

EHTEL

EUROPEAN HEALTH TELEMATICS ASSOCIATION

Sustainable Telemedicine: paradigms for future-proof healthcare

A Briefing Paper



European Commission
DG Enterprise & Industry

Prepared for the Sustainable Telemedicine Task Force, EHTEL

Foreword

With this Briefing Paper, EHTEL substantiates its role as an integrative enabler: Beyond being a platform and networking node, EHTEL creates an added value for all stakeholders in healthcare. I would like to thank all those who contributed to this publication.

While the report summarises positions and experience gained from EHTEL activities over nearly 10 years, its novelty and empirical foundation stem from the support of its two major stakeholder groups, i.e. the Ministries of Health and the EHTEL/ELO network including the National eHealth competence centres. Members of both groups kindly supported this work.

From a strategic perspective, the 2004 European eHealth action plan successfully initiated a top-down process by anchoring eHealth at the policy level, thus inducing large scale infrastructural and market developments. It's now time to deploy the complementary bottom-up process: We need to concretise the European eHealth strategies by reconnecting citizens, patients and health professionals and developing win-win constellations in practical daily life.

By going back to the roots of healthcare and reconciling those fundamental values with innovative technological approaches, we are putting public health into practice and thus fostering a new breed of population-oriented service industry. The present report shows that this process is already starting, but still in lack of a facilitating strategic framework. In order to achieve sustainable results, telemedicine and telehealth need explicit implementation, support, concrete incentives and reality-based cross-stakeholder scenarios.

Developing electronically supported interaction between all stakeholders points at fostering personal and professional relationships as well as business relationships – to the advantage of all. Further measures would be to establish a true interdisciplinary telemedicine service framework to overcome the multidisciplinary scattering of individual services and to agree on a common language of structured definitions for telehealth and telemedicine solutions.

EHTEL is determined to address all eHealth stakeholders and will contribute to establish such frameworks, which will assist the birth of better health and care for all. This report in hand, we are undertaking the first step into the right direction.



Martin D. Denz, EHTEL President

Acknowledgements

I would like to express my gratitude to the co-authors and co-editors of this document. Firstly this Briefing Paper was made possible by a generous investment of time and knowledge by two major stakeholder groups of EHTEL, i.e. the Ministries of Health (MoH) Group and the EHTEL/ELO Network of eHealth Competence Centres. The communication with the National Member States was facilitated by the survey on "Strategies and Roadmaps for Sustainable Telemedicine". The survey is the basis of a comprehensive information assembly on the po-sition of telemedicine in National eHealth Strategies, the regulatory and policy framework for telemedicine services plus a collection of best practice examples, which is available to EHTEL members and other groups on request.

We thank warmly the two co-facilitators of the survey, Drs Chris Flim of NICTIZ, the National IT Institute for Healthcare in the Netherlands (EHTEL prime contractor) and Drs Jelle Attema of NITEL (part of EPN, a platform for the information society in The Netherlands).

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healthware



Executive Summary

Telemedicine has pioneered the use of communication technologies within healthcare. Hence telemedicine services are principally available for decades – some even say for as much as 130 years (referring to an early telephone based medical consultation!). This notwithstanding European health policy recently focused more generally on eHealth services.

Hence infrastructure elements like enhanced health insurance cards and e-services like reimbursement and the Electronic Transmission of Prescriptions have become the focal point for information and communication technology (ICT) in healthcare. But clinical ICT applications besides and beyond the EHR should not be forgotten, and with the evolving availability of eHealth infrastructures we are likely to observe good opportunities for a “renaissance of telemedicine” with a new generation of highly interconnected services integrated into clinical use cases as e.g. the case management of chronic heart failure. These services will be geared at being for wide and routine use, but also will be part of the business process and thus sustainable.

Telemedicine services respond to today’s health and social demands, i.e. treatment of chronic patients, support for the quality of life of elderly people living at home and they also support the patient empowerment of well-informed citizens to make healthcare choices.

The 2004 eHealth action of the European Union (eHealth - making healthcare better for European citizens: An action plan for a European eHealth Area), which is the current guideline for the implementation of the EU’s vision on eHealth and forms an important part of European i2010 strategy, mentions telemedicine services as an upcoming milestone: “By end 2008, the majority of European health organisations and health regions (communities, counties, districts) should be able to provide online services such as teleconsultation (second medical opinion), e-prescription, e-referral, telemonitoring and telecare.” Given this objective the EU will intensify the attention towards Telemedicine services in 2008.

With this Briefing Paper, EHTEL would like to offer all stakeholders, i.e. politicians, citizens/patients, health professionals, healthcare providers, health insurers and many others a snapshot of the State of the Art on the European, National and Regional levels with the focus on sustainable services. Based on a summary of what has been achieved – particularly in the form of routinely used (but often still small scale) telemedicine services across Europe – a set of recommendations towards a “Vision for Europe 2020: Integrated Telemedicine Services” is established.

EHTEL aims to contribute to the rebalancing of deployment efforts between infrastructure and clinical services, and between ICT experts and health professionals. Furthermore EHTEL will analyse, what should be done to make additional telemedicine services sustainable to support the health and social needs of European citizens/patients.

¹ Practice by Telephone. The Lancet, Nov. 29, 1879, p. 819

Starting from a minimum of definition work (telemedicine is basically “care at a distance”), the Briefing Paper highlights the success factors of sustainable services as opposed to discontinued or only minimally maintained services from pilot projects. Here the current challenge is to aggregate the achieved pieces of evidence, to consolidate the results, to integrate approaches on the basis of international, open standards, and to drive them towards operational development. Furthermore, a distinct shift is needed from telemedicine applications as stand-alone, added-value components driven by the paradigm of technology-push, toward eHealth services emerging as one-of-many features in digital medical work environments driven by the paradigm of demand-pull.

By adopting the terminology of Internet services, the Briefing Paper differentiates between distributed, networked use of specific specialised medical expertise, i.e. teleservices between health professionals/ doctors (“D2D”) like teleconsultation, teleradiology and telepathology from telemedicine services directly offered to patients (“D2P”) such as telemonitoring and telehomecare, emergency care, care of mobile patients and Internet based patient consultations.

The vision on telemedicine services in European countries can be divided in three types:

- • • Those which are an integral part of the most actual eHealth strategy where telemedicine applications are developed as part of this eHealth strategy;
- • • Those mentioned in the most actual eHealth strategy, but where telemedicine applications are not or not yet developed in direct relation to this strategy;
- • • Those not mentioned in the eHealth strategy but where some few developments of telemedicine applications in practice are emerging.

State-of-the-art of telemedicine and telehealth in Europe is completed by Best Practice examples and National case reports thereby providing a sound basis for a long term vision for integrated telemedicine services.

On the basis of the observations the Briefing Paper delivers some key messages:

- • • Facilitating change for professionals and patients;
- • • Involving professionals and patients in eHealth through telemedicine;
- • • Establishing a culture of interdisciplinary and cross-sectoral collaboration;
- • • Making National strategies for sustainable telemedicine explicit;
- • • Establish a European support framework for sustainable telemedicine.

These recommendations are of course open for comments by the Members and Partners of EHTEL and our different stakeholder groups. They will serve as foundations for EHTEL creating a cross-stakeholder telemedicine expert group and developing new initiatives for the two coming years with a view to support all stakeholders in the deployment of eHealth and telemedicine services in support of the transformation of health care delivery.

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1 Introduction

Telemedicine – or more generally: telehealth – services are increasingly established as a means to facilitate the distribution of human resources and professional competences. More particularly, these services can speed up diagnosis and therapeutic care delivery for emergencies, support virtual hospitals in patients' homes and allow primary healthcare providers in geographically dispersed locations to receive continuous assistance from specialised coordination centres. Thus telemedicine is, or will be, a major topic on the agendas of health and social care policies in Europe and worldwide. With new technology such as interactive DVB-RCS satellite technology, additional options for connecting professionals-to-professionals and professionals-to-patients, as well as for the design and deployment of completely new, integrated services and applications become feasible.

While some telemedicine services had been successfully piloted already decades ago, uptake and routine usage of such services is still subject to noticeable variations. Narrowly targeted services like teleradiology or telemonitoring of patients with high risks of fatal cardiac events or some forms of surveillance in the sense of telehomecare are in routine use in many countries already. With almost universal availability of broadband connectivity and de facto internet standards for audio and video streaming, teleeducation and telepresence become an obligatory element of medical teaching and continuous medical education. Imaging oriented services like teleradiology and – to a lesser extent – telepathology have been successfully embedded in clinical environments and are nowadays often part of routine health care. Some of these services may lack external visibility since they have been established as in-house services (e.g. a radiologist assessing diagnostic images from a radiological workstation at home or a pathologist assessing specimens of a high capacity link within an academic hospital). The latter might also be a reflection of the still restrictive legal environment which is much stricter when extramural services are offered.

At the same time the potential of telemedicine to enable the digital networking of patient-oriented medical care is currently far from being sufficiently unlocked and needs to be better and more widely utilised. The nation-wide use of telemedicine services seems to be particularly delayed if compared to the long testing phase established through the many EU and nationally-funded pilot projects.

Possible reasons for this include the lack of appropriate and ready to use interoperable – and more particularly highly secure – communication infrastructures, poorly documented and unproven Return on Investments (RoI) models, the unclear and restrictive legal environment and probably most particularly the lack of reimbursement schemes for telemedicine by statutory as well as private health insurance schemes.

Telemedicine can significantly contribute to and will be a crucial element in, the necessary transformation of national and regional health care systems. It can only be achieved with sufficient awareness and commitment by local, regional, national competent authorities, the active support of clinical professionals and citizens/patients looking for more effective and convenient services.

2 EHTEL Task Force Sustainable Telemedicine

The European Health Telematics Association is an international non-profit association with the mission to support all stakeholders in implementing and using ICTs to deliver health and social care. Established in 1999 under Belgian law, the activities of the association began with initial support from the European Commission, enabling EHTEL to offer a comprehensive source of eHealth information aimed at meeting the demands of those responsible for the provision of eHealth, together with the means for effective network and access. EHTEL provides to its members a cross-stakeholder platform for information, communication, representation, networking and co-operation in support of the implementation of information and communication technologies (ICT) in health and social care in Europe.

The cross-stakeholder dialogue has become a guiding principle for EHTEL activities. In the framework of a recent EHTEL conference it was concluded that, «Continuity of healthcare is a key element of agendas in Europe. This leads to the challenge to enable improved information management and patient-centred collaboration among all health professionals and across a wide range of care environments. The full benefits of eHealth will only be realised by 'connecting people'. This involves a fundamental shift in perspective and the understanding that eHealth is not simply a set of products or applications but a range of options to improve and transform healthcare services. Hence EHTEL believes that using ICTs in health and social care in Europe offers an unparalleled opportunity to revolutionise: (1) The quality of health and social care services provided to patients and citizens, (2) The speed and ease of access to those services; and (3) Their efficiency and cost effectiveness. The association brings together under one roof all of the constituencies with an interest in ICTs in health and social care: National and regional health authorities and systems, Hospitals and other health institutions, Public and private insurance providers, Health professionals, Health managers and executives, Patients, Citizens and consumers, Industry, Researcher and academics.

Telemedicine has been on the agenda of EHTEL already by representation in its initial workgroup structure throughout the years 2000 to 2002. Since the organisational structure has meanwhile been adopted to become a flexible organisation of task forces, the topic is now followed-up in the two task forces "Sustainable Telemedicine" and the task force on "Chronic Disease Management".

This briefing paper has been prepared for the Task Force "Sustainable Telemedicine" and has been supported through some external funding in the framework of the Healthware project (<http://healthware.alcatel.net/>) in relation the Healthware Users and Citizens Open Group (UCOG). This document builds also on the study "Strategies and Roadmaps for Sustainable Telemedicine – Analysis & Recommendations based on Country Reports on Telemedicine in Europe". This study was subcontracted by EHTEL with the aim to establish an inventory on National Telemedicine roadmaps. The survey has been performed by NICTIZ, the National IT Institute for Healthcare in The Netherlands and national coordination point and knowledge centre for IT and innovation in the healthcare sector, with the support of NITEL. NITEL is part of EPN, a platform in The Netherlands for the information society promoting the possible benefits of ICT for society. NITEL's aim is to improve Dutch healthcare by stimulating the implementation and use of telemedicine services, to help remove barriers, and to enhance opportunities for telehealth.

3 Telemedicine: Definitions, Classification and Strategies

For the purpose of this briefing paper, EHTEL understands the term telemedicine as follows: “Telemedicine services provide means to improve accessibility to high quality health care in case of shortage of appropriate health professionals or the necessary medical expertise or skills at the site of the patient. Telemedicine thus covers a broad spectrum of services such as teleconsultation, second opinion, tele-homecare and teletraining and builds on technologies such as video-conferencing supported by the exchange of medical images and medical records as well as remote monitoring. Communication infrastructures include ordinary telephone land-lines, internet connections of various speeds and in many instances also satellite links to enable health care in remote and isolated areas.”

3.1 Definitions and classification approaches by EU, WHO and Journals

The overarching theme of telemedicine is best described as being “care at a distance”, e.g. «Telemedicine is an umbrella term that encompasses any medical activity involving an element of distance»¹. As the field has further developed various elements have been added and some definitions of the term telemedicine by third parties are provided:

- • • In 1993 the European Commission defined: “Telemedicine is the rapid access to shared and remote medical expertise by means of telecommunications and information technologies, no matter where the patient or the relevant information is located.”
- • • In 1995 the Journal of Telemedicine and Telecare named telemedicine again as “Medicine practised at a distance” and emphasised that it does not only encompass both diagnosis and treatment, but also medical education.
- • • The World Health Organisation (WHO) stated in 1998: “Telemedicine is the delivery of healthcare services, where distance is a critical factor, by all healthcare professionals using information and communications technologies for the exchange of valid information for diagnosis, treatment and prevention of disease and injuries, research and evaluation, and for the continuing education of healthcare providers, all in the interests of advancing the health of individuals and their communities.

Also in the WHO definition of Health Telematics special reference was given to “Telemedicine in order to bridge the spatial distance between patient and physician or between several attending physicians (examples: telediagnosics, teleradiology , teleconsulting)”.

At the same time WHO differentiated between ‘telehealth’ with the meaning of “teleprevention” and ‘telemedicine’ with the sense of curative telemedicine. Yet this differentiation has not been adopted over the world with the consequence that telehealth and telemedicine are often used synonymously.

- • • By adopting the classification of Internet services, this Briefing Paper differentiates furthermore services between health professionals/doctors («D2D» aka “B2B”) like teleradiology and telepathology from services directly offered to patients («D2P» aka “B2C”) like telehomecare, care of mobile patients and Internet based consultations. This will be additionally highlighted for “principal telemedicine services” in section 5.

¹ Wootton R et al (2001) Recent advances: Telemedicine. BMJ, 323:557-560

3.2 National Extensions of Telemedicine definitions

- • • Denmark: “Telemedicine is a technology in which the transfer of video, pictures, sound and test results enables experts who are not physically present to be involved in the diagnostics and care of a patient.”
- • • Ireland: “The National Telemedicine Strategy focuses on telemedicine and telecare
 - Telemedicine applies to communications involving doctors and hospitals;
 - Telecare applies to communications involving nurses & carers and is increasingly focused in the community and on the home;
 - Which combined are: The use of information and communications technology to deliver health-care remotely”.
- • • Norway: “Telemedicine is defined as means to improve health care services in general. Overcoming shortage of appropriate medical expertise is one aspect amongst others.”
- • • The Netherlands: “Telemedicine is about processes in healthcare that have two characteristics:
 - a. Physical distance is bridged using information and communication technology
 - b. Two actors are involved, where at least one is a health care professional

The terms telehealth and telecare (in comparison with telemedicine) have been particularly highlighted by UK (England):

- • • “Telehealth is the delivery of health related services and information via telecommunications technologies. ‘Telehealth’ is an expansion of the functionality of telemedicine and unlike telemedicine (which focuses on the curative aspect) it encompasses preventive, promotive and curative aspects.
- • • The term telemedicine is at times interchanged with telehealth. Like the terms “medicine” and “health care”, telemedicine often refers only to the provision of clinical services while the term telehealth can refer to both clinical and non-clinical services such as medical education, administration and research.
- • • Telecare is a combination of equipment, monitoring and response that can help individuals to remain independent at home. It can include basic community alarm services able to respond in an emergency and provide regular contact by telephone as well as detectors which detect factors such as falls, fire or gas and trigger a warning to a response centre.”

3.3 European Strategies

The 2004 eHealth action of the European Union (e-Health - making healthcare better for European citizens: An action plan for a European e-Health Area²) is still the guideline for the implementation of the EU’s vision on eHealth. It forms an important part of European i2010 strategy, i.e. Achieving stronger growth and creating jobs that require higher qualifications within a dynamic, knowledge-based economy.

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

3.3.1 National Extensions of Telemedicine definitions

While the overall objective of the action plan is better access, quality and effectiveness of care, “The action plan sets out a roadmap for greater use of technologies, new services and systems, built around an objective of a “European e-Health Area”. It identifies practical steps to get there through work on electronic health records, patient identifiers and health cards, and the faster rollout of high speed Internet access to enable optimum interactions among health care professionals and with the general public. It also calls on Member States to develop national and regional e-Health strategies. Thanks to this plan, by the end of the decade, the EU should be well-placed to measure the impact of e-Health technologies on the quality and efficiency of services, as well as overall productivity. e-Health will become commonplace for health professionals, patients and citizens.”

An important action foreseen in this Action Plan was for all member states to develop an eHealth roadmap: “By end 2005, each Member State is to develop a national or regional roadmap for e-Health. This should focus on deploying e-Health systems, setting targets for interoperability and the use of electronic health records, and address issues such as the reimbursement of e-Health services.” As documented in the eHealth ERA project^{3,4}, most Member States have reached this milestone and defined National eHealth roadmaps.

By reviewing those eHealth strategies and priorities per country, it has become evident that telemedicine is in most cases not mentioned so far. This must however not necessarily imply that telemedicine services are not under preparation or have not already been established. Rather for the time being, eHealth strategies seem to be focused mainly on overall eHealth planning and implementation tasks like establishing a secure communication infrastructure; defining and deploying interoperable network services etc. Yet it makes it more difficult to obtain a realistic representation of the status of telemedicine, telehealth and related services throughout Europe.

3.3.2 EU Telemedicine plans

Telemedicine services are mentioned as an upcoming milestone in paragraph 4.3.2 of this Action Plan: “By end 2008, the majority of European health organisations and health regions (communities, counties, districts) should be able to provide online services such as teleconsultation (second medical opinion), e-prescription, e-referral, telemonitoring and telecare.” Given this objective the EU will intensify the attention towards Telemedicine services in 2008. Thus Telemedicine is explicitly mentioned in the annual policy strategy 2008⁵, chapter 2: Priority actions for 2008, paragraph 2.4 Security and Freedom foresees: “Initiative on telemedicine for chronic disease management (home health monitoring)”.

Starting e.g. with the organisation of the event TeleHealth 2007, the European Commission is preparing a communication on “Telemedicine and Innovative Technologies for Chronic Disease Management” that is foreseen to be published in October 2008. The elements to be addressed are inter alia: legal obstacles (tax, social security, liabilities, claims), financial issues like patient reimbursement, practical issues (accreditation, certification, labelling), data protection and privacy and last but not least: Interoperability. Furthermore a public consultation has been launched in October 2007, aimed at gathering telemedicine expertise in all Member States. The Communication on Chronic Diseases and Telemedicine will particularly tackle the legal and privacy issues linked to cross-border telehealth and telemedicine services.

³ http://ec.europa.eu/information_society/activities/health/docs/policy/200703ehealthera-countries.pdf

⁴ http://ec.europa.eu/information_society/activities/health/docs/policy/ehealth-era-full-report.pdf

⁵ Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee of the Regions, Annual policy strategy for 2008, Brussels 21-2-2007 COM(2007) 65 final, cf. http://ec.europa.eu/atwork/synthesis/doc/aps_2008_en.pdf

4 Lessons learned: Sustainable telemedicine service vs. discontinued or only minimally maintained pilot projects⁶

As opposed to most eHealth services, many telemedicine services already oversee a longer history of development and testing. Since the now-a-days evolving infrastructures of eHealth have not been available previously, 'first generation' telemedicine services were mostly based on proprietary technologies and hence implemented as islands.

4.1 Early pilot projects

After two decades of pioneering work from around 1975 to 1995, followed by a decade of transition with early adopters using telematics applications to improve their daily work in health and social care in limited scenarios, telemedicine has then clearly started to become an important issue for implementation, operational deployment of services and a promising market for industry.

Great efforts have been undertaken and a great number of projects have been carried out in order to exploit the telemedicine and eHealth potential. Most of these projects have not accomplished sustainability, but have created a large variety of different, in most cases insufficiently interoperable, applications.

The current challenge is to aggregate the achieved pieces of evidence, to consolidate the results, to integrate approaches on the basis of international, open standards, and to drive them towards operational development.

4.2 Lessons learned from early telemedicine pilots

Various insights and experiences have been gained from projects and services in different parts of Europe and hence, differently organised healthcare systems during the past two decades. These insights are considered on the background of what can now be observed:

A shift from telemedicine applications as stand-alone, added-value component driven by the paradigm of technology-push, toward eHealth services emerging as one-of-many features in digital medical work environments driven by the paradigm of demand-pull.

The experiences range from technically well-done applications without or with scenario-dependent acceptance by the users, to technically simple, out-of-the-box solutions with great acceptance and clinical impact. In some cases, telemedicine solutions have even initiated changes in medical best practice for e.g. diagnostic procedures.

⁶ Excerpt from "Insight and experience gained from clinical telemedicine applications", presented by Alexander Horsch et al. at the Healthware workshop, Luxembourg, March 2006.

A carefully balanced distribution of benefits among the stakeholders;

- • • the general use of equipment required for telemedicine such as digital stethoscopes or digital cameras for daily work and not only reserved for the potentially rare use of a telemedicine service, so that the health professionals are familiar with the handling;
- • • the digitisation of work environments with the side-effect of creating a good basis digital telecommunication;
- • • a good education and training of users;
- • • clear operational models for collaboration between health service providers; sound economical models not expecting single eHealth services to afford basic telematics infrastructures which rather have to be implemented on a national scale to serve all services;

all these have been identified as key success factors for sustainable, well-accepted services.

In order to gain a broad acceptance among users, telemedicine and eHealth services of the next generation must be both working safely and smoothly to operate elements of information and communication technology, supporting integrated care processes inside healthcare providers and between healthcare providers and patients. They must not put any further burden on healthcare professionals, but rather help them to work in a more efficient and effective way.

5 Principal Telemedicine Services

5.1 Telemedicine services as a response to health and social demands

Europe is facing the challenge of delivering quality healthcare to all its citizens, at an affordable cost. The increasing demand by citizens for best quality healthcare, the costs of managing chronic diseases, and the need for prolonged medical care for an ageing society are major factors behind this challenge. Telemedicine services are suited to close the clash between raising needs and limited resources, i.e. they are a possible solution for the challenges of today's health and social care. Therefore, in this paragraph the potentials of telemedicine services are linked to the major challenges of healthcare systems all over Europe. These challenges can be viewed from many different perspectives. For the social challenges, emphasis is put on the cost perspective and the citizen perspective.

5.1.1 Treatment for chronic patients

Already 70% of healthcare budget is spent on treatment of chronic diseases. The demand is therefore to reduce costs, e.g. by seeking for solutions which may:

- • • Reduce the number of (poli)clinical control visits necessary;
- • • Transfer from expensive (hospital) care to cheaper alternatives;
- • • Reduce the volume of acute hospitalisations because of complications (preventing upfront instead of damage-control afterwards).

Chronic diseases are affecting the quality of life of patients and sometime their relatives. There is therefore a demand from the citizens for solutions which may:

- • • Help them in taking part in daily life if possible without loss of privacy;
- • • Prevent or reduce patient hospitalisation, travelling long distances and waiting for control visits;
- • • Recognise and treat first signs of complications as soon as possible.

5.1.2 Support for the quality of life of elderly people including living at home

Without changing the way elder citizens are supported in 2020, almost 20% of all working people will have to work in healthcare. This may lead to a scarcity of professional resources. At the same time, quality of life is not only about health, but also about wellness aspects, e.g. getting attention. Older people are not always used to technology and ICT tools.

Here too, there is a demand to reduce costs, e.g. by seeking for solutions which may:

- • • Use the scarce resources in a more efficient way;
- • • Offer a standard set of services as a basis for all citizens;
- • • Manage the rising of costs for this segment;
- • • Integrate ICT (e.g. telehomecare) in care, living and wellness.

Here again, there is a demand from the citizens for solutions which may:

- • • Help to identify the best fit of services for each individual;
- • • Support citizens in their individual choices;
- • • Give citizens more individual choices for health and wellness services;
- • • Make telecare services available in an assisted ambient manner.

5.1.3 Patient Empowerment: Citizens want information to make their own choices

Specific patient groups will take more control in their own hands regarding their health. Other groups of patients will rely on their caring professionals for these choices. In both cases the choice is made by the citizen, not the professional.

5.1.4 Individualised Care provision: Case vs. disease management

Care will shift to an integrated approach of diseases where different professionals play their role in the service chain. For patients with multiple diseases a next step will be made towards case management, to provide custom made healthcare services to individuals.

This requires a culture shift for professionals; from individualists to team players. To support the choices of patients' flexible healthcare according a 'cafeteria model' has to be established. At the same time more healthcare services will be provided directly to the citizen, who is willing to pay for extra services either through insurances or in a retail model.

5.1.5 Distributed, networked use of specific specialised medical expertise

The continuous medical and technological developments require more and more specialisation. This implies that not all expertise is available at every location. Especially small hospitals look for possibilities to maintain delivering a broad range of services.

Here too, there is a demand to reduce costs, e.g. by seeking for solutions which may:

- • • Ensure optimal use of expertise knowledge for larger groups of patients;
- • • Stimulate the optimal use of scarce resources through cooperation at a distance.

Here again, there is a demand from the citizens for solutions which may help to:

- • • Get information on specific expertise in the region, national or abroad;
- • • Make this specific expertise available for individual citizens.

5.2 Tele-services primarily between health professionals ("D2D")

Telehealth comprises interactions between health providers and citizens/patients ("D2P") and within the group of health providers ("D2D") in support of healthcare and prevention given the fact that there is no direct physical contact with each other⁷. If the patient is present at this consultation, this could be extended to "D2D2P". Still the following descriptions concentrate on the healthcare providers being the primary partners of the tele-services.

5.2.1 Teleconsultation/Second Opinion

Generally speaking, teleconsultation is the consulting participation of a distant physician or of other health-care professionals. Although the videoconferencing systems often used for teleconsultations allow this type of telepresence, not every system solves the manifold problems of media discontinuities in medicine. These can only be overcome by an accompanying exchange of documents enabled by shared medical records or the electronic transmission of reports and findings.

⁷ cf. Definition of Telemedicine by the Swiss Association for Telemedicine and eHealth, endorsed also by ISTeH.

⁸ Nerlich M, Schall T, Stieglitz SP, Filzmaier R, Balas A: A Generic Approach To Teleconsultation - An opinion based Guideline from G-8 GHAP Subproject 4 Group (International Concerted Action on Collaboration in Telemedicine - Teleconsultation Guideline Consensus Process)

The primary use of imaging procedures has led to new medical services for the purposes of remote evaluation (teleradiology, telepathology etc.) and teleconsultation as well as teleconferencing. Mere secondary-opinion procedures for ensuring a better diagnostic and therapeutic quality have already been applied as a matter of routine in many institutions throughout Europe. The issue that is still being discussed is the extent to which the work of an expert (specialist) on site can or should be replaced, for example, as regards to performing an intra-operative rapid histological diagnosis using means of telepathology.

Teleconsultations are increasingly used in those specialist fields of medicine, in which corresponding diagnostic findings data (mainly images) can be transmitted digitally. In addition to the disciplines already mentioned, these specialist fields comprise, among others, ophthalmology (eye fundus), dermatology (macroscopic and microscopic skin lesions), cardiology and surgery (summarising evaluation of X-ray images and other findings). The following definition was given in the draft for a guideline on teleconsultation:

“Teleconsultation is the consultation of one (or more) distant health care professional(s) by a locally present health care professional about a patient’s case, diagnosis and treatment using telecommunications and information technology to bridge the spatial distance between the two (or more) participants”. Teleconsultation offers opportunities of improving cooperation, especially among healthcare professionals, and simultaneously enhances the quality of patient care. The videoconferencing systems often used for teleconsultations allow for the remote presence of an (additional) colleague, but do not solve the manifold problems of media discontinuities in medicine. These can only be overcome through an accompanying exchange of documents.

The technologies used are not specified so that telephone consultation is also included in this definition. Since numerous attempts to contact a specialist are necessary for simultaneous second opinion procedures between two highly qualified doctors to be able to communicate with each other directly (at the same time), asynchronous communication using mailbox procedures, the medical multimedia data being transmitted via email, has gained increased acceptance and become the preferred methods e.g. for obtaining second opinions of highly specialised physicians e.g. in Gastroenterology.

5.2.2 Teleradiology

Teleradiology is the transmission of X-ray images and material generated with other imaging methods and their evaluation. It refers to an assessment in selected settings such as an evaluation by a consulted specialist, teleradiological evaluation by the radiological supervising physician of a hospital; and to the case of an outsourced emergency service, provided by a large hospital to smaller clinics that have no internal radiological emergency service. There are additional applications for education and further training and for scientific purposes.

Teleradiology has been the most rapidly adopted form of telemedicine services, since the use of digital imaging procedures has increased quickly, even outside the “tele” context. Hence teleradiology is already used routinely in many European healthcare institutions.

“Primary teleradiology” implies the use of some imaging procedures without a radiologist being active on site. This scenario is rejected by some health professional organisations because of quality concerns. In addition it may cause job loss of medical specialists.

The demand for broadband data connections in the healthcare sector is caused to a high degree by teleradiology applications, since huge data volumes must be transported regularly, in particular, as regards

diagnostic film sequences or image sequences (CT Scan, MRI). Therefore, an essential role concerning the easier use of teleradiology applications is the introduction of advanced image compressing algorithms in addition to the better availability of transfer capacities (e.g. fibre optics or high bandwidth satellite links). Although a high level of standardisation of image formats has been achieved through DICOM, which is meanwhile supported by most of the (digital) imaging devices, many issues relating to secure image data transmission remain still to be solved.

5.2.3 Telepathology e.g. for rapid histological diagnosis

Telepathology with the aim of a second evaluation of images has been widely deployed already. But the benefit and reliability of the systematic replacement of a pathologist on site, e.g. for rapid histological diagnosis, is still disputed. Undisputed are applications in radiological and pathologic education and further training as well as for scientific purposes.

In certain surgical operations – usually when there is a suspicion of a malignant recurrence – a part of the intra-operatively removed tissue is examined by the clinical pathologist during an operation. If no pathologist is active at the relevant hospital, the tissue must be transported to an external pathologist. This leads to prolonged operation and anaesthesia times and, besides additional stress on the patient's health, to economic disadvantages. Telepathology can, under certain conditions, reduce the above-mentioned stress through a faster transmission of pictures and the relevant findings. Instead of sending the tissue sample with a courier to pathological evaluation, it is processed on site – perhaps under video-control of the consulted pathologist – by a specifically qualified employee and put into a remote-controllable examination microscope (robot microscope). The pathologist's control commands for the microscope and the images of the preparation are transferred in real-time so that the remote clinical pathologist can communicate his evaluation after only a few minutes.

Telepathology also includes the transmission of images for second-opinion procedures, for education and further training and for scientific purposes. Corresponding applications have proven their worth in the field of haematology, where "telehaematological" evaluation is used for quality assurance and reference purposes in combination with specific diseases.

5.2.4 Professional learning and training

There is a separate area of opportunities closely related to the distributed, networked use of specific specialised medical expertise but with a focus on the skills of the professional himself. Telemedicine provides a range of new possibilities to learn and train professionals. E.g. by viewing real-life operations or sharing experiences with colleagues worldwide.

Also in this area opportunities are abundant to provide professionals with telemedical skills to be able to provide care through telemedicine services to their patients.

5.3 Telemedicine services directly offered to patients ("D2P")

5.3.1 Telemonitoring and Telehomecare

Telemonitoring comprises the remote monitoring and care of patients, who might be subject to recurrent/deteriorating disease and/or to disability in their familiar home environment. Thus complex monitoring

tasks that are otherwise only possible during inpatient treatment in hospitals are performed in an ambulatory or the patient's home environment. Telemonitoring has hence potentials of substituting the hospital's monitoring activities and offers improvement potentials for unobtrusively accompanying patients who might be subject to recurrence, for example, after a stroke. In this field, for example, sensory systems that can be applied in the direct environment of the patient are used. One field of application is expanded forms of diagnostics, for example, using ECG data transmitted by telemetric means or via a data connection. Furthermore, comprehensive care concepts for chronic patients, in particular within the sense of secondary prevention, can be realized with this procedure. So the patient is able to make use of medical monitoring and care services in his direct personal environment. Given appropriate side conditions, the patient may lead an autonomous life despite his suffering from severe health problems. Yet in addition to the care of geriatric patients, attention must also be given other patient groups and their requirements.

5.3.2 Emergency care and care of mobile (travelling) patients

Telemedicine in support of the medical care of emergency patients includes, among other elements, data communication between the hospital, the emergency service and a consulted physician for providing advice to the physician active on site. Care of mobile (travelling) patients is also a possible field. The care of emergency patients is of the classical domains of telemedicine and is also a relevant application for the European healthcare sector. Enabled by early data communications between the emergency service on site and the admitting hospital, the hospital staff can make the necessary preparations – or even other decisions, such as the use of a rescue helicopter – in good time. Teleconsultation, i.e. providing expert advice to the physicians and/or paramedics on site, is also possible.

As another example, passengers on board airplanes and ships may also receive medical advice or can be attended to by the crew under the supervision of doctors – including, for example, teliagnosis and telietherapy, if the appropriate telecommunication facilities are in place and if the craft are connected, e.g. via satellite, to the relevant operations centres. Concrete applications were tested, for example, within the framework of the NIVEMES EU project with emphasis on Greece. In addition, there are commercially operated telemedicine applications for passengers and crews of cruise ships (cf. section 5.4).

5.3.3 Patient Consultations and Internet based online services

Telehealth also comprises to counsel patients directly via communication lines, typically the Internet. While this service can be part of telecare or telehomecare services it can also directly be offered in the framework of health information portals or internet pharmacies.

Thus some eHealth portals offer pay-for-services like individual therapeutic counsel and prescriptions over the Internet in addition to general health information. While this is normally accessible to every Internet user, some national regulations and the Professional Code of Conduct of some Medical Associations do not support this kind of professional interaction. Typically only non-binding, general expert advice is in compliance with the Code-of-Conduct of Medical Professions⁹.

Finally health professionals also join discussion forums of consumers and patients on the Internet – either as professional moderators, contracted resource or sometimes also in the sense of a volunteering role and informal communication. While in accordance with the ideal of a free exchange of information, content and

⁹ E.g. Medical Associations in Germany refuse medical treatment over the Internet without cryptographic security measures. In addition, start of treatment is principally not permitted over the Internet.

quality of discussions among medical laymen and, in part, among laymen and physicians are subject to high variations which may result in turn, into health risks for the audience, some forums have developed to well qualified Internet-supported self-help groups.¹⁰ Hence, certain online discussions and fora for health related issues may enable the qualified exchange of information in the support of prevention, disease management, self-help and consumer and patient empowerment.

5.4 Telemedicine services for ‘niche’ markets

While the services described so far are complementary to “regular”, brick-and-mortar healthcare, some special environments or circumstances make telemedicine being the only option to provide healthcare at all or at sufficient quality. The service offered is mostly teleconsultation; particularly ships and military missions often use multi-functional equipments enabling also remote imaging (teleradiology) and remote diagnoses for special diseases (like teledermatology).

- • • Aviation healthcare: Telemedicine services for passengers and personnel in airplanes.
- • • Maritime healthcare: Telemedicine services on board of ships or offshore.
- • • Space healthcare: Telemedicine services in space, e.g. Telemonitoring.
- • • Defence healthcare: Telemedicine services to support health professionals working in military missions in remote or third world countries (Balkan states, Afghanistan, Iraq,...), e.g. Telesurgery, Teleradiology.
- • • Disaster Relief: Telemedicine in areas of natural disasters (earth quakes, floods etc.).

Satellite based telemedicine is particularly suited to support those scenarios. While those applications may dominate the public perception of telemedicine and at the same use a serious amount of financial resources, they are normally only models for new medical or technological approaches (like robots) but will not lead to large scale implementations as such. Hence these services are treated as specialities and ‘gadgets’ without connection to the nation-wide roll-out of new eHealth enabled services.

5.5 Cross-border telemedicine

Excellent medical competency centres might offer their expertise at an international level (e.g. international centre for rare metabolic disorders or a telepathology consultation centre, e.g. the service offered by Charité, Berlin, Germany). In such cases, arising liability issues are to be clarified among other things – for example, by analogy with the model of a telemedicine agreement proposed by the WHO.

During telemedical treatment, the transferred information can overcome any national border, easily at any distance. The resulting needs are interoperable applications and a clearly defined legal and also financial framework. Cross-border telemedical treatment requires interoperable applications and a binding legal and financial framework.

¹⁰ For example some message forums on the subject: Diabetes mellitus.

6 Telemedicine as component of eHealth roadmaps and deployments in Europe

The current status of Telemedicine deployment is mirrored by the positioning of telemedicine and telehealth in the eHealth strategies and roadmaps of European States and of course by integration of telemedicine services with the eHealth infrastructure and other eHealth services. This overview synthesises information obtained from National representatives (Ministries of Health and/or telemedicine experts) of: *Austria, Belgium, Bulgaria, Cyprus, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Luxemburg, The Netherlands, Norway, Poland, Romania, Slovakia, Spain, Sweden, Turkey, and United Kingdom* on the positioning of telemedicine in National eHealth strategies (section 6.1) and the regulatory and policy framework for sustainable telemedicine services (section 6.2).

6.1 Positioning of Telemedicine in National eHealth Strategies

In general the vision on Telemedicine in European countries can be divided in three types:

- • • Vision on telemedicine is an integral part of the actual eHealth strategy and telemedicine applications are developed as part of this eHealth strategy;
- • • Vision on telemedicine is mentioned in the actual eHealth strategy, but telemedicine applications are not developed in direct relation to this eHealth strategy (yet);
- • • Telemedicine is not mentioned in the eHealth strategy and few developments of telemedicine applications in practice are visible.

Overall most countries have an eHealth strategy but few examples of explicit strategies on telemedicine exist (e.g. Ireland, Romania). Some countries have made choices for certain projects or types of telemedicine applications, but arguments or empirical foundations for overall choices on telemedicine, projects or application-types have not been documented.

6.1.1 Roadmap excerpt: Austria

“The main aims of telemedicine projects and developing efforts are the required increase of medical quality for all citizens in Austria, increase of accessibility to medical services and the decrease of costs for the different partners.”

6.1.2 Roadmap excerpt: Bulgaria

“The advantages of the implementation of telemedicine solutions in healthcare are:

- • • Higher accessibility – each patient will have the chance to be treated by the best specialists in the respective area;
- • • Higher effectiveness of the health assistance – better and stable results are achieved – concerning the improvement of the patients’ health status;
- • • Better economical effect - the amount of hospital-stay and the days for ambulatory treatment get lower, then the amount of active labour days for each patient is rising – that lifts the gain for the employers and influences positively the economical growth of the country as a whole. That also will bring lower treatment costs for the health insurers.”

6.1.3 Roadmap excerpt: Denmark

“Telemedicine provides a number of ways to enhance the quality of care and service and thereby the level of patient satisfaction. Furthermore, telemedical solutions can help, ensuring a more rational use of resources available to the Danish health care system.”

“Telemedical solutions may entail a number of advantages for the patient, including faster and better diagnosis, fewer extra medical investigations, no unnecessary transportation etc. In certain cases, the use of telemedical solutions will also enable relatives to remain close to the patient, to the benefit of the patient’s psychological well-being. For the health care professionals, new possibilities will emerge: consultations with experts, better decision support, less travelling etc. With telemedicine, existing physical limitations can be disregarded. The patient doesn’t necessarily have to come to the expert; nor do images need to be moved physically. This can all result in better communication internally in hospitals and between hospitals, practice sector and community health care. Equipment, professional expertise and emergency alert can be put to more efficient use.”

6.1.4 Roadmap excerpt: Ireland

“The Department of Health & Children, together with the Health Board Executive (HeBE) commissioned the preparation of this strategic vision and approach for the development of telemedicine in Ireland. The purpose of the National Telemedicine strategy is to:

- • • Firmly establish the use of telemedicine as a normal support tool to healthcare delivery putting telemedicine firmly “on-the-map;”
- • • Bring telemedicine to the consciousness of decision makers at all levels, particularly those charged with service modernisation and change;
- • • Establish basic principles;
- • • Establish basic infrastructure, and
- • • Make significant initial progress.”

6.1.5 Roadmap excerpt: Italy

“Telemedicine is seen as an important aspect of improving quality of health care and increasing efficiency in the new National HealthCare Plan.”

6.1.6 Roadmap excerpt: Norway

“The overall vision of the eHealth strategy is better healthcare services with the use of ICT. Telemedicine is defined as means to improve health care services in general. Overcoming shortage of appropriate medical expertise is one aspect amongst others.”

6.1.7 Roadmap excerpt: The Netherlands

“Telemedicine is considered one of the innovative means to improve healthcare.”

6.1.8 Roadmap excerpt: United Kingdom – England

“The vision is set out in the White Paper report “Our health, our care, our say: A new direction for community services”: The objective is to deliver a radical and sustainable shift in the way that services are delivered; away from the “one size fits all” approach of reactive treatment, often in a hospital setting, to a person-centred service making use of new technological opportunities.”

“It is expected the increased use of telecare/telehealth will:

- • • Reduce the need for residential/nursing care;
- • • Unlock resources and redirect them elsewhere in the system;
- • • Increase choice and independence for services users;
- • • Reduce the burden on carers and provide them with more personal freedom;
- • • Contribute to care and support for people with long term health conditions;
- • • Reduce acute hospital admissions;
- • • Reduce accidents and falls in the home;
- • • Support hospital discharge and intermediate care;
- • • Contribute to the development of a range of preventative services;
- • • Help those who wish to die at home to do so with dignity.”

6.1.9 Roadmap excerpt: United Kingdom – Scotland

“A policy report was published; the ‘Kerr Report’ and the Government document in response, which is the current policy document called “Delivering for Health”.

Some recommendations that were made:

- • • Provide care as close to the patient as possible, at home or close to home;
- • • Provide other care as much as possible in local communities;
- • • Hospitals should ‘do what they are good at’ = focus on core competences and stop small services for fragmented disciplines;
- • • Provide tools for empowering and self management of patients.

To reach these objectives there is a big role for ICT (or eHealth), with a focus on Electronic Health Records and telehealth“.

6.2 Regulatory and policy framework for sustainable telemedicine services

The successful establishment of sustainable telemedicine services builds on various regulatory factors, i.e. the adaptation of the legal framework for teleservices, organisational aspects, financial elements like reimbursement schemes and also technical measures like standardisation and the inclusion into relevant infrastructure planning.

Those factors are complemented by elements, which might be summarised as “change management” like user awareness, assessment of user demands and needs, cultural changes in healthcare provision and healthcare governance. Finally also the development of business models, and last but not least, the overall market readiness of industrial suppliers are important factors.

6.2.1 Regulatory and policy framework: Belgium

A national strategy has been developed to exploit the eHealth/telemedicine opportunities with the ‘Be-Health’ infrastructure. The goal of the strategy is to involve all relevant actors, to create coherence between the different (information) systems, to guarantee privacy, the quality of data and safety, and to enhance optimal use of the available means.

On the legal level, a “sectorial” committee is responsible for privacy, quality of data.

Organisational support was provided by the inauguration of a vision-group responsible for the definition and development of a vision of eHealth/telemedicine. In this group all relevant actors are involved. A maintenance-group is responsible for the technical and financial aspects of the BeHealth platform. Since the BeHealth platform integrates a number of initiatives in the Belgian health care and social security system, the financial impact of the development of the platform is small: existing budgets are being used.

6.2.2 Regulatory and policy framework: Denmark

The implementation of sustainable telemedicine services is supported by the national government and its institutions responsible for telemedicine by:

- • • Legal recommendations from the National Board of Health;
- • • A national Health Net, based on Internet technology, as technical support for the exchange of clinical images, videoconferencing etc. (MedCom – the Danish Health Net);
- • • Financial incentives (e.g. Diagnoses Related Groups codes for telemedicine support);
- • • Defining a national implementation strategy with national dissemination projects.

6.2.3 Regulatory and policy framework: Estonia

From various cross-border telemedicine projects, particularly those carried out in the Baltic countries, success factors for telemedicine have been identified, like project implementation by experts with good professional background and having received special training; most important is to enable projects to become part of the health care delivery process.

Telemedicine services are part of a national strategy and have received dedicated support;

6.2.4 Regulatory and policy framework: France

From the legal point of view, the “Ordre National des Médecins” (National Council of Doctors, in charge of ethical rules) has started to define the responsibility of practitioners in distant expertise. For the financial sustainability of telemedicine, work is underway to define special invoicing – but this is still very slow and difficult.

One of the main difficulties for developing telemedicine is economic and organisational: remote and collaborative activities are not really defined from an economic point of view.

6.2.5 Regulatory and policy framework: Greece

The absence of a general organisational and legal framework is noted as a major obstacle. Such a framework is needed to clarify tasks, responsibilities, and also the reimbursement principles for telemedicine services. Overall the principles of the national strategy are:

- • • Bringing the nation's health information system under the quality and safety imperative;
- • • Moving from administrative complexity to evidence based simplicity;
- • • Disengaging the dynamic elements of our health legal system from the rigid body of the national laws;
- • • Creating strategic partnerships;
- • • Creating the knowledge based infrastructure.

The great challenge in eHealth is to be dealing with the constant organisational change. For its potential to be realised, changes are required in the way we understand partnerships, professional roles, and relationships; they call for leadership, new organisational infrastructures and policy integration across all sectors of society influencing health. Continuing political commitment and leadership is needed in order to maintain the momentum, align actions and eventually, empower the many actors involved at all levels to move at fast paces individually but in a concerted manner, in order to make the change.

6.2.6 Regulatory and policy framework: Hungary

The reasons why telemedicine is not (yet) on the priority list:

- • • There is a major restructuring - structural and financing - reform process in Hungary;
- • • There is no appropriate and ready to use interoperable communication infrastructure;
- • • There is no supportive legal environment; and
- • • There is a minimal awareness by the local, regional and national competent authorities. They are mainly focused onto the reform process.

6.2.7 Regulatory and policy framework: Norway

To draw up a relevant and feasible strategy for deployment, knowledge about characteristics of successfully implemented telemedicine applications have to be considered. After more than ten years with telemedicine project and pilots in Norway, quite some insight exists.

As a summary of the international validated knowledge the following citation¹¹ is given: "Telemedical applications introduced into routine practice are typically characterised by the following six features: 1) local service delivery problems have been clearly stated, 2) telemedicine has been seen as a benefit, 3) telemedicine has been seen as a solution to political and medical issues, 4) there was collaboration between promoters and users, 5) issues regarding organisational and technological arrangements have been addressed, and 6) the future operation of the service has been considered."

¹¹ Obstfelder A, Kjersti H, Engeseth KH, Wynn R (2007) Characteristics of successfully implemented tele-medical applications. Implementation Science 2007, 2:25 (full text cf. <http://www.implementationscience.com/content/2/1/25>)

While health care is a public matter in Norway, the implementation of telemedicine still depends on local commitment and their involvement. The strategy to manage this includes common public adaptation (i.e. as providing infrastructure and standards) and local authorities' liability, commitment and ownership.

User involvement is an important principle in Norwegian governmental policies, but has not held a specific role within development of telemedicine strategies. The primary movers within this work have been "fiery souls", committed health care personnel, particular groups of expertise, and public health authorities.

A technical infrastructure for electronic interaction in the health care sector is already in existence. The supply by the market is straightforward since the public health care services use applications from commercial companies. A primary challenge in the near future is to include the various stakeholders in health-care into the use of electronic interactions.

6.2.8 Regulatory and policy framework: Sweden

A versatile infrastructure is provided by Sjunet with a dedicated IP infrastructure that interconnects all County Councils. This means all primary care and hospitals are possible to interconnect.

The obstacles perceived for the more extensive use of Telemedicine are:

- • • During these first years there were stability and support problems in the infrastructure. This has caused discussion if this is useful at all. We will solve this by new infrastructure and a more active support organisation.
- • • Since telemedicine takes at least two parts, the matter of coordinating people into special rooms at a certain time is problematic. The "spontaneous" meeting like making a phone call does not happen. And good tools for planning have not been available.
- • • It is still a special event to sit in front of a camera. Education and training are necessary. And the sharing of medical images has not been perfect because of old infrastructure. Also many doctors like to meet patients and colleagues live.
- • • In some (very few) cases discussions about financing has been an issue. If municipalities need medical expertise for care of elderly, the responsibility and payment issue for the doctor must be solved.

6.2.9 Regulatory and policy framework: The Netherlands

The approach to financing telemedicine has been to provide buying power to insurance companies and consumers and hence to support good initiatives or programs indirectly through financial subsidies. This is typically a one-time subsidy and hence sustainability should reach following this. Furthermore new tariffs for innovative services are needed. Also some insurance providers have selected telemedicine services to offer added value to their customers.

From an organisational aspect new procedures for disease and self management have been created with the goal to promote cooperation focused on the patient, not on the providers. Furthermore healthcare consumers are provided with objective online information to be better supported in their choices.

The technical platform for telemedicine services will be provided through the National "AORTA" infrastructure and a nation-wide EHR which is defined and implemented using international standards.

The legal basis is established through the legal basis for eHealth services, i.e. by the legislation on Patient Identification (BSN) and on EHR. The latter regulates professional obligations, patient rights, authorisation, data protection, etc.

User demands have been documented as:

- • • Trust in quality and security of solutions;
- • • Customer Centric services;
- • • Stimulating awareness of customers;
- • • Always available, easy to use services integrated in daily life;
- • • One-stop-shop for customer service;
- • • Personal budgets for these services (cafeteria model).

The Health-IT industry has developed already profitable business models for some services offering flexible subscription packages targeted for sufficient numbers of subscribers.

6.2.10 Regulatory and policy framework: UK-England

From an organisational viewpoint, delivery of the programme (within the National Programme for IT) is managed through the Local Ownership Programme. The Department of Health has established a National Framework Agreement (NFA) for telecare which encompasses both telecare and telehealth solutions. Multi-disciplinary teams have been created at the health and local authority level that will develop and deploy integrated care plans.

To encourage the adoption of these services by means of finance, the government has made available £80M under the Preventative Technology Grant in financial years 2006/07 and 2007/08.

Interoperable telemedicine solutions are supported by the development and application of international standards. At the same time those standards enable to integrate telehealth solutions to the core eHealth infrastructure which is based on open international standards. A barrier to deployment is the missing scalability of the present technology that will need to be overcome in order to achieve sustainable deployment.

6.2.11 Regulatory and policy framework: United Kingdom Scotland

Telehealth is handled as an integral part of eHealth and hence the means needed for eHealth are applicable to telehealth. At the same time telemedicine suffers from the low budget for ICT (0.5 – 1.0 % of health expenditure) provided by the government to regional health boards. The budgets will have to rise in the near future.

So far no eHealth dedicated Scottish legislation exists, i.e. rulings are based on Case law.

Telehealth needs reshaping of organisations and cultures for various aspects/groups like:

- • • Patients need to be convinced telehealth services are safe and as good as a traditional visit to a doctor.
- • • Professionals need to be convinced that telehealth is safe, quicker and more efficient than traditional procedures; professionals are a barrier: they want to keep on working as they always have done, and consider it a threat for their job.
- • • Organisations need to be sure that the cultural change is manageable, has health economic benefits and they are able to fit their HR and payment for these 'new professionals'.

7 Best Practice examples and National case reports

7.1 Telemedicine services directly offered to patients (“D2P”)

7.1.1 D2P Best Practice: Austria

Telemonitoring of diabetes patients over the portal healthgate.at telecommunication between different healthcare providers in the project health@net <https://www.healthnet.or.at/products/Healthweb/>

7.1.2 D2P Best Practice: Bulgaria

The “Telecentres Project” includes 10 towns and/or villages in the Septemvri parish and enables blood pressure measurement from a distance as well as online consultations with GPs and cardiologists.

7.1.3 D2P Best Practice: Cyprus

DITIS is a project which is being developed since 1999. It has been successfully deployed by PASYKAF for the home care of cancer patients. It enables the effective management and coordination of healthcare teams, for the continuous assessment, diagnosis and treatment of patients at home or wherever else they may be.

7.1.4 D2P Best Practice: Finland

Secure information exchange with patients by SMS messaging is used by hospital districts.

Citizen initiated recording, where a patient can transfer personally conducted laboratory tests into the patient record system of the health care provider is in use in several hospital districts and some health care centres. Teleconferencing where the physician is at one location, while the patient and the nurse are at another is used in several health care centres.

7.1.5 D2P Best Practice: France

ANTADIR, the nation-wide initiative for integrated care, coordinating care for lung-diseases is a successful but isolated example of telemedicine.

The telemedicine network of Guiana – created in 2001 – connects the isolated health centres of Guiana to the hospital of Cayenne, thus alleviating the geographical isolation of the medical structures of the Guianese interior. The network is enabled by the presence of the French space agency CNES in Kourou. Predominant medical applications are teleconsultations in many medical specialities and teleepidemiology (early epidemiologic alerts).

7.1.6 D2P Best Practice: Greece

A project for the provision of eHealth home-based rehabilitation, follow-up and home hospitalisation services in patients with advanced stages of chronic diseases has been run by the eHealth Unit of Sotiria Hospital, Athens. The specific project concerned chronic patients suffering mainly of advanced stage COPD, with a past history of multiple hospital admissions.

FRONTIS; “Hospital at Home”: The Hospital at Home Department of Hygeia Hospital in Athens aims to actually convert the patient's home into a hospital room in order to safely and efficiently treat at home a wide spectrum of medical conditions, which otherwise require management in a hospital. The aim is to treat at home almost any patient who does not require surgical intervention or close monitoring in an intensive care unit.

7.1.7 D2P Best Practice: Luxembourg

An interesting project is the “Luxembourg Heart Failure” telemonitoring project. (When heart failure patients face the transition from the hospital setting to home, they need close follow-up to prevent deterioration and exacerbation of their disease.)

7.1.8 D2P Best Practice: The Netherlands

Self management and telemonitoring for diabetes is offered by the Diamuraal foundation. Portavita supports self-management of anticoagulation therapy through telemonitoring and teleconsultation. Other telemonitoring services are offered to citizens with Chronic Heart Failure (CHF), Obstructive lung diseases (COPD) and Diabetes in many regions like e.g. Amsterdam, Zwolle, Groningen, Maastricht and Rotterdam.

An innovative home care concept enables elderly to live on their own at home. A virtual care centre and nursing home is provided through personal broadband communication combined with selected nursing elements. The audio-visual surveillance system developed for the VieDome health care project can be adapted to a wide variety of users in different environments. It ensures also privacy, security, trust and confidentiality of the clients.

7.1.9 D2P Best Practice: United Kingdom

(England) Kent County Council has invested £1 million in a telehealth pilot scheme involving 275 people with chronic illnesses such as diabetes, heart and chest problems. The evaluation is currently ongoing but the results look promising.

(England) Telecare offers the promise of enabling thousands of older people to live independently, in control and with dignity for longer. £80 million, across 2006-07 and 2007-08, was announced for a “Preventative Technology Grant” to support 160,000 older people to stay in their own homes.

(Scotland) The “Tele-booth” HealthPresence solution links clinicians with patients at a distance by video conferencing. Consultation will include medical tests such as blood pressure, oxygen saturation, weight, pulse rate and spirometry.

(Scotland) 14 minor incident units of hospitals are connected through video-conferencing to Aberdeen for online support. After 5 years as a project it has become a regular service.

(Scotland) More elderly people want quality of life and live at home as long as possible. But personnel to support (especially) chronic ill, elder citizens at home is lacking.

Fourteen continuous projects exist in Scotland, among them examples in the field of paediatric telemedicine, teleneurology and teleendoscopy. The projects were selected based on criteria defined by a reference group.

7.2 Telemedicine in support of collaboration of health professionals (“D2D”)

7.2.1 D2D Best Practice: Denmark

Teleradiology: The aim of the “lookup of X-rays and descriptions via the Internet” project (2002-2005) has been to give healthcare professionals direct access to central patient information, which is stored in another county or in the hospital’s own RIS (Radiography Information System) or PACS (Picture Archive Communication System),

Teledermatology is based on the sending of digital images of skin conditions, as a supplement to the traditional cooperation and patterns of patient referral between medical practice and specialists in dermatology. The overall aims of the teledermatology project (2002-2005) have been to:

- • • Replace/supplement general referrals to skin specialists with telemedicine consultations.
- • • Assure patients of equal and quick access to specialist assessments of skin images through their own doctor.
- • • Support continuing training of GPs through communication with skin specialists.
- • • Establish nation-wide provision for telemedicine skin image consultation.

7.2.2 D2D Best Practice: Estonia

The Baltic International Telemedicine Network (BITNET) includes applications for neurophysiology, medical diagnostics, and radiology, as well as videoconference facilities for urgent and scheduled consultations, medical rounds, and education programs.

Application of telemedicine started with teleconsultations in neurology and family medicine.

Partnership for the heart: German-Estonian health project for the treatment of congenital heart defects in Estonia. (Publ. Aug 2005)

- • • The training of Estonian physicians in Germany,
- • • Training courses conducted by German and Estonian specialists in Estonia and
- • • Use of telemedicine for consultation on a continuous basis.

7.2.3 D2D Best Practice: Finland

Teleradiology is in daily use in several hospital districts, where DICOM pictures and shared archives are common. Telelaboratory services between organisations are common. 90% of the hospital districts had some method for the electronic distribution of laboratory results in 2005. Health care centres purchased video conferencing in order to consult a specialist of a hospital. Telepsychiatry and teleophthalmology are among the services used.

7.2.4 D2D Best Practice: France

Many regions have carried on developments. Since 2000, two types of projects are commonly under construction. First are regional interoperability platforms to interconnect diverse healthcare organisations



and networks and link telemedicine to other medical data interchanges. Regional Hospital Agencies (Government local representatives) develop these tools and coordinate them with specialized videoconference bridges on high speed IP networks.

7.2.5 D2D Best Practice: Greece

In Sikinas a teleeducation scenario has been implemented: The medical staff working in rural primary care medical centers in Sikinas, are physically and digitally isolated and so have great difficulty in ensuring their continuing education.

7.2.6 D2D Best Practice: Ireland

The main disciplines using telemedicine are: radiology, pathology, neurosurgery, oncology and paediatrics, and the main applications were teleradiology (25 hospitals), videoconferencing (16) and telepathology (5).

Some examples

- • • Tele-Radiology: This is the largest telehealth service in Ireland;
- • • Tele-Cardiology: St. James Hospital, a major tertiary hospital in Dublin, links with Sligo General Hospital;
- • • Tele-Oncology: The Medical Oncology team at Sligo General Hospital (SGH) in the northwest of Ireland commenced in 2002 to expedite patient cases with specialists in St. Luke's and St. Vincent's University Hospitals (SVUH);
- • • Tele-Primary Care-Surgical Consultations: Killybegs Community Hospital. From its Telehealth Unit, regular video-consultations are carried out between (a) patients and the primary care team and (b) a general surgeon in Letterkenny hospital.

7.2.7 D2D Best Practice: Norway

Some examples of Telemedicine services are:

- • • Sounds, images and videos recorded by primary care doctor and transmitted to specialist;
 - Examples are stethoscopy, dermatology, ear-nose-throat conditions, examination of optic fundus for diabetes patients;
- • • Telepathology, pathological support of hospitals lacking this capacity;
- • • Teleradiology, as imaging goes digital, support can be given at distance;
- • • Videoconferencing for psychiatry and for cancer care.

7.2.8 D2D Best Practice: Romania

The National Communications Research Institute (INSCC) from Bucharest has coordinated several National Telemedicine Projects, among them: Implementation of a Multimedia Platform for Complex Medical Teleservices (TELMES) with two pilot regional telecentres at Pitesti and Iasi for teleradiology, telepathology, teleconsulting, telediagnosis, telemonitoring. The project develops a multimedia network for integrated teleservices with the aim e.g. to optimise the medical decisions to increase the quality and decrease the costs: to expand of the services range of health professionals in healthcare.

7.2.9 D2D Best Practice: Sweden

Teleradiology has been set up in cooperation with the Telemedicine clinic in Barcelona to balance the lack of radiology specialists.

- • • Pathology project: In south east of Sweden a new infrastructure based on video infrastructure is installed and regular meetings are setup between these hospitals, with expert nurses locally handling the equipment.
- • • Eye bottom pictures in Örebro: The very specialist in analysing eye bottom pictures is situated in Örebro between Stockholm and Gothenburg. Professionals all over the country contact her to share their pictures using web sharing and audio conferencing.
- • • Primary care in Västerbotten: Västerbotten is situated in the North of Sweden. Distance from north to south is some 300 km and distance from coast to the Norwegian border is some 400 km the three hospitals are situated in the east near the coast. Instead of travelling in taxis, ambulances or private cars, each primary care is equipped with video conferencing equipment. All personnel at the primary care units can handle the equipment and it is the responsibility of the personnel at the hospitals to take care of Video patients at the same conditions as “IRL” patients.

7.2.10 D2D Best Practice: Spain

Based on <http://www.itelemedicina.com> which includes reference telemedicine projects or services operating in Regions in Spain from 2003 up to today, e.g.

Andalucia: A virtual environment to support vital emergency also allows teleconsultation between health professionals and training.

Baleares: The Hospital has created a service that allows, from primary care centers, to make a request for a consult and send the pictures of their diagnosis.

Canaries: The telemedicine project consults through teleconsultation in psychiatry, radiology and dermatology.

Castilla y Leon: Telecardiology is being practiced in some centres for Primary Care Community. According to sources in the regional government, results and the demand for this service has influenced an increase of the coverage to 100 centres. (January 2004).

Catalonia: According to the Catalan Institute of Health (ICS), a total of 282,908 visitors have used the online service to be offered through the webportal of which 137,805 users have requested medical consultation.

Galicia: In regard to telemedicine, sources in the Ministry announced strong momentum, expanding their existing applications (radiology, ophthalmology and dermatology) to other clinical specialties such as psychiatry, the Ministry is working on creating a Telemedicine Centre Address.

7.2.11 D2D Best Practice: The Netherlands

KSYOS TeleDermatologie®: Through this Teleconsultation-service a General Practitioner can consult a dermatologist via the internet. This reduces 50 to 70% of patient referrals to the dermatologist!



8 Vision for Europe 2020 : Integrated Telemedicine Services

In most nations around Europe there is a keen awareness of the need to transform healthcare systems to cope with current and future social and medical challenges . Telemedicine and telehealth can be tools to meet those challenges as long as they as they are being routinely used to support the care process.

To be sustainable, telemedicine and telehealth should not be considered as separate from, but as an integral part of eHealth deployment and infrastructures. eHealth infrastructures will be the common platform for all digital services within healthcare.

This is required both in terms of efficiency and interoperability and to safeguard patient rights to privacy and data protection on one hand and to accessibility and usability of services on the other.

8.1 Facilitating change for professionals and patients

Introduction of Telemedicine services is complex and requires many preconditions to implement successfully and sustainably on a larger scale. One of the main lessons learned from first generation Telemedicine is that services should not be positioned apart from regular care but integrating them requires 'changing some rules of the game'.

Integrating telemedicine services therefore implies facilitating change management. This is considered the key success factor in a statement from Scotland: "Most important: Countries should implement a strategic approach at the top and connect it with the bottom for implementation in practical daily life. This does not go by itself, but requires a dedicated organisation to make it happen."

Lack of facilitation is also recognised by other experts as an important reason why successful pilots do not lead to large scale implementations. Policy makers should establish a framework to facilitate introduction and support for both patients and professionals.

8.2 Involving professionals and patients in eHealth through telemedicine

Many professionals consider eHealth as something to do with computers, instead of patients. In many member states, difficulties have been encountered in involving healthcare professionals or even better, getting them be the driver of change when deploying eHealth services.

This is not the case for telemedicine initiatives. Most initiatives in telemedicine were started by, or in close cooperation with professionals.

Telemedicine is seen by many professionals as an improvement of their core business and seen by many patients who use the services as an improvement in quality of life. It is therefore recommended to use this commitment of these professionals and patients as an enabler for implementing other elements of their eHealth strategy.

In other words, Health Professionals should be encouraged and enabled to integrate telemedicine as part of their professional relationship with patients in suitable treatment but

- • • Health Professionals need to understand and have confidence in the information and communication technologies used;
- • • Health Professionals need clarity on their responsibilities and revenues to invest their time and effort into telemedicine services.

8.3 Establish a culture of interdisciplinary and cross-sectoral collaboration

Telemedicine has been held back from widespread deployment by many of the same barriers that have faced eHealth. But for telemedicine the barriers of culture and organisation are even more explicit as almost by definition telemedicine crosses organisations, professional specialties, structures and often most crucially budgets. This can be and often is seen as a threat for professionals, managers, administrators and budget holders. In the early pilots this was mostly overcome by local commitment and enthusiasm but this will no longer be enough as telemedicine services are rolled out more widely and are targeted at new types and levels of service. This is an issue of education which will need to be addressed across the spectrum of healthcare stakeholders which can be greatly helped by intelligent sharing of knowledge and experience from opinion leaders and early adopters

8.4 Making National strategies for Sustainable Telemedicine explicit

The following actions may help European countries to stimulate uptake of sustainable telemedicine as an integrated part of care, helping to solve healthcare (future) challenges:

- • • Formulation of scenario's for possible roles of telemedicine in healthcare in 2020. This vision addresses 'the main challenges of the changing healthcare landscape' and includes cross-border aspects of (tele-)healthcare.
- • • Formulation of an explicit telemedicine implementation strategy for realisation of the preferred scenarios derived from and within the overall eHealth Strategy.
- • • Formulation of business models and case studies which can then be put into the public domain to help and encourage the growth of routine use of telemedicine support for new and improved health services to patients/citizens.

8.5 Establish a European supporting framework for Sustainable Telemedicine

Additional, coordinated actions will have to be implemented in cooperation of all European countries together with the European Commission to lower the thresholds for future deployment of sustainable services.

- • • **Establish a true interdisciplinary telemedicine service framework** to overcome the multi-disciplinary scattering of many individually designed services leading to the duplication of organisational, technological and regulatory efforts.
- • • **Establish a reference system of better structured definitions and nomenclature for tele-services** in support of better comparability of telemedicine solutions. Here the approach to classify telemedicine/telehealth services as “B2B” (i.e. health provider to health provider) and “B2C” (healthcare service directly offered to the consumer/patient) might be an important step to the simplification of nomenclature.

9 Annex: Environment of the EHTEL Task Force Sustainable Telemedicine

9.1 Networking and cross-stakeholder dialogue

The European Health Telematics Association (EHTEL) provides a particular opportunity for cross-stakeholder dialogs and has already established joint positions e.g. for the “added value of eHealth for the management of chronic conditions” in close collaboration with European associations representing Hospitals (HOPE and EHMA), Physicians (CPME, UEMS), Pharmacists (PGEU, EAHP), Nurses (EFN) and quality experts (ESQH). Further networking opportunities are offered through the representation of specific stakeholders within the organisation like the

- • • Ministry of Health Group (former Healthcare Authorities Group): This group brings together representatives of health ministries and equivalent bodies from across Europe, in order to build on their experiences in the development of eHealth and telemedicine. It also serves as advisory board for some EHTEL projects;
- • • EHTEL/ELO-network: This network of “EHTEL-Like Organisations” brings together local, regional and national entities whose mission, like EHTEL’s, is to promote the implementation and use of ICTs in health and social care. With the progress from strategies and blueprints to large scale implementation projects, this group emerges into a network of National eHealth competence centres, bringing together organisations like MEDCOM, gematik, NICTIZ, Arge ELGA, Carelink, KITH etc.

9.2 EHTEL “4C of Healthcare” Approach

In the framework of a 2007 EHTEL conference it was concluded that “Continuity of healthcare is a key element of agendas in Europe. This leads to the challenge to enable improved information management and patient-centred collaboration amongst all health professionals, e.g. physicians, community pharmacists and hospital pharmacists, nurses and across a wide range of care environments e.g. in hospitals, private practices, pharmacies and in community and homecare settings. Connecting people in health and social care will benefit from the application of IT in support of Continuity of care, Collaboration between stakeholders, better Communication safeguarded by Confidentiality.

9.3 HEALTHWARE project

The HEALTHWARE project aims at validating and stimulating DVB-RCS based telemedicine solutions. DVB-RCS technology offers satellite reception and transmission capabilities from anywhere, solving terrestrial network problems, and provide rates that allows to run interactive applications based on videoconferencing like collaborative staff meeting, teleexpertise, teleconsultation, training, etc. The DVB-RCS technology is now mature and becomes a cost effective way to achieve the deployment of value-added solutions for medical practice and care management.

9.4 Healthware User & Citizen Open Group

The Healthware User and Citizen Open Group (UCOG) , created in the framework of the EU co-funded Healthware project aims to gather not only the medical users involved in the Healthware pilots of the project but also the numerous experts, decision-makers, representatives of patients and citizen associations, actors or beneficiaries of telemedicine solutions in Europe.

The User and Citizen Open Group represents an open space to exchange and discuss the main issues and strategies relative to the development of telemedicine solutions in Europe. The UCOG is contributing in this way to a more accurate definition of the user needs, and to an increased knowledge of the implementation's technical, organisational, financial and legal aspects on the European territory, so as to define at best the opportunities of development and the organisational model required for a long-lasting implementation and penetration of these satellite-based telemedicine systems.

9.5 Healthware telemedicine workshops - co-organised by CNES, C2Team and EHTEL

As the project partner responsible for dissemination in the EU co-funded Healthware project, EHTEL - together with other partners - has co-organised two telemedicine workshops and demonstrated particular expertise moderating telemedicine expert sessions:

- • • Vision for Satellite Telemedicine for Europe. Connecting people through innovative telemedicine solutions (e.g. a session on “Telemedicine in Europe: achievements and perspectives”) at the Med-e-Tel 2006;
- • • Health Professionals’ and Patients’ expectations about Telemedicine: How far do they match? at the TTeC 2007.

Both workshops gathered qualified experts from all over Europe, who reported both on the level of strategic, business and evaluation studies as well by demonstrating quite concrete implementations with obvious benefits for the patients and with first hand experiences of “lessons learned” of the health professionals. EHTEL will continue the cross-stakeholder dialogue on telemedicine together with the Healthware project partners – eventually also in support of the preparations of the European Commission for recommendations on chronic diseases and telemedicine.

9.6 Telemedicine related Position papers by the EHTEL Patient Task Force

The EHTEL Citizen and Patient Task Force, which is in fact a hybrid group both serving as stakeholder representation and also producing working documents, has done some work in the framework of the Healthware project:

- • • “eHealth – Care in the Home. A Position Paper, Prepared by the EHTEL Patients’ and Citizens Task Force”. September 2006.
- • • “eHealth and Patient Safety. A Position Paper, Prepared by the EHTEL Patients’ and Citizens Task Force”. September 2006.
- • • “eHealth: The Electronic Patient Record. A Position Paper, Prepared by the EHTEL Patients’ and Citizens Task Force”. September 2006.

Those papers have been firstly distributed at the World of Health IT in Geneva 2006. Then – with an emphasis on the first one – they have been presented to the Tromso eHealth and Telemedicine Conference in June 2007 and received very positive connotations.






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