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4-2008

CREATING SUSTAINABLE RURAL HEALTHCARE NETWORKS THROUGH NEW TECHNOLOGY AND LEARNING OPPORTUNITIES

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EUREKA DIGITAL 4-2008

ISBN 978-82-7389-128-0
ISSN 0809-8360

Project Sustainable Rural Health Care Networks

This report is part of the overall project Sustainable Rural Health Care Networks (Sustainable Health). Rural areas in the Northern Periphery face specific challenges as regards to the provision of high quality, coherent and integrated health services. These challenges manifest in the obvious geographic factors including isolation and small dispersed populations, limited public transport and road infrastructure, and the resultant, long distances to hospitals and primary health care services institutions.

There are also significant difficulties in attracting and recruiting qualified and experienced personnel in rural health care services. This is compounded by the increasing centralisation of specialist secondary care services and the increase in the proportion of the elderly population relative to total population.

The Sustainable Health project aims to enable actors to provide high quality, coherent healthcare services in their communities and thereby contribute to the viability of these communities. The project will examine and pilot a number of approaches to address several different aspects of challenges to providing coherent, high quality health services to the population in the Northern Periphery.

The Sustainable Health project is a Transnational project involving partners from four European countries; Norway, Scotland, Sweden and Finland. The partners come from regions all facing similar problems in regards to developing coherent, sustainable health care services.

Partners

- AKMC, Centre for Emergency and Disaster Medicine – Sweden
- UHI Millennium Institute: Morey College and Lews Castle – Scotland
- NHS Western Isles – Scotland
- NHS Argyle and Clyde – Scotland
- National Centre for Telemedicine – Norway
- Tromsø University College, Department of Health – Norway
- Regional Development Centre of Mid-Troms – Norway
- Kemi-Tornio University of Applied Sciences – Finland

The Sustainable Health project is a part of the Northern Periphery Programme and is part funded by the European Regional Development Fund (ERDF).

Project period
01/06/2005 – 01/09/2007

Background

Traditional roles of health care started changing, especially in rural and remote communities. For example recent developments in health policy in Scotland and the UK have shifted the focus of heath care to primary and community services. The changes in the NHS have seen health care practitioners take on roles that are traditionally filled by doctors. One of the most significant transformations has been in the provision of 'Out-of-Hours' care, where health care practitioners including nurses, midwives, paramedics, pharmacists and allied health professionals' started undertaking new and challenging roles in an environment where doctors are not providing out-of-hours care. Noteworthy is that health care professionals in rural communities are finding that to successfully undertake the care and management of unscheduled patients and meet their needs, they have to take on more advanced and specialised roles of unscheduled primary, secondary, pre-hospital care and 24 hour requirements. As a result nurses and other health practitioners require training and support to develop new competencies. They need to enhance their knowledge and skills in relation to the development of new roles within unscheduled care as well as be prepared for autonomous practice without reference to a doctor. It is assumed that solutions like that are extremely important especially in isolated and peripheral areas suffering from unsustainable public services and unprofitable private provision. Modern technology and new ways of learning will play a significant role in adaptation to this changing environment.

In many countries around the world there is great potential offered by the internet (Wei et al 2000, USAID 2000) and a new technology has been considered in term of delivering range of services. Amongst the others, health care policy and professions in the sectors have begun to promote the role of telemedicine in service provision. Methods such as teleradiology, teledermatology, telecardiology, telepsychiatry and distance education are developing now and in the future they may play an important part of every-day life.

The aim of this project is to explore existing opportunities for professionals working in rural areas in the health sector using ICT as a tool for competence building, cooperation and education. The work will look at the accessibility of the higher education in Northern Norway, which is characterized by many isolated and peripheral areas. It will also identify the competences needed to support the new unscheduled health care requirements and it will review the idea of on-line learning. Eventually, using an example of the Scottish solutions

which are already available for the health care sector, the project will look at new ways of delivering services in remote and rural areas of Norway.

This report is part of the work undertaken for the Northern Periphery Programme (NPP) project: Sustainable Rural Health Care Networks and is largely based on three documents: Rural Health Report – Unscheduled Health Care Training & Competences Required and On-line modules available in Scotland (Addison 2005); Sustainable Rural Healthcare Networks – E-learning opportunities in Northern Norway (Furu et al 2005); Sustainable Rural Healthcare Networks – Higher Education for Health Personnel in the northern regions of Norway (Norbye et al 2005). The main objective of this part of the project is to consider sustainable systems for education and upgrading of professional skills in remote and rural areas. The focus is on the need to provide educational and training programs that are tailored for the challenges in the different areas in which the health personnel work.

Problems and potential solutions for health care in rural and remote areas

Characteristic of rurality

Rural areas can be described as sparsely settled places away from the influence of large cities. Rurality can also be determined by the low population density. What characterise rural areas

is that very often provided services are limited or unavailable. Amongst the other these may include access to schools, universities, hospitals.

It has been identified that there are two major problems in rural health (AHCPR 1996. These are:

- underserviced delivery due to a lack or maldistribution of resources, both in terms of money and labour;
- lack of specialty services. Medical specialists often do not have enough 'critical mass' of patients to allow them to economically serve a low population area. The hardship on patients can be particularly demanding in some illnesses, say cancer, in which treatment requires regular long distance travel.

In fact, the rural health care roles should be able to deliver extended and flexible health services, including the diagnosis and treatment of common health concerns, and should improve patient care for the people at community health centres including children, adults, and elderly people.

According to Bache (2001) nurses in rural communities are able to develop the new skills required and are already providing effective alternative services that meet the needs of the patients in the communities in which they live. Experienced nurses, after adequate training, are able to share the workload of the doctors and treat suitable patients independently without reference to the doctors.

Mabrook & Dale (1998) evaluated activities of a nurse led minor injuries unit based in a community hospital situated eight miles away from its sister district hospital in Crawley. They concluded that: *"with careful planning, adequate supervision, and support from multidisciplinary teams nurses can provide a worthwhile and effective service for a local community."*

More specifically, Benger (2002) set out to determine whether nurses working alone in a peripheral unit are able to appropriately request, and accurately interpret, peripheral limb radiographs. The study conclusion was that experienced nurses, working without continuous medical supervision in a remote unit, are able to request appropriate radiographs of the peripheral limbs and can also interpret these films to a high standard, though with a tendency to err on the side of caution.

More recently, McKenna, McCann, McCaughan, & Keeney (2004) investigated the role of an outreach oncology nurse practitioner (ONP) and found that such nurses can provide high-quality services in remote and rural areas. The study also found that to be successful the post holder needs appropriate personal attributes such as flexibility and communication skills and the ability to work independently as well as part of a team.

The studies show that nurses with experience, training and support are able to provide high quality patient-focused health care services in rural communities. The focus therefore for educational providers is to provide sustainable systems for the training and support of rural health care practitioners such as nurses in the gaining of experience and development of the competences required for the new roles in unscheduled care.

NHS Scotland and 'Out-of-Hours' care

NHS Education for Scotland takes the view that out-of-hours practice is one aspect of the broader unscheduled care process with a focus upon new ways of working across both primary and secondary care, and across 24 hours, 7 days a week (Addison 2005).

Such a rapid pace of change in health services means that there is a need to provide the rural healthcare professional with the knowledge and skills to address these 24/7 roles and challenges e.g. to assess and manage the problems presented by people attending a community health centre with a minor illness.

There is a very wide range of unscheduled care competences to be developed by health care practitioners. The NHS Education for Scotland Framework for Care Document (August 2004) identified four main areas of care as:

- elderly,
- mental health,
- vulnerable adults,
- children and families.

The report also encapsulated all of the competencies into four core components (Addison 2005):

- minor injuries management
- minor illness management
- advanced clinical examination
- history-taking, diagnosis and decision-making skills.

These broad headings are helpful in mapping the existing unscheduled care educational provision with the competencies required.

Training requirements in rural areas

There is a huge potential for rural communities to become more self-sustainable. There are many examples (e.g. out-of-hours care) which indicate that with a proper education and training, people can gain experience needed to provide wider services. Therefore there is a great-demand for flexible programmes of education for unscheduled and out-of-hours care training of health practitioners in remote and rural areas. In the same time there is a requirement to provide educational and training programmes that are particularly tailored for the challenges in the different areas in which the health personnel work and that have methods of delivery that are appropriate to meeting the skill development needs of the health professionals.

Distance and on-line learning can provide specialist training to people in remote communities that will help them to update and improve their skills at a reasonable cost.

New technology and learning opportunities

E-learning / on-line learning

E-learning, described also as a web based learning, net based learning, computer based learning, computer based training, online learning, distance learning, distance education, includes an interactive learning processes using digital teaching aids and resources from digital networks (Intermedia 1999). E-learning is defined as any form of learning that utilizes a network for delivery, interaction, or facilitation. The network could be the internet, a school or college Local Area Network (LAN) or even a corporate Wide Area Network (WAN). The

learning could take place individually (guided or instructed by a computer) or as part of a class. Online classes could meet either synchronously (at the same time) or asynchronously (at different times), or some combination of the two. E-learning involves ''a delivery of a learning, training or education program by electronic means. It engages the use of a computer or electronic device (e.g. a mobile phone) in some way to provide training, educational or learning material". It overcomes timing, attendance and travel difficulties.

E-learning is also identified with:

- the convergence of the Internet and learning, or Internet-enabled learning;
- the use of network technologies to create, foster, deliver, and facilitate learning, anytime and anywhere;
- the delivery of individualized, comprehensive, dynamic learning content in real time, aiding the development of communities of knowledge, linking learners and practitioners with experts;
- a phenomenon delivering accountability, accessibility, and opportunity to allow people and organizations to keep up with the rapid changes that define the Internet world;
- a force that gives people and organizations the competitive edge to allow them to keep ahead of the rapidly changing global economy.

Paulsen (2001) states that in the net based education:

- the students are separated according to space and/or time,
- an educational institutions is running the activity,
- the data network is utilized for providing the content,
- the data network is used for communication between students and teachers in the learning process.

According to Paulsen (2001) there are many benefits which are associated with the E-learning. Some of them include:

- using the Internet gives better control over the time. The students may study whenever they want and at the time they want;
- using the Internet gives access to an enormous amount of learning resources;

- using the Internet gives opportunities for cooperation independent of time and place;
- using the Internet give the students opportunities for reflection and time for formulating the comments, answers and questions;
- using the internet gives unique opportunities for utilize the text files that are automatically stored;
- using the Internet gives opportunities for using software for learning purposes;
- using the Internet gives opportunities for using multimedia elements for presentations of the content.

The three main advantages of on-line learning are (Addison 2005):

- flexibility: study courses at any time of the day and week,
- affordability: due to reasonable fees and the ability to study without loss of income,
- accessibility: on line learning gives opportunities to those who cannot attend a campus

On-line learning is a type of distance learning that is increasing in popularity. There is a noticeable move by education and training institutions towards providing courses delivered by the internet. For example, in the health care sector, telemedicine, which is often described as medicine at a distance, and video conferencing, is already a way for GP's to provide support to health care practitioners working in emergency departments and minor injuries units in rural and remote areas.

Specialised training delivered by the internet is an ideal way to help health practitioners in rural areas to keep up with current job demands and new roles. Those who live in rural areas, where specialised training is unavailable or difficult to access, can benefit from distance learning.

The key aspect is the quality of the on-line learning materials, the skill of the on-line facilitator in encouraging interaction and developing activities, and the personal support and supervision that the participants receive.

In the on-line world of teaching, how the course is taught is more important than what is taught. Palloff & Pratt (2001) claim that the key to success in online teaching is in fact not the content but the method by which the course is delivered. In other words pedagogy, not

technology, is the most important factor: online teaching requires a skilled facilitator building a learning community.

In the online learning setting, health care professionals are able to learn new skills without having to spend long periods away from their jobs. Everyone has an opportunity to respond to questions and to be exposed to different perspectives which means that health practitioners learn from each other.

Blended learning

Apart from the E-learning there is also the blended learning approach. Blended learning, also called as hybrid learning, is the term used to describe learning or training events or activities where e-learning, in its various forms, is combined with more traditional forms of training such as "class room" training and face-to- face delivery.

Blended learning can be delivered in a variety of ways. A common model is delivery of "theory" content by e-learning prior to actual attendance at a training course or program to put the "theory" into practice. This can be a very efficient and effective method of delivery, particularly if travel and accommodation costs are involved. This mixture of methods reflects the hybrid nature of the training.

Distance Learning

There are many types of distance learning: correspondence courses, television and radio broadcasting, teleconferencing, videoconferencing, and computer-based training. In fact, distance learning incorporates many different technologies and involves more than the use of computers. Distance learning can take many forms including: paper documents, electronic documents, television broadcasting, videoconferencing, audiotapes, videotapes, CDs, DVDs, live web-casts, email, virtual classrooms, and discussion boards.

There are key educational issues to keep in mind. Each type of distance learning can be effective but some courses and subjects are better to suited to certain types of distance learning methods than others, depending on the recipients and the knowledge and skills to be delivered. Furthermore as Porter (1997) states:

"Distance learning can only be effective when there's a good match of material and media; even then, the course's effectiveness depends on how well the combination of material and media meet the target audience's needs" (p.40).

Indeed the NHS Education for Scotland Framework for Care Document (August 2004) recognises that:

"There is unlikely to be a single delivery model that will apply across all clinical settings and local clinical, geographical and professional contexts will require different solutions" (p.4).

Noteworthy is that in the context of emergency medicine that not all of the training can be achieved via the classroom or internet, because much of the learning has to take place in supervised practice where the practitioners and their supervisors assess their competence to practice Laird (2005). Supervision and how it will be accomplished remotely is therefore an important issue that needs to be addressed when developing the training to be delivered by on-line and distance learning modules. Thus when developing the on-line and distance training programmes it is important to decide the most appropriate ways to deliver the various unscheduled care skills training required.

Unscheduled Care Distance Learning Modules

Nowadays there are numerous learning modules associated to health service that are available at many universities. It is possible that these existing modules could be adapted and converted into on-line modules and applied to meet the unscheduled care competence requirements. This may be a quick and effective way to provide the necessary training to rural health workers.

Educational providers in Scotland have started to respond to the new needs of health practitioners and developed a number of modules which respond to the out-of-hours and unscheduled care agenda (Addison 2005). Therefore at the moment there are many on-line modules designed to train health practitioners. In spite of that there is a constant need to develop more on-line modules for health practitioners e.g. NHS Education for Scotland Framework for Care Document (August 2004) points out that *"it has been suggested that as many as 70% of out-of-hours calls in some settings are in respect of the ill child"* (p.l5). This suggests that it might be worthwhile to focus immediately on the development of specific health care needs of children training in order to meet the likely high demand of children patients in most rural communities.

Therefore there is a need to provide educational and training programs that are tailored for the challenges in the different areas, such as the different demands of patients, in which the health practitioners work. As there are no doubt differences in the geography and in the health service needs of different parts of rural Europe, there is a need for more specific modules to be developed for health professionals in the different rural and remote areas of northern Europe.

NHS Scotland Report: Facilitating Education to Support New Roles (September 2004) states that: "Whatever distance learning methods are chosen, the courses developed by various educational institutions need to be standardised across the country." In other words all e-courses should have the same format and structure but with different content. In this way the on-line modules that are developed could still be tailored for the specific requirements and challenges in the different areas.

Northern Norway and opportunity

Characteristic of Norwegian landscape

Although Northern Norway covers about 45% of Norway, only 11% of the Norwegian population lives there with an average density of 2.66 inhabitants per square kilometer (Furu et al 2005). The county is dominated by mountainous or high terrain varied topography with the rugged coastline, broken by massive fjords and thousands of islands. All of these factors significantly influence every-day life and have a huge impact on community's activity.

Higher education in Norway

Higher education in Norway is delivered mostly by the state-owned organisations which are largely independent and are characterised by considerable academic and administrative autonomy. According to Ministry of Education, Research and Church Affairs (1999) nearly 90 per cent of all Norwegian students decides to choose one of 38 state institutions. There are also 26 non-state universities/university colleges where the other 10 per cent of students is located (Norbye 2005).

Entrance to higher education institutions is normally granted on the basis of upper secondary education. Admission can also be gained on the basis of 5 years of work experience or a combination of education and the work experience (Norbye 2005).

The aim of the universities/university colleges is to make higher education more widely available while increasing the amount of academic expertise available to the different regions of Norway. Although colleges offer shorter courses of a more vocational orientation than those offered by the universities, they make an important contribution to the decentralisation of higher education, which otherwise would not be easily accessible to people living in rural areas in Northern Norway. Many students combine courses at the colleges with courses at universities. (Ministry of Education, Research and Church Affairs 1999).

Because of diversified landscape and many remote and rural areas, which are characteristic for Northern Norway, there has been decentralized education which uses new technology as a way of communicating. For example the Norwegian Centre for telemedicine has established an activity named 'Net base competence building' working with E-learning and eHealth matters (Furu et al 2005). ICT is used to provide net based education and E-learning. For many years technology has contributed to the flexible and open learning possibilities. No matter of geographical distance and the weather conditions, the possibility for education and training is present for everyone, even if the professionals are hundreds miles away.

It has been identified that there is a need for education and competence building, and ICT may play a significant role in delivering it (Furu et al 2005). In fact, during the last years several documents concerning the use of ICT in the public sector (for example *"From partly to whole, A coherent health service"*, The eNorway Action Plan, eNorway) have been published in Norway. These documents were designed as political guidelines defining the overall goals. They should be updated on a regular basis taking into account current progress, including changes in the legislation, new technology and IT infrastructure (Furu et al 2005).

ICT in the Health Sector

In the eNorway Action Plan, the concept of lifelong learning is discussed. The recommendations are to (Ministry on Health and Care Services 2005 cited in Furu et al 2005):

- integrate ICT in all education. Everyone should have equal access to ICT during their education, irrespective of sex, social background and expectations;
- develop and exploit ICT as a separate subject and educational/teaching resource in order to fulfil individuals' and society's qualification requirements;
- establish an infrastructure which allows for the use of ICT in all areas where such would result in a better learning situation;
- develop content and teaching resources which are based on access and active use of ICT in education and teaching;
- develop skills for all partners in the educational system that will enable them to become active users of ICT when organising and implementing teaching processes.

Although those are general recommendations, they are directly applicable for the health sector. Thus, the main focus regarding the use of ICT within the health sector can be summarized as follow:

- information exchange,
- access to sources of knowledge,
- interdisciplinary cooperation (interaction between professional groups),
- establishing professional networks,
- commence making practical use of new tele-medical aids.

Telemedicine in Norway

"Telemedicine", "TeleHealth", "Tele-Care", "Health Telematics", "eHealth", "Medical Informatics" or simply "ICT for health" - these terms are commonly used for describing the same phenomenon. Although the terminologies for "telemedicine" have changed over the years, the Norwegian Centre for Telemedicine has chosen to keep the term "telemedicine" in its name and it uses the following definition:

"Telemedicine is the investigation, monitoring and management of *patients and the education of patients and staff using systems which allow ready access to expert advice and patient information no matter where the patient or relevant information is located"* (European Health Telematics research programme Advanced Informatics in Medicine, 1991).

The Norwegian Centre for Telemedicine is the national resource organization for telemedicine in Norway. Several other organizations in Norway are concerned with various aspects of

telemedicine. In Trondheim, the KITH centre of competence in information and communication technology in health care develops standards for telemedicine solutions. KoKom is a national centre for emergency health care communication strategy, established in Bergen by the Ministry of Social Security and Health. The Interventional Centre at the Rikshospitalet university hospital in Oslo is a research and development centre for minimally invasive and image-guided therapy. There are also five regional health care networks in Norway (Furu et al 2005).

Telemedicine services can:

- make specialist services available locally, and improving their efficiency;
- make health services available directly to the patient's home;
- provide faster treatment for patients.

Telemedicine has many possible applications, and it is helpful to variety of users. For instance, telemedicine can make daily life easier for children with diabetes and their families. With a support of simple equipment parents can receive their child's blood sugar level readings by a text message. Other systems for telemedicine make it easier for patients to contact with their general practitioner by e-mail. If a digital stethoscope is used to record the sound of a child's heart, the primary care doctor can send the recording by e-mail to a cardiologist for a specialist opinion. There are more example like that but what links all of them conclude that telemedicine can safe money, time and accessibility to the service (Furu et al 2005).

Students no longer need to be physically present at a university to obtain an education. Videoconferences and web based distance education services make it possible for the student to follow the lessons over the internet or at a local studio. A professional network on the web can connect the members of a particular medical profession.

Telemedicine Challenges

There are some challenges for telemedicine to be developed. Firstly, the use of telemedicine has the potential to conflict with strict information security regulations. Close cooperation

with Norway's Data Inspectorate is therefore crucial. The inspectorate was set up to enforce legislation protecting the privacy of personal information. Furthermore, reimbursement systems need to address the costs associated with telemedicine consultations. Implementing telemedicine services often requires organizational changes within the health sector. In cooperation with decision makers, key stakeholders and interest groups, NST is dedicated to meet these challenges and promote the efficient use of health care sector resources through the use of telemedicine (Furu et al 2005).

NST and net based education

The Norwegian Centre for telemedicine has in cooperation with universities, colleges and centres of expertise developed education and training programmes (E-learning) for health professionals and social care workers (Furu et al 2005). Helsekompetanse.no is a national eLearning portal for health professionals and social workers, patients and the next of kin, with the main objective of helsekompetanse.no being to establish eLearning programmes for the health sector. At helsekompetanse.no you can also attend net-based courses or participate in virtual networks and there are programmes for patients and their families as well as health professionals. The Norwegian Centre for Telemedicine contributes to development, coordination and distribution of education and training programmes. This eLearning portal provides a framework for the development and implementation of new eLearning programmes(Furu et al 2005).

Example of Decentralised Nursing Education

Since 1990 Tromso University College has offered a decentralised model for nursing education. The aims have been to provide nurses for rural municipalities and to offer higher education to adults who had difficulties in being a full time student due to family responsibilities (Norbye 2005).

The students work in local study groups, connected to a local study centre. The teaching methods are flexible and blended. The students have to meet in Tromso, on campus one week per term. The personal meetings are usually used when training in specific practical fields is needed (Norbye 2005).

E-learning is used throughout the entire nursing program and the students have their own internet based classroom. Videoconferences are used when lecturing to the entire class. The students are often based in different areas of the county. There can be up to five studios connected in a videoconference (Norbye 2005).

In addition to the teaching methods employed in distant learning it is also important to maintain regular contact between the local teacher and the students. These meetings are held weekly at their local study centre. Based on their own preparation the students have the opportunity to participate in in-depth discussions in various fields of study with the other students and teachers.

By providing education through a decentralised educational model, the rural districts have now been able to stabilise the staffing situation in rural areas where previously there were difficulties in maintaining skills and knowledge for nurses. This decentralised model has now been implemented by other University Hospitals throughout Norway and reinforces the need to provide nurse education where the rural students live so as to make them a sustainable workforce in the rural municipalities.

Conclusion

Rapid development of new technology creates opportunities for improving services in remote and rural areas. This can be done for example by using E-learning. As presented in this project, on-line and distance education represents a cost-effective and convenient method of enabling rural health care professionals, such as nurses, to update and improve their skills in any aspects of unscheduled care.

The report has identified much of the training which is required to support unscheduled health care competencies and, by using example of Scotland, it reviewed the on-line and distance learning opportunities already available for the health care sector. Further, the work has looked at the accessibility of the higher education in Northern Norway and potential of developing local community by using new technology.

It has been identified that sustainable systems which will meet the needs of the patients in the rural communities in which the health care professionals work requires: on-line and distance education courses across the country, modules tailored for the challenges in the different

areas, multidisciplinary teams that provide support, planning and adequate supervision, and practitioners who have flexibility and communication skills and the ability to work independently as well as part of a team.

Finally, it is worth reiterating that there may be a need to provide educational and training programmes and modules that are tailored for the challenges in the different areas due to the differences in the geography and in the health service needs of different parts of Scotland, Northern Norway and rural Europe. In other words, the various unscheduled care available modules may not be of use in different areas and would need to be adapted or newly developed as on-line modules to match the specific needs required. To ensure that health care staff working in this new environment is fully trained and supported, a further work and development within area is required.

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