



Competitive Health Services

Promoting innovative eHealth services across the Northern Periphery

Telemedicine and eHealth provide an alternative way of delivering healthcare services to people in remote or rural communities where access to health services might be limited. This is particularly relevant in the Northern Periphery, which is geographically vast and sparsely populated.

Competitive Health Services project aims to develop health services for the residents of the Northern Periphery by

- developing and implementing innovative eHealth solutions and
- promoting transfer of the best practices in the Northern Periphery

Particular focus will be on eHealth services for primary care, chronic conditions and remote specialist services.

The implementation is carried out in phases:

- first by mapping eHealth services in the partner countries, which enables selection of the best practices for piloting
- then assessing the health care sites for their technology readiness, so that services are piloted where they are most likely normalised and integrated
- and finally launching pilot services in selected sites.

Mapping of eHealth services

We have now completed the mapping phase of the project and have identified the best practices and innovations in the Northern Periphery by analysing existing services in Finland, Sweden, Norway and Scotland. Attention has also been given on service needs and gaps and country specific policies and regulations. The results of these surveys will be published later this year as a printed report and will be available on-line at our website.

Utilization of the Normalisation Process Model

In order to ensure development of eHealth services that are sustained beyond the end of this project, we will utilize a Normalisation Process Model in the implementation. This model is described in more detail in the following article by Dr. Anne MacFarlane.

International Seminar in Inverness, Scotland

The Centre for Rural Health will host an International Seminar in Inverness, Scotland, on the 4th and 5th of February 2009. This seminar will bring together representatives from health care sites where new services will be piloted, eHealth service providers and the project consortium.

The aim is to 'match' the identified best transferable eHealth practice or service model with the most appropriate pilot site. There will also be an opportunity for the eHealth practice or service representatives to showcase their work.

eHealth Service Development using the Normalisation Process Model

Dr. Anne MacFarlane, Lecturer in Primary Care, Department of General Practice, National University of Ireland, Galway



E-Health offers the opportunity for information communication technologies to impact on, and improve, people's access to quality healthcare, particularly in rural and remote areas. The promise of e-Health has been realized in certain settings and for certain kinds of services. For instance, Finland has an excellent track record of implementing telemedicine and electronic patient records.

However, the promise of e-Health to become a routine and taken-for-granted way of service delivery across health systems has not been realized. Even countries like Finland are familiar with the fact that it can be very difficult to implement a new e-Health service to the degree that it becomes sustained in use in every day practice. It is still common to hear about an e-Health service that does well at a pilot site or during a demonstration phase but, does not endure beyond that. This can be very frustrating for service users who 'lose' a service once the pilot or demonstration phase is over as well as being frustrating for clinicians, service planners and policy makers.

There have been important advances in understanding the implementation of e-Health services in recent years. One exciting development is the introduction of the Normalisation Process Model (May, 2006). This is a sociological model, based on ten years empirical, qualitative health services research in the United Kingdom. The model aims to (i) assess the potential for innovations like e-Health services to become routine and taken for granted in day to day healthcare work and (ii) identify levers and barriers to that outcome.

The NPM draws attention to clinical encounter (e.g. how do doctors and patients experience the e-health service? Can they do the work that they are supposed to do together? Does the technology affect their relationships in any way?) as well as the wider, organisational, institutional context (what tasks need to be done to make sure that the e-Health service runs smoothly and is there an acceptable 'division of labour' in place among the relevant staff? Are there sufficient financial resources for the e-Health service?).

In this project, we are using the NPM as our theoretical framework. We will use the model to gather information about potential pilot sites in Finland, Sweden, Norway and Scotland. We will assess the potential of those sites to receive an e-Health service from one of the other countries. We can also use the model to monitor the pilot service once it is in place to identify levers and barriers to its long term success and, ideally, to ensure that the pilot service becomes a new and routine way of working.

May, C. A rational model for assessing and evaluating complex interventions in health care BMC Health Services Research 2006, 6:86 (7 July 2006)

Providing health services in Finland: challenges and opportunities

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Finland is a sparsely populated country and its 5.3 million inhabitants live on an area of 337000 km². The population dens

ity is on average 16 inhabitants per square km² and in the municipalities of the northern part of the country from 1 – 10 per km². Long distances pose a challenge to the delivery and accessibility of health care services.

Public sector covers about 85 % of the health care services and private sector provides 15 % of the services. In the public sector, specialized health care is provided in 21 hospital districts which are organized by municipal federations and primary health care services are provided in 229 health care centres which are overseen by municipalities. The Finnish health care system typically gives an independent role and extensive decision making rights in the provision of health care services to the 415 municipalities (a median population of only about 6000 inhabitants).

Our rapidly ageing population gives rise to an increasing demand for social and health care services and this presents another big societal challenge. In Finland, the proportion of persons aged 65+ is estimated to rise from the present 16% to 26% by 2030. Keeping the proportional per capita consumption of social and health services constant, the number of employees needed for the services should rise from the present 350000 to 480000 by 2030. Because the proportion of working age population will be decreased significantly by 2030, this needed increase in the number of employees would be entirely unrealistic. The northern part of the country is also facing a third challenge due to labour force out-migration which causes labour shortages.

We are faced with challenges but we also have means to address them. One of the most important solutions is modern health care information and communication technology (ICT). A lot of expectations have been laid upon ICT and a large number of innovative healthcare applications have been developed. They consist of different kinds of eHealth applications: information transfer solutions for professional communication and self-care applications, and last but not least, solutions enabling more efficient and direct document and information sharing between patients and professionals.

In Finland, all hospital districts and health care centres use almost exclusively electronic patient records (EPR) in their everyday work. The exchange of electronic patient information between health service providers necessitates the use of high data security networks, which can be realized through different kinds of Intranet solutions or secure Internet connections. This cross-enterprise data exchange has increased rapidly in Finland. Most health centres and hospitals use electronic referrals and are able to exchange laboratory results and radiology images. Digital data depositories in individual health care institutions are in active clinical use and secure data connections enable the communication of electronic patient information.

On the national level, we are building an IT architecture which is based on legislation and its implementation is mandatory for all health care providers by 3/2011. It consists of local EPRs using common data structure and technical standards, the national eArchive which allows online access to all EPRs with patient's consent, a national electronic prescription database, and an eView for citizens, enabling them access to their own patient and log data.

Currently general health related e-Information is available everywhere, but personalized communication between professionals and citizens is at an early stage, with active ongoing development. High eLiteracy among health care professionals and the general population and a high coverage of computers and broadband networks provide a fruitful soil for further delivery of health services also in the peripheral areas of our country in the future.

Project partners

The Northern Ostrobothnia Hospital District



The Northern Ostrobothnia Hospital District (NOHD), the Lead Partner of the project, is the northernmost university hospital district of Finland. It is a municipal federation of 39 members and it provides specialised medical care services for the 370 000 residents of its member municipalities in the Northern Ostrobothnia. NOHD maintains and owns three hospitals: Oulu University Hospital, Oulaskangas Hospital and Visala Hospital.

Oulu University Hospital is responsible for the provision of highly specialised health care services, such as open heart surgery, neurosurgery and radiation therapy in the northern Finland. This area of responsibility spans across five hospital districts and covers a vast geographical region including almost half of Finland with a population of over 720 000 people.

NOHD has been one of the early adopters of ICT in service delivery, largely due to the sparsity of population and long distances. Development of ICT-based services began in 1990 and teleradiology, tele-videoconferencing, distance education and a web-based multimedia medical record have been integrated into the service structure. Special focus has been placed on wireless technology and its utilization in the efficient communication between primary care and secondary care.



From left: Juha Korpelainen, Seppo Heikkilä, Minna Mäkinieniemi, Pasi Parkkila and Jarmo Reponen

The project team includes:

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Photo: Ippo Okkonen

The County Council of Västerbotten and the University of Umeå



Västerbotten County Council is a regional authority with the responsibility for delivering primary health care to the 250 000 inhabitants of Västerbotten County, and specialised medical care to the almost 1 million citizens in Northern Sweden. Västerbotten County council owns and operates the University Hospital of Umeå which also houses the Faculty of Medicine at Umeå University. Research and development are carried out in collaboration with a broad spectrum of subjects and disciplines relating to human health. One important area for research and development is biomedical engineering, comprising technical areas such as applied electronics, signal processing, measuring techniques, biomechanics and fluid dynamics. Education in biomedical engineering for Master and Ph D students is also carried out.

Sweden has an excellent infrastructure, where almost all parts have access to broadband that facilitates reliable transfer of all types of files. All health care centres have videoconference equipment installed. In the County Council of Västerbotten we have several innovative clinical applications of telemedicine in use. Many units have been involved in applying telemedicine since the late 1990's. Some examples of applications are: telemedicine support for district nurse surgeries, diagnosing dermatological conditions, psychiatry, dental care, speech therapy, VR games for remote stroke diagnostics and rehabilitation, to mention a few.

Umeå University is the largest and oldest university in northern Sweden (29 000 students, 4 100 employees). Research in the areas of life sciences, life quality, and health and well-being are among the strong areas of the university. The Department of Informatics at Umeå University studies the relationship between people and information technology: in the home, at work, with mobile applications, in organisations and in specialised settings.



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The Q-Life research group in the department explores new ways in which information technologies can be designed and applied to enhance life quality for a wide range of individuals: in everyday life, in clinical settings and in other specific circumstances. We have developed and experimented with many novel interactive devices and environments, with a particular focus on psychological well-being, personal creativity, health and mental and physical activity. We work closely with many organisations, including local authorities and others concerned with catering for the needs of groups such as the elderly and the mentally disabled.

We have broad experience of working within international and national collaborative projects related to this theme, including EMMA (Engaging Media for Mental Health Applications), The Cave or the Telescope (studying the use of virtual and augmented reality as aids to learning for mentally disadvantaged children), ENGAGE (methods for designing and assessing technology with specific emotional effects) and MobiSams (investigating the role and potential impact of mobile collaborative technology on healthcare in institutions and on homecare practices). In the MAMA (Mobile Augmented Memory Aid) project we focused on older people who remain in good general health while experiencing some problems associated with modern lifestyles related to their mental condition. Q-life is a founding member of CHAP (Centre for Health and Participation in the Ageing Population), which brings together researchers from the departments of Informatics, Geriatric Medicine, Health Economics, Nursing, Occupational Therapy, Physiotherapy, Social Work, Sociology, Public Health and Clinical Medicine. The mission is to enhance health, to prevent disease and disability, and to promote rehabilitation of people as they age.

The Norwegian Center for Telemedicine



The Norwegian Centre for Telemedicine (NST) is located in the city of Tromsø in the north of Norway. The Centre's mission is to produce and provide knowledge about telemedicine and e-health, both nationally and internationally. The goal is to ensure the integration of telemedicine services into health care. NST is internationally renowned and has been a World Health Organization (WHO) Collaborating Centre for Telemedicine since 2002.

Strong Research Focus

One of NST's strengths is applied research related to developing practical telemedicine solutions. Out of NST's staff of around 100 people, more than half is engaged with research within technology, organisations, pedagogics, social sciences and clinical studies. At present, the Centre has some 15 PhD students making groundbreaking research within telemedicine.

Our projects range from needs assessment to the entire process of developing, implementing, and evaluating telemedicine and e-health solutions.

The Centre's mission is to provide concepts and advice on equipment and forms of organisation in order to help healthcare providers use telemedicine services effectively. We provide guidance and advice for those who want to implement services like teledialysis, teleradiology, telepathology, video conferencing and more.

International Cooperation

As part of the work as a WHO Collaborating Centre for Telemedicine, NST seeks to engage in international cooperation. Over the years, the Centre has done telemedicine feasibility studies and initiated collaboration in countries such as Botswana, South Africa, Sri Lanka, Nepal, Cuba, Afghanistan, Russia, Cambodia and Palestine.

Presently, we are implementing a telemedicine network in Palestine, connecting the rehabilitation centres in Jerusalem, Bethlehem and the West Bank by video conference equipment. This project will improve the health services to the handicapped by allowing patient information to be sent from one centre to the other, when the patients themselves are not able to travel between centres.

Tromsø Telemedicine Laboratory

NST is also host and leading partner in a newly established research institute named Tromsø Telemedicine Laboratory (TTL). In TTL, the NST and nine other research partners will develop new technologies to ease the increasing burden on the health care system, due to an aging population and more chronic diseases. The work is sponsored by the Norwegian Research Council (NFR).



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From left: Line Helen Linstad, Frank Larssen, and Bente Christensen

The University of Aberdeen, Centre for Rural Health



The University of Aberdeen is Scotland's third oldest and the fifth oldest in the UK. Aberdeen is an international university built on serving one of the most dynamic regions of Europe. With over 13,000 students, and over 3000 staff, we are at the forefront of teaching and research in medicine, the humanities and sciences.

The Centre for Rural Health (CRH) was founded in 2000 as a department of Aberdeen University. Since 2005 CRH has been operated as a collaborative venture between the University of Aberdeen and the UHI Millennium Institute.

The CRH mission is to: *'advance knowledge of health and health services in rural and remote communities.'* Those communities currently face a number of important challenges including: changes in demography; changes in the nature of health care provision; and increased expectations of the community. CRH is developing the evidence base for rural health care by carrying out relevant primary research; developing collaborative research with social scientists, geographers and policy researchers and bringing the international perspective through appropriate collaborations.

We provide expertise in: evaluation of health care delivery; rural health care policy and management; epidemiology; clinical trials; public health; systematic reviews; data linkage studies; qualitative research; research costing and administration.

CRH has some experience of working on NPP projects having previously been partners in the 'Our Life As Elderly' (OLE) and 'Extreme Weather Conditions' (EWC) projects.

For further information on the Centre for Rural Health please click [here](#).



From left: Lee Dowie, David Heaney and Mary Wakeling

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The Department of General Practice, National University of Ireland, Galway



The National University of Ireland, Galway was founded in 1845 (as Queen's College, Galway) and is now a thriving institution with over 15,000 students (including students from over 40 countries), taking courses in six colleges/faculties.

The Department of General Practice was set up in 1997 and currently there is a staff of twenty. Research funding in excess of €900,000 was secured by the department as lead applicant, with a further €6.3m in collaboration with other departments and institutions.

The Department of General Practice has a research focus on the north-western sea board region of Ireland and has a particular interest in professional practice in rural areas. The Department's first study on telemedicine was led by Dr. Anne MacFarlane, 2004-2005. This study A Qualitative Review of Telehealthcare Services in the North Western and Western Health Boards provided a portfolio of e-health activities in the region and an analysis of service users' and service providers' experiences of telehealthcare and its implementation. Follow up research in 2005-2006, Telehealthcare for Arranmore Island, Co. Donegal: A Consultation and Development Project concentrated on a remote, island community setting. Participatory research methods were used to consult with the islanders and service providers about the potential for video conferencing equipment to enhance access to health and social care services.

International Collaborations

Dr. Anne MacFarlane is involved in other international networks and activities that will contribute to this EU NPP research. She is member of an expert advisory group for a UK Service Delivery and Organisation funded project Understanding The Implementation and Integration of E-Health Services, led by Professor Frances Mair, University of Glasgow. Dr. MacFarlane is also a member of an international Normalisation Process Model study group, led by Professor Carl May, University of Newcastle-upon-Tyne. The Normalisation Process Model has been developed to understanding how new clinical techniques, technologies and other complex interventions become routinely embedded in practice. The model offers practical value (understanding how new ways of thinking, acting and organizing become routine in practice) and a conceptual map (process evaluation of complex interventions and for the organization of implementation processes) for researchers, service planners and policy makers interested in e-Health services.



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