizens, alliances with relevant partners from industry, societal organisations, government and senior citizins are needed. Therefore TiGO connects these partners aiming at translation and implementation of multidisciplinary research results into economic value and societal innovation. Partners of TiGO include caregivers, insurers, companies and science and knowledge institutes. [36]

The mission of TiGO is:

- To increase the healthy life expectancy;
- To increase the self-management of senior citizens and their active participation in society;
- To stimulate training of healthcare professionals and health education of citizens.

Examples of focus areas for TiGO are:

- Technical innovations in home environments, aiming at extending independent living;
- Telemedicine-applications aiming at remote monitoring of chronic ill people;
- Research into contributing factors of elderly willingness of continuing to work after having reached the retirement age;
- Biomedical research of the process of ageing;
- Insight into (early) ageing, age-related illnesses, and innovative prevention techniques.

2.7 Regional health networks

Health care organisations (care givers and insurers) have joined forces in many regional health networks. Often cooperation with research institutes and network organisations are also set up. Examples of such regional health networks are (far from being complete; the interested reader is invited to complement this list and read the details for each via the references):

- IZIT [37];
- Health Valley [38];
- VitaValley [39];
- Zorg Innovatie Forum [40];
- Care Ring, 'netwerk voor zorgcommunicatie' [41];
- ZorgNet Noord [42];
- Stichting Zorgring Noord-Holland Noord [43];
- SchakelPunt Informatie Transmurale Zorg [44];
- Stichting RHECO 'Regio Helmond-Eindhoven Communicatie Ondersteuning' [45];
- Stichting Transmurale Zorg Den Haag en omstreken [46];
- Stichting Elektronisch Zorg Dossier Amsterdam [47];
- GERRIT, 'samenwerkingsverband Friese zorgverleners' [48].

3 UK eHealth arena

In the United Kingdom the publicly-funded healthcare system is called the National Health Service (NHS). The UK government has been determined to improve NHS by using ICT since 1997. This determination was reflected in information for health report published in 1998, where the government's strategy for the subsequent years was depicted broadly. In 1999 the UK eHealth Association was established to represent organizations and individuals interested in the development of eHealth in the UK. The UK government, on the other hand, lunched the National Programme for IT in the NHS (NPfIT) in 2002. The following sections give an overview of NPfIT and UK eHealth Association.

3.1 National Programme for IT

In 2002 Derek Wanless wrote a report on the future funding of the NHS, where he recommended a doubling of spending on ICT. As a response to this criticism the UK government launched NPfIT with £2.3bn of funding and a centralized programme of procurements to revolutionize the way ICT is used in the health service [49]. The three most important projects of NPfIT are: electronic patient records, electronic booking systems for appointments and electronic transfer of prescription information. The objectives of these projects can be summarized as (see also Figure 3 for an illustration):

- The NHS Care Record Service (NHS CRS) to provide accurate details of patients' conditions and treatments to the professionals treating them wherever and whenever needed.
- The electronic booking system to enable patients to book appointments with specialists from their GP's surgery or from home.
- The electronic prescription system to automate a largely paper-based process in order for patients to get their prescribed drugs from pharmacists.

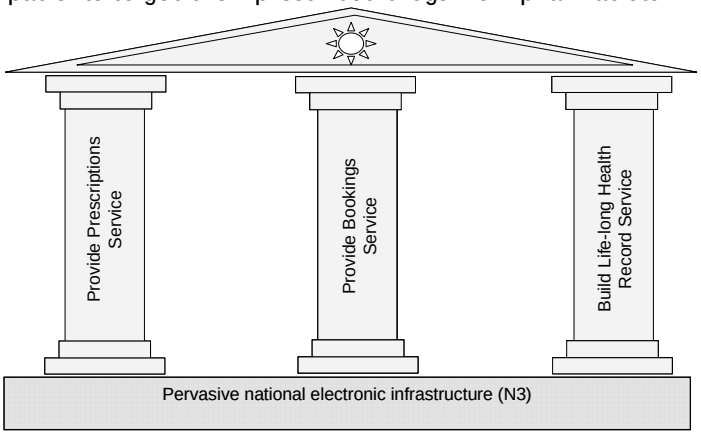

Figure 2: NPfIP overview, the original scope in 2002 (the picture is taken from [50].

In addition to the services delivered through NPfIT, there has been a great deal of local ICT activity within the NHS, for example in the area of telemedicine. There have been also further large projects such as the National electronic Library for Health (that provides the most recently available medical knowledge and evidence online for professionals), NHS Direct Online (a web-based service that provides health related information such as a health encyclopedia and self-help guide as well as information on local NHS services), and provision of health related information using digital television (that provides health related information) to help improving public health and also to encourage appropriate use of health services.

According to [50], on a typical day of October 2007 the NPfIT enabled the following services: 200,000 prescriptions to be transmitted electronically, 18,500 Choose & Book electronic bookings, 1,550,000 queries on the patient demographic system (enabling letters to be posted to the correct address and patient information to be handled more efficiently), 625 new users to be registered for access to the NHS Care Record Service, 52,000 unique authenticated users to access the NHS Care Record Service, 290 new NHS secure email users to be registered, 130,000 NHS Mail users to send 1 million secure e-mails (one third of which contain confidential patient information), 15 NHS National Network (N3) secure broadband connections to be installed, 8,535 GP practices to use the Quality Management Analysis System, 1.5 million records to be added to the Secondary Uses Service. The latest overview of services provided by NPfIP is depicted in Figure 3.

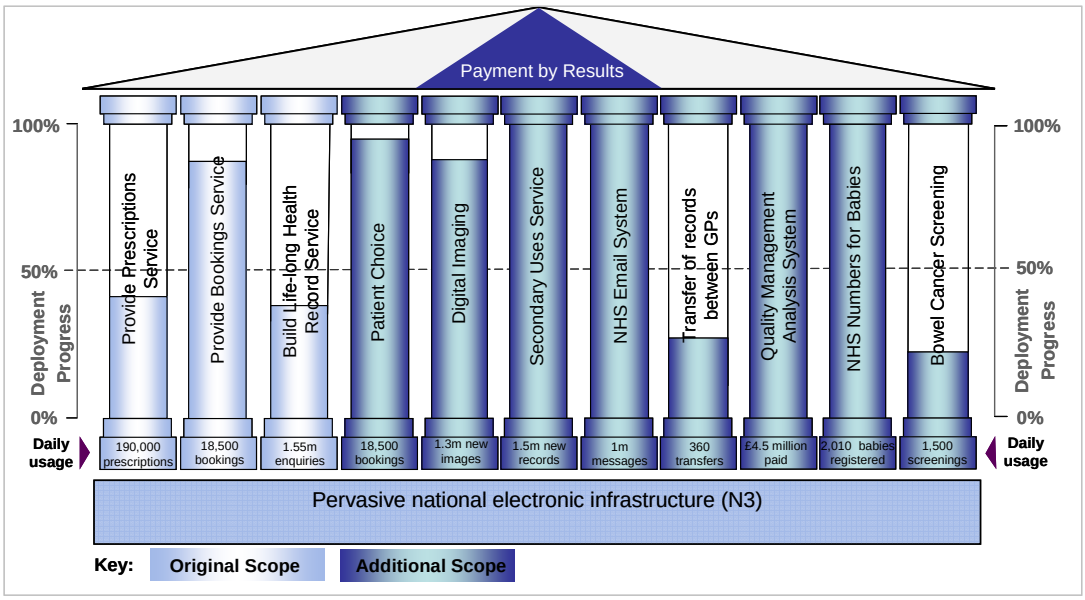

Figure 3: NPfIP overview, the scope in 2007 (the picture is taken from [50]).

3.2 UK eHealth Association

The UK eHealth Association (UKeHA) [51] was established in April 1999 as the UK Telemedicine Association to represent organizations and individuals interested in the development of eHealth in the UK. It is a non-profit company that is governed by a Board of Trustees. At this moment there are almost 90 members representing the wide scope of UK healthcare stakeholders (e.g., service and equipment providers and manufacturers, user organizations such as local governments, housing associations and health authorities, professional bodies, and individuals and students).

The Association aim is to become the national body that promotes eHealth. This is achieved by: promoting eHealth research and education, promoting the development of eHealth policy and standards, encouraging the adoption of uniform standards and practice, ensuring the recognition of the intellectual property rights developed, interacting with related associations in other countries, and public relations.

The UKeHA has a number of Special Interest Groups (SIGs). A technical SIG is actively involved with the data transmission issues, international standards, and service quality assurance for remote care. Other SIGs deal with small and medium sized enterprises, legal and ethical issues; and eHealth in chronic illness.

4 Finnish eHealth

The Finnish eHealth approach is one where healthcare and well-being are tackled together. Finland's strategic choices are [52]:

- To ensure the availability of information for patients undergoing treatment, regardless of time and place, in both public and private health care. The means to achieve this include comprehensive digitization of customer data, development of the semantic and technical compatibility of electronic patient record systems for the entire content of patient records, development of the national health care infrastructure and information network solutions, identification and authentication solutions, electronic signatures, and maintaining online information to support decision-making.
- To enable the participation of citizens and patients, and ensure that citizens have access to more information and to high-quality health information. The means to achieve this include development of a citizen's health information portal, access for citizens to their own patient records, health information and log data, and development of e-services (booking of appointments, e-discussion, e-document transfer, online consultation).

Solutions to support e-services to citizens are built on top of a national architecture. The legislation-driven national architecture will essentially 'force' technical interoperability of the systems involved. Citizens should be given reliable information on the following [52]: health promotion; the symptoms and treatment of illnesses; service providers in the public, private and third sectors; the content, availability (queues), cost and quality (quality indicators) of services; and their benefits and rights. Interactive e-services are also needed, such as appointment booking, consultation, interpreter services, Q&A, virtual discussion forums, self-help systems for chronic illnesses, etc.

The National Public Health Institute is building a health information portal for citizens [53]. This portal will provide citizens with high-quality health information, which will for instance help them in reading their own patient records.

For coordination and steering information management in the health care and social welfare sectors the Ministry of Social Affairs and Health is responsible. KELA (National Institute for Social Security) maintains national electronic archiving of patient records and a national prescription database. STAKES (National Research and Development Centre for Welfare and Health) is responsible for maintaining the national code service, and TEO (National Authority for Medico-legal Affairs) for maintaining the certification service for health care professionals. Those expert bodies (KELA, STAKES, TEO) participate in international cooperation. Furthermore Finnish eHealth has an international dimension through several TEKES funded cooperation projects. One example is the Finnwell program [54] that has the objective to promote health and wellbeing through technology applications and service innovations. The Finnish Innovation Fund, Sitra [55] is an independent public fund that under the supervision of the Finnish Parliament promotes the welfare of the Finnish society. HealthCare is one of their focus domains, for which a program runs in the period 2004-2009. One of their activities was for example the disclosure of medical information from the CoChrane Library to the Finnish public. The Cochrane Library contains high-quality,

independent evidence to inform healthcare decision-making and are recognised as the gold standard in evidence-based health care [56].

For a graphic illustration of the well-being and health vision in Finland see Figure 4.

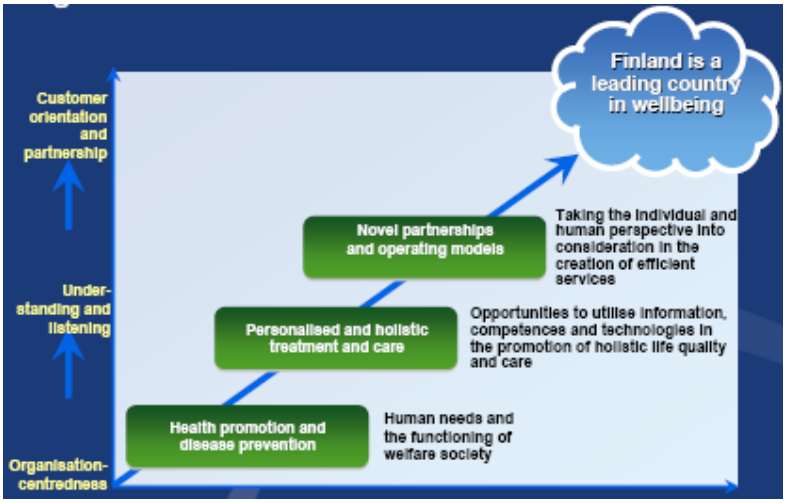

Figure 4: Finnish approach in health and well-being.

5 Swedish e-Health

A nationally coordinated action on the development of ICT in health and social care sector is via the 'National high-level group for e-Health' [57]. The National High-Level Group for eHealth has drawn up and agreed on a set of basic principles for national collaboration on ICT development in the health care sector. These are intended to support the continued development and renewal of the health care and social services [58].

The High-Level Group has responsibility for informing stakeholders, care professionals and the general public about the content and importance of the National Strategy for e-Health, following up its implementation and securing broad-based support for its provisions. It will also initiate a strategy discussion on decisions that need to be made at various levels if the strategy objectives are to be achieved.

The group's aim has been to develop the strategy in open dialogue with many of the health care sector's key stakeholders in order to benefit from existing knowledge and experience in this area. A broadly constituted reference group composed of experts and industry representatives acts as an advisory drafting body for the High-Level Group. The reference group includes representatives from other ministries, committees of inquiry, government agencies, the research community, private care providers, the pharmaceutical industry, ICT suppliers to health care and health care professionals' national organisations. [57]

Focal areas include [57], see also Figure 5:

- Laws and regulations,
- Common information structure,
- Common technical infrastructure,
- Interoperable, supportive ICT systems,
- Information access across organisational borders, and
- Easy access for citizens to information and services.

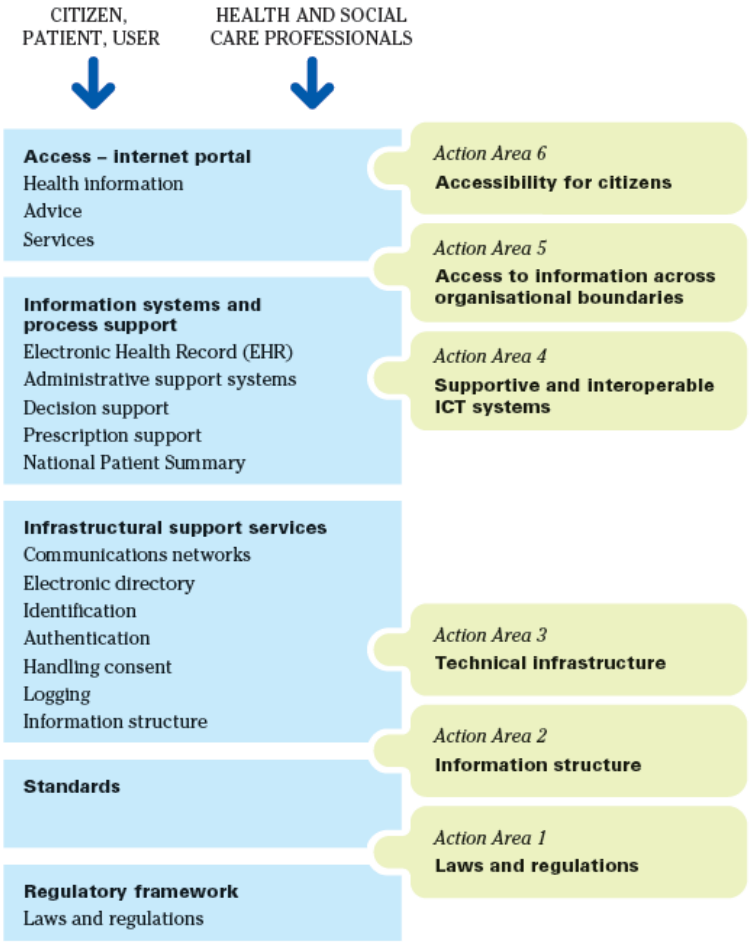

Figure 5: Action areas in Swedish eHealth [57]

SJUNET is the Swedish Health Care Network comprising an infrastructure for communication between hospitals, primary care centres and home care. It is also hosting a wide range of services from national authorities and health care service providers and selected vendors. [59] Since 2001 Carelink, a collaborative organisation for ICT in Swedish healthcare, is responsible for Sjunet. Carelink is a member-based organisation open to county and municipal councils and private care providers. Its operations are supported by the National Board of Health and Welfare through a collaborative agreement.

Carelink promotes the development of Sweden's health and elderly care services by initiating, developing and managing national e-Health solutions in collaboration with its members and other stakeholders [57]. The operations of Carelink AB are managed by a special interest group composed of representatives of county and municipal councils, private care providers and the National Corporation of Swedish Pharmacies. Carelink offers the following:

- Strategic ICT guidance to seek to create a concrete national strategy in dialogue with stakeholders, and to plan and manage national ICT initiatives in the health and elderly care services (target group: management);
- Development to direct and coordinate national initiatives and development projects aimed at developing efficient and effective e-Health solutions (target group: citizens and health and elderly care professionals);
- Management to securely establish the value of developed national solutions through secure functionality, accessibility and continuous development (citizens and health and elderly care professionals).

Carelink's overall goal is to promote efficient and effective e-Health solutions in the health and elderly care services and thereby help to:

- benefit society through better public health
- benefit citizens through better accessibility and safer care
- benefit care providers by helping to improve the quality and efficiency of their operations.

6 German eHealth

Modernization of the healthcare system using ICT is the overall target of German eHealth strategy [60]. The objectives are to establish more citizen-oriented services, support patient-centered care, improve quality and services, reduce costs, and provide better data for health system management. The underlying concept of German eHealth strategy is "citizen-managed, personal electronic health record".

The eHealth strategy, which has implicitly been included in the 2003 Law for the Modernization of Statutory Health Insurance, achieves its objectives by establishing an ICT infrastructure and implementing a (voluntary) private electronic patient record and other applications. The infrastructure envisioned consists of connected Virtual Private Networks (VPNs) and some special infrastructure services. The cost of the infrastructure is financed by one or a few applications that have a strongly positive benefit/cost ratio. In this way, these applications can make the development of other applications cost effective by eliminating those basic costs for them. The priority applications with a strongly positive benefit/cost ratio that are considered by German Federal Ministry of Health are:

- Online verification of insurance status (mandatory for citizens),
- Transmission of (drug) prescriptions (mandatory for citizens),

- Drug interaction and contraindication checks (voluntary for citizens).

The second activity of the German eHealth strategy is the implementation of a (voluntary) private electronic patient record and other applications, step by step, using the established infrastructure. Example eHealth applications and services are:

- Electronic health record that also optimizes clinical documentation,
- Electronic health cards to be used by citizens to manage and access their personal electronic health records. These records are provided and used by healthcare professionals in the form of the electronic copies of the original documentation,
- Health portals that provide access to health information, disease-specific information, information on healthcare and other health related services for citizens as well as for professionals.
- Patient identifiers that are issued by Trust Centre for the Health Insured Number (Vertrauensstelle Krankenversichertennummer) to identify German citizens based on their social security numbers in a way that meets all data protection requirements.

7 Danish eHealth

MedCom is a co-operative venture between authorities, organisations and private firms linked to the Danish healthcare sector. In the 1999 financial agreement between the counties and central government, it was decided that MedCom would be made permanent, with the following objective [61]:

"MedCom will contribute to the development, testing, dissemination and quality assurance of electronic communication and information in the healthcare sector with a view to supporting good patient progression.

In recent years (2003-2007) telemedicine has played a small role in the existing IT strategy for the Danish Health Sector. Large implementations were done in national projects on teleradiology and teledermathodology. Recently a new national strategy is formulated [62]; with focal points being:

- Web portal with access to the Danish healthcare services for citizens [63] as well as access for professionals to the portal and the Health Data Network (SDN), e.g. for consulting laboratory data. The portal provides functions like personal appointment book, secure e-mail function, which can be used as an e-mail consultation facility. The common public healthcare portal sundhed.dk uses the SDN as a channel for connecting to the basic systems in the healthcare sector.
- Common medication card; facilitating healthcare professionals to online access to up-to-date information about every person's medication. Introducing shared data about medication is a wide ranging project which will more or less involve the entire healthcare sector, with more than 4,000 healthcare institutions and over 30 different IT providers.
- E-record; electronic patient records.

- Several local authorities projects, like rehabilitation plan standard (DGOP) and disseminating existing communication between the home care service,GP surgeries, hospitals and pharmacies.
- Consolidation and dissemination, like expanding the use of electronic laboratory requests, communication between laboratories, and expanding the use of electronic referrals.

Coherent Digital Health (SDSD) in Denmark has the overall task of creating a coherent IT architecture offering facilities and features that can boost quality, efficiency and service for all the stakeholders in the healthcare sector, including individual citizens. The objective is to implement a service-oriented architecture for the entire sector which we can call a healthcare IT system. MedCom will be responsible for the platform's expansion and for ensuring that it meets all the relevant quality and security requirements. [62]

MedCom International is a member of a forum @HEALTH [64] where the main focus is on building networks and exchanging experiences in the area of eHealth between partners in Europe and Latin America.

The Baltic eHealth project [65] has connected up the national healthcare data networks in Denmark, Norway and Sweden with the regional networks in Estonia and Lithuania to create a Baltic healthcare network (BHN). This Baltic network has created new opportunities in the healthcare system.

8 Spanish eHealth

The national programme for the healthcare system in Spain is defined in the Plan for Quality in the National Health System [66], issued by the Ministry of Health and Consumer Affairs. The strategic goals of the Plan for Quality include improving citizen participation in their own healthcare, increasing patient safety through improved quality of care, intensifying healthcare ICT security by continuous assessment, and increasing the use of ICT by adapting the human resources policy to the changing service needs.

eHealth activities, called "Health on line", are an integral part of Plan Avanza, the Spanish eGovernment strategic plan for 2006 – 2010. The Plan Avanza was published in 2005 [67]. It aims to coordinate the policy objectives and activities of the various regions of Spain with those formulated at the European level in the strategic framework i2010 – European Information Society 2010.

Spain is developing the interoperability and integration of the electronic health card, electronic prescription and electronic health records between all regional health services. The National Health System has the specifics of:

- Universal access, public funded health care system.
- Health Care Services and many Public Health responsibilities are decentralised to the Regional Governments (17 Autonomous Regions and 2 Autonomous Cities).
- Interregional Health Council: common basic health policies.

ISCIII [68,69] is a scientific support organisation to the National Health System, a public research centre and a funding agency. The main goals are to provide scientific and technical support to the National Health System and coordinate health research in Spain. ISCIII is an autonomous body within the Ministry of Health and Consumer Affairs. The Health Research Agency (FIS) aims, among among others at involving health care professionals and institutions of the National Health System in performing research and promoting the link between basic, translational and clinical research.

Some larger projects in the area of eHealth and ageing well are carried out in Spain, such as by Telefonica in their Granada Wellbeing and eHealth Living Lab [70]. A recent example is on connecting elderly people in Spain to their family and friends, by Vodafone and the Spanish red cross [71]. In this project 3G mobile broadband technology is used to deliver services through voice and videoconferencing using media devices already familiar to them, such as mobile phones and television.

9 Conclusion

In Europe a lot of eHealth related activities are carried out, under the responsibility of many different organisations and communities. In every country the situation and organisation is or can be different. Besides national approaches in Europe, a country-exceeding effort is streamlined by EU and EU eHealth-related programmes.

In this report an effort was undertaken to give some first pointers to relevant communities and eHealth strategies. The IIP HealthSupport is of course one of them, and with this report we aim to anchor our activities in an European setting.

This report by no means intends to be complete in its overview. It is tried to be as brief as possible and provided the information mostly via the list of references. More factsheets on specific countries can be found in one of the ERA reports [19].

References

1 www.iipHealthSupport.nl

2 http://ec.europa.eu/information_society/activities/health/index_en.htm

3 e-Health - making healthcare better for European citizens: An action plan for a European e-Health Area; http://ec.europa.eu/information_society/doc/qualif/health/COM_2004_0356_F_EN_ACTE.pdf

4 i-2020 policy framework promoting Information and Communication Technologies; http://ec.europa.eu/information_society/eeurope/i2010/index_en.htm

5 http://www.ehealth-era.org/publications/publications.htm

6 http://ec.europa.eu/information_society/activities/health/policy/index_en.htm

7 http://ec.europa.eu/information_society/activities/health/policy/i2010subgroup/index_en.htm

8 http://ec.europa.eu/information_society/activities/health/policy/stakeholders_group/index_en.htm

9 http://www.srdc.metu.edu.tr/stakeholders_group/index.php

10 http://ec.europa.eu/information_society/activities/health/downloads/index_en.htm

11 http://www.ehealthnews.eu/content/blogcategory/20/62/

12 http://ipts.jrc.ec.europa.eu/publications

13 http://ec.europa.eu/information_society/activities/health/research/index_en.htm

14 http://cordis.europa.eu/fp7/ict/programme/challenge7_en.html

15 http://www.aal-europe.eu/about-aal

16 http://ec.europa.eu/cip/index_en.htm

17 www.ehealth-era.org

18 http://www.ehealth-era.org/documents/eHealth-ERA_D3_1_eHealth_RTD_Report_Final_rev1.pdf

19 http://www.ehealth-era.org/documents/2007ehealth-era-countries.pdf

20 http://ec.europa.eu/information_society/newsroom/cf/itemdetail.cfm?item_id=4113; http://www.ehealthnews.eu/content/view/1218/108/

21 http://www.mediformatica.com/en/mediformaticas-blog/mediformatica-s-blog/smart-open-services-sos-project-pan-european-multi-lingual-emergency-patient-records.html

22 http://seniorproject.eu (environmental scanning report available after registration via http://seniorproject.eu/index.php?module=CMpro&func=viewpage&pageid=19)

23 http://www.aaliance.eu/public/

24 http://www.ehtel.org/

25 http://www.ehtel.org/SHBlob.asp?WCI=ShowD&F=english%2Fdti81865%2FEHTEL+Briefing+Paper+Sustainable+Telemedicine.pdf

26 http://www.epist.org/iae/

27 www.continuaalliance.org/home

28 http://www.innovatieplatform.nl/index.cfm/t/English/vid/1D5C98F1-02F9-F219-D57CD0D0E6C24BFB

29 Rens van Tilburg and Florian Bekkers; 'Voorstellen Sleutelgebieden-aanpak, Ambitie, excellentie en actie, Van dijkgraaf tot art director: voorstellen tot actie van het Innovatieplatform' (in Dutch), Den Haag, 4 oktober 2004, Innovatieplatform.

30 'Project Nederland Ondernemend Innovatieland'; document (in Dutch) available via ministery of Economic Affairs; http://www.minez.nl/content.jsp?objectid=153187&rid=45706

31 'Innovatie Platform Werkdocument'; documents (in Dutch) available via http://www.nederland-innoveert.nl/zorg/

32 'Life Sciences & Gezondheid' theme of EZ/SenterNovem; http://www.lifesciencesgezondheid.nl/

33 http://www.zorginnovatieplatform.nl/innovaties/overzicht/thema/17/eHealth/

34 http://www.zonmw.nl/en/

35 http://www.healthcareandict.org

36 http://www.ti-go.nl/home/

37 www.izit.nl

38 www.health-valley.nl

39 www.vitavalley.nl

40 http://www.zorginnovatieforum.nl/

41 www.care-ring.nl

42 www.zorgnetnoord.nl

43 www.zorgring.nl

44 www.spitz-mh.nl

45 www.rheco.nl

46 www.transmuralezorg.nl

47 www.ezda.nl

48 www.gerrit-net.nl

49 IPPR report http://www.ippr.org/ecomm/files/public_value_ehealth.pdf

50 http://www.ukeha.co.uk/sig_paper_detail.asp?sigNo=15

51 http://www.ukeha.co.uk/about.asp

52 eHealth Roadmap – Finland, Reports of the Ministry of Social Affairs and Health 2007:15. http://www.stm.fi/Resource.phx/publishing/documents/10546/index.htx (also interesting roadmap report available at http://www.ehealth-era.org/database/documents/ERA_Reports/FINLAND%20country%20report%20sep07_FINAL.pdf)

53 www.tervesuomi.fi

54 http://akseli.tekes.fi/opencms/opencms/OhjelmaPortaali/ohjelmat/FinnWell/en/etusivu.html

55 http://www.sitra.fi/en ; http://www.sitra.fi/en/Programmes/health_care/health_care.htm

56 http://www.cochrane.org/ ; http://www3.interscience.wiley.com/cgi-bin/mrwhome/106568753/HOME?CRETRY=1&SRETRY=0

57 http://www.ehealtheurope.net/img/document_library0282/NationalStrategy-Sweden.pdf

58 http://www.sweden.gov.se/sb/d/2950/a/65070

59 http://vefir.unak.is/ICTConference/Larson.pdf

60 http://www.ehealth-era.org/database/documents/ERA_Reports/Germany_eH-ERA_Country_Report_final_30-06-2007.pdf

61 http://www.medcom.dk/wm109991

62 'On the threshold of a healthcare IT system for a new era', www.medcom.dk/dwn1830

63 Danish portal; www.sundhed.dk

64 www.ithealth.org

65 www.Baltic-eHealth.org

66 Plan for Quality in the National Health System: http://www.msc.es/en/novedades/docs/PlanCalidadSNS.pdf

67 Plan Avanza: http://www.planavanza.es/index.html

68 http://www.isciii.es/htdocs/en/index.jsp

69 INSTITUTO DE SALUD CARLOS III (ISCIII); Institute of Health Carlos III; http://www.episouth.org/outputs/wp5/s_t_module/Curso/Day1/ISCIII_episouth-2008%20Opening.pdf

70 Granada Wellbeing and eHealth Living Lab, Telefonica, presented at AAL meeting in Berlin, http://www.aal-kongress.de/, January 2008.

71 http://www.ehealtheurope.net/News/4151/vodafone_and_spanish_red_cross_partner_on_3g_care