
ITTS: Implementing Transnational Telemedicine Solutions

Final Report





**Northern
Periphery
Programme**
2007–2013

Innovatively investing
in Europe's Northern
Periphery for a sustainable
and prosperous future



European Union
European Regional Development Fund



Welcome to the Final report of the Implementing Transnational Telemedicine Solutions (ITTS) project.

I hope that you will see as you look at this report the breadth of what we have achieved. The aim of ITTS was to implement transnational telemedicine solutions across the Northern Periphery region. This aim was achieved: 25 new telemedicine services were implemented in 48 sites, across six partner countries, within ten demonstrator projects. These services directly benefitted 3890 patients and 560 clinical staff and showcased available solutions to policy makers both within and beyond the Northern Periphery region.

Knowledge exchange between partner countries not only enabled the success of ITTS, it also meant that it has been a real pleasure and privilege working with people across the Northern Periphery on this project.

Dr David Heaney,
ITTS Project Director

About ITTS

ITTS was a project part-funded by the EU Northern Periphery Programme (NPP), which aimed to implement transnational telemedicine solutions at scale across Europe's Northern Periphery Programme area, introducing new telemedicine applications to remote and rural areas in order to improve healthcare delivery for rural communities. ITTS began in September 2011 and built on previous work which mapped telemedicine services available in remote and rural areas of Northern Europe.

Six NPP area countries were actively involved and ten demonstrator telemedicine projects were implemented.

The project teams were:

- Scotland (Lead Partner): Centre for Rural Health, University of Aberdeen
- Finland: Oulu Arc Subregion
- Ireland: National University of Ireland, Galway
- Northern Ireland: Centre for Connected Health & Social Care
- Norway: Norwegian Centre for Integrated Care and Telemedicine (NST)
- Sweden: County Council of Västerbotten

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Executive Summary

Delivering healthcare to remote and rural populations is a significant challenge, requiring innovative strategies to overcome infrastructure deficits, travel difficulties and staffing problems. Telemedicine reduces transport costs, and enables new models of care to be introduced, yet is not in common use.

Implementing Transnational Telemedicine Solutions (ITTS) aimed to implement telemedicine solutions at scale and in a sustainable manner, normalising them into everyday practice and using transnational knowledge exchange to provide advice on best practice. It also aimed to demonstrate whether these services were cost-effective.

Ten demonstrator projects were classified into three themes: videoconferencing consultations (VC); smartphone and internet based mobile self-management; and home-based health services. The ten projects were

- VC links for speech therapy services
- VC links for renal services
- VC links for emergency psychiatry services
- VC links for remote diabetes services
- Smartphones for tracking physical activity
- Smartphones and internet support for diabetes
- Smartphones for inflammatory bowel disease

- Remote support in medical and social care emergencies
- Remote exercise classes for rehabilitation
- Home-based service delivery for patients with multimorbidity

ITTS has supported the development of **25 new services** in **48 sites** in the participating countries.

In total **3890 patients** have used these services as a direct result of the project, expanding access to timely and local health care. The estimate for potential use of these services is over **27,500 patients**.

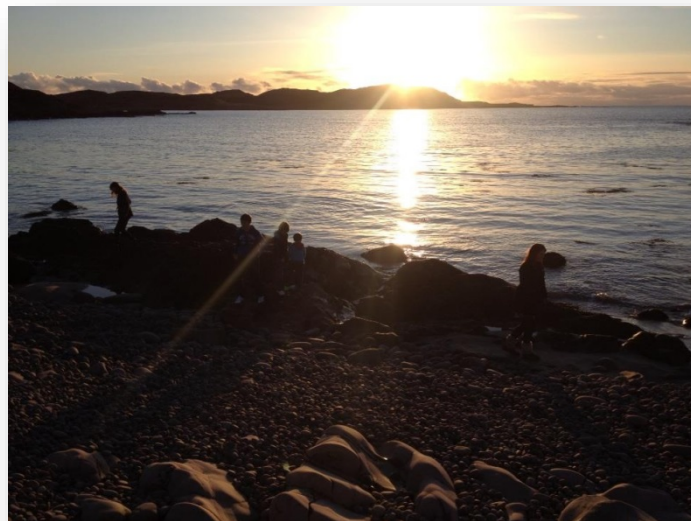
In total, **560 staff** were involved in the demonstrator projects.

It is estimated that **6.03 tonnes** of carbon emissions were saved as a direct result of travel time saved by the introduction of these services.

The evaluation demonstrated widespread positive feedback from patients and from clinicians in regard to the innovations. Some of the services were already demonstrating positive returns on investment, for other services potential has as yet to be realised.

Dissemination of findings aimed to spread of telemedicine into everyday practice in other parts of the region and beyond, and to impact on policy development. This has been achieved through the website, newsletters, leaflets, presentation at international conferences, peer reviewed academic papers, and through social media.

The direct impact of ITTS on service delivery is concrete, measurable, and sustainable, and is the main achievement of the project. Historically, telemedicine has rarely moved beyond pilot projects. By employing knowledge from previous experience, ITTS has showcased what can be achieved.



Background of Telemedicine



ITTS has shown that transnational knowledge sharing can facilitate the implementation of sustainable telemedicine solutions.



A total of 25 new services have now been implemented at more than 48 sites across the programme area.

Background of Telemedicine

Delivering healthcare to remote and rural populations is a significant challenge, requiring innovative strategies to overcome infrastructure deficits, travel difficulties and staffing problems. There is an urgent need to reduce transport costs and carbon footprint, plus a growing acknowledgement that models of long-term care will have to evolve to cope with demographic changes and the economic downturn. Telemedicine may help to provide equity of health service regardless of distance from major centres of care. Yet telemedicine is not in common use; while there have been numerous pilot studies, on completion technology is often withdrawn and the services have not been sustained. The disconnected nature of developments has meant similar problems are often encountered during each new implementation

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[Teleconsultation] has led us to examine the possibility of home VC for selected patients and consider use by a wider range of health care professionals in our discipline.

Prof Sandra MacRury, Consultant Diabetologist



The ten demonstrator projects were classified into three themes:



Video-consultation

- 1** The major benefit of videoconferencing (VC) is to save travel time and costs, either for the patient who can contact their doctor at a site nearer their home, or for the healthcare staff, who need not travel large distances to visit patients. It also allows the introduction of services to areas that have been previously deemed too remote to allow cost-effective access. Because VC can use readily available, relatively inexpensive technology with which many people and institutions now have experience, it is a simple and economic introduction to telemedicine for clinics.

Mobile self-management

- 2** Smartphones are becoming increasingly popular and can provide reminders, symptom or activity tracking facilities, and of course, communication with health services, among many other features, allowing an inexpensive method of interaction with large numbers of patients. Similarly to websites, they can support self-management programmes, providing an exchange of information for various health areas and the potential for patients to participate in their health care more pro-actively, thereby reducing the burden on existing services.

Home-based health services

- 3** Finally, home-based care is of particular interest to people living in remote and rural areas, especially those who suffer from multiple or complex health and social care needs, and those who are restricted in their ability to travel by illness or mobility issues. Telemedicine can reduce hospital visits and help keep patients in their own communities, bringing care into their homes that they would otherwise not be able to, or have the opportunity to access.

The ten demonstrator projects are detailed in the following pages.

Note: While most of the technology used in the demonstrator projects is in existence, the implementation occurred in new sites, and in a co-ordinated fashion to promote sustainability.

Speech Therapy Services

Scotland | Sweden | Ireland | Northern Ireland

An existing transnational network of speech therapists has been expanded across the Northern Periphery to deliver improved care and reduce unnecessary travel.

Remote speech and language therapy (SLT) services are established in Sweden, and have been demonstrated to work in Scotland. Through ITTS, these services have been extended to new clinical areas, such as head and neck cancer patients and people with Parkinson's, linking directly into patients' homes where possible.

The aim is to maximise the use of existing VC units and promote the clinical use of VC in other disciplines to develop an economically viable multi-professional clinical network of VC facilities.

Speech therapists are connecting not only with patients but also with national centres of excellence for specialist advice and creating professional networks for education and support.

We have used [VC] with quite a variety of patients and I think it's enabled us to provide a better service – either because it meant that I didn't have to travel, or somebody else didn't have to travel. One patient has been using VC to access a very specialist speech therapy service. Now that just wouldn't have been possible without the VC.

Speech therapist, Scotland

Benefits

- VC facilitates shorter, more frequent therapy sessions which are less tiring for patients
- Children in particular work well with remote VC therapy

Renal Services

Scotland | Norway | Sweden | Northern Ireland



Home dialysis, Norway

Scotland (NHS Highland) and Norway (University Hospital of North Norway, Tromsø) have developed significant expertise in the use of videoconferencing (VC) within their renal services. Through ITTS, these services have been expanded to incorporate more sites, and extended to include outpatients and home dialysis patients.

Renal services in Sweden and Northern Ireland have built on the success of this VC link and have successfully integrated the technology into clinical practice. The implementation sites have benefited from the new service which has resulted in greater flexibility and more timely support for renal patients, both in local health centres and in their own homes.

A now established transnational network of renal staff will continue to be extended across the Northern Periphery.

ITTS has focused on 3 areas of implementation:

- Patient review appointments via VC
- Outpatient clinics at remote sites delivered via VC
- VC in homes of home dialysis patients

Benefits

- Increased number of consultations
- Reduced travel for both patients and clinicians
- Specialist support and improved handover of care to remote clinics

Emergency Psychiatry Services

Norway | Scotland

A videoconferencing (VC) solution provides patients in an acute psychiatric state with access to specialist evaluation as close to their home as possible. In addition, VC can enable a 24-hour system where psychiatrists are available for patients who visit emergency departments at district centres.

The rationale behind a VC solution includes difficulties in recruiting specialists, minimising travel for patients and carers and the provision of specialist services to remote locations. Studies in Norway have shown that there are no differences between telemedicine and conventional face-to-face methods with regard to quality and satisfaction among patients and professionals. Telepsychiatry has also proved to be cost effective.

It is important to develop a VC system where it is easy to involve a specialist directly in a consultation, both when the patient is admitted to 24-hour departments and when the patient is consulted by an ambulatory team. In such a system the specialists can be located in different local sites.

The pathway for the patient is shorter because you are able to do the job more efficiently and have more frequent meetings with the patient.

Psychiatry nurse, Norway

Benefits

- Locates patient assessment within communities, preventing an automatic transport for admission process
- Provides local emergency care, saving costs incurred in transporting patients
- Prevents additional patient distress as a result of relocation

Remote Diabetes Services

Scotland | Finland | Northern Ireland



VC for diabetes services allows local access to specialists without the patients having to travel as far, or as often for several different appointments. Readings from blood glucose meters can also be transmitted electronically.

Videoconferencing (VC) is used to deliver teleconsultations as part of diabetes services where there is considerable distance between the consultant and patient. Patients attending short notice appointments, 6-monthly or annual reviews can attend clinics at a local site, remote from the diabetes consultant who is based in a central location, saving either their travel time and costs, or the consultant's. The patient is escorted by a specialist diabetes nurse at the remote site who sends blood glucose data from the patient's meter via the internet to the consultant. A consultation can then take place via VC in a similar way to

a face-to-face consultation. After the consultation, the doctor uses digital dictation to make information immediately available to the GP. Incorporation of the specialities of podiatry, dietetics and other relevant specialties will also ensure a comprehensive service is offered to patients at remote sites.

ITTS has expanded the previous service across the Scottish Highlands and into the Orkney Islands, and started a new service in Northern Ireland.

Benefits

- Consultants spend less time travelling to remote clinic sites which frees up their time to see more patients via VC or face-to-face consultations with newly diagnosed patients

Tracking & Promoting Physical Activity

Ireland | Scotland | Norway | Sweden

An increase in obesity, COPD and diabetes, to name a few health concerns, has prompted governments to endorse regular physical activity as an essential tool in promoting an individual's health. The aim of this project was to harness smartphone software technology to monitor and promote physical activity and improve associated health outcomes.

Using smartphones to monitor physical activity was run as a pilot project in Ireland and revealed impressive results: over the course of the pilot, the average daily step count in a control group had decreased by 156 steps per day with the step count in the intervention group increasing by 2,359 steps per day.

Following the success of this pilot, the app was 'prescribed' by GPs in Ireland, and Scotland; a diabetes consultant in Northern Ireland; and weight loss groups in Norway.

Benefits

- Patients who own smartphones generally tend to carry these with them all the time and so no additional equipment is required.
- All that's needed is the will to walk!



Weekly step counts are sent to the practice nurses who then monitor the data and set new targets, gradually increasing patients' activity levels.

Diabetes Services

Northern Ireland | Ireland | Scotland | Norway

Through the ITTS project we have learnt the benefits of transnational knowledge exchange and we hope to produce tangible results from the investment of bringing these people together.

David Heaney, ITTS Project Director

Key points

- ITTS has created an international network of expertise to advise on how to improve diabetes care using technology to support patients and clinicians and also integrate care systems.
- We believe knowledge sharing can provide answers to common questions and solutions to upcoming challenges to assist everyone involved or interested in diabetes care.

There are numerous technological options available to help support and streamline diabetes care, but information about optimum clinical solutions is often scarce. Many institutions resort to creating their own tools and would benefit from a forum for knowledge and expertise sharing.

Self-help tools on a mobile platform enable diabetic patients (and other patient groups) to self-monitor their disease. Functionality can cover food intake, physical activity and blood glucose measures as well as a personal goal-setting module for following up on own achievements.

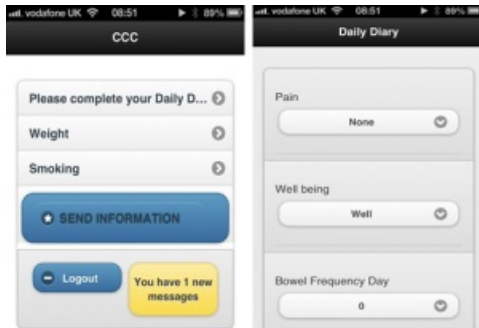
ITTS partners have experience in a variety of self-care platforms and the challenges connected to the

implementation of such tools and services. ITTS enables the partner countries to engage in knowledge exchange, to learn from each other and to better understand the barriers to implementation and how these can be avoided.



Support for Patients with Inflammatory Bowel Disease (IBD)

Ireland | Scotland | Norway | Sweden



Each patient has a range of symptoms that can be displayed graphically, and if any of the symptoms deviate from a normal level, this will alert both the patient (via the smartphone) and the IBD nurse.

The app was developed and trialled in a collaboration between Angus Watson, a surgeon at Raigmore Hospital, Inverness, and OpenBroly, a Scottish technology developer company, to help monitor inflammatory bowel disease.

There is a wide spectrum of disease among patients with Crohn's and ulcerative colitis, including patients whose disease is well controlled and those who need more intensive management. In addition to the geographic challenge of delivering high quality health in rural areas, there is a professional challenge to general practitioners who may only have one patient with Crohn's or colitis in his/her practice.

This project was launched to help patients manage their own disease through the use of smartphones, whilst giving them access to the best specialist advice. A smartphone application (app) was designed to enable patients to record their symptoms; this information is then monitored by a

specialist IBD nurse who calls the patient for a consultation should any symptoms deviate from normal. The IBD nurse can then direct the patient's care appropriately.

Since September 2013, following successful implementation in Scotland, ITTS Ireland have trialled a service with Galway University Hospital, clinical research facility and IBD patients in the associated referral area.

The app facilitates close monitoring and a prompt response which should help reduce admissions and catch problems before they worsen, or alternatively reassure patients that all is well and they can avoid unnecessary outpatient appointments.

There's a sense we're at the crest of a wave of how smartphone technology will be used in the future to improve people's health, but also to capacity build around them managing their own health which I think is the goal of all primary healthcare systems around the world. Prevention is better than cure...

General Practitioner, Ireland



Medical & Social Care Emergencies

Scotland | Northern Ireland | Finland

Remote support in medical and social care emergencies is facilitated through the use of telecare. Telecare employs the use of a range of monitoring and alarm-based technologies in the home setting. It is used primarily to support individuals with a range of health and/or social needs to live more independently and remain at home safely.

A basic telecare technology package includes a base unit, body transmitter and other sensors such as smoke detectors. An enhanced telecare package includes a wide range of peripheral sensors, including epilepsy sensors and DDA (Disability Discrimination Act) pagers for people with sensory impairments. These alarms

and devices trigger a response from a call centre, alerting them to problems and arranging to provide any help required.

Benefits

- The alarm system allows both patients and staff to call for help
- It also warns staff when patients unexpectedly leave the building



One of the key challenges in dealing with medical and social care emergencies is the high incidence of false and unnecessary alerts; this is especially problematic given the rural nature of northern periphery areas of Europe.

Exercise Classes for Rehabilitation

Scotland | Ireland | Sweden | Finland

I think the service definitely needs to be sustained. Our population is getting much older so they're going to be less likely to be able to come into the surgery; if we can reach out to them with the technology it could be beneficial for the future.

Physiotherapist, Ireland

Key points

- Many patients who would benefit from rehabilitation classes are not well enough to travel; for these patients to participate from home helps their recovery and can allow them to get well enough to potentially join standard classes.
- The use of VC widens access to these classes, which are often oversubscribed, with long waiting lists.

Remote exercise classes can be used in the rehabilitation of a number of long-term conditions such as COPD, stroke and pain conditions. Patients who live far from clinics or have travel difficulties may be unable to attend rehabilitation groups.

A home-based solution, or one available closer to home (e.g. in a local healthcare centre), offers these patients the opportunity to take part in classes, ensuring they are offered the same clinical, social and educational benefits as those living closer to larger clinics.

A technology solution using internet-based VC enables patients to view their physiotherapist and other class members at the same time from the comfort and convenience of their home.

The exercise programmes are designed in a similar format to those run in regular exercise classes, but using equipment readily available in or near the home. The physiotherapist is able to monitor the patients by seeing and speaking to them and also by remote monitoring using equipment appropriate to the particular condition.

Patients with Multimorbidity

Scotland | Northern Ireland | Sweden | Finland



In northern Sweden, a drop-in service for self-measuring of blood pressure and INR values is now available at healthcare centres in Malå (since November 2012), Sorsele (since January 2013) and Storuman. To date, over 500 patients have used this new service.

Based on previous experience of home-based services for patients with complex care requirements, this project takes different forms in different countries:

In Ireland, a self-monitoring station is based within a GP clinic where patients can check their blood pressure and weight and use exercise equipment.

In Sweden, clinic-based blood pressure self-monitoring services were implemented, in addition to a second service: a “check-up bag” that nurses use on home visits to evaluate blood pressure and calculate the INR blood clotting measure.

In Finland’s Oulu Arc Subregion, patients use a web portal to access laboratory results, monitor their health and contact healthcare staff with any questions, plus housebound patients with social and health care needs were offered a VC care option.

Benefits

- Patients have peace of mind that their condition is being monitored
- Patients gain greater understanding of their condition and how to manage it
- Less risk of unplanned admissions to hospital
- Reduced anxiety for carers and family

Options for self-care can help patients learn more about their health and take responsibility, with support and encouragement from clinicians.





25 new services at over 48 sites across the programme area!

KEY MILESTONES

- linking up of successful services with potential importing sites
- ratification of 10 business cases by a group of external experts
- launch of live services to patients in the northern periphery
- completion of evaluation

clinicians in regard to the innovations. Some of the services were already demonstrating positive returns on investment, for other services potential has as yet to be realised.

The direct impact of ITTS on service delivery is concrete, measurable, and sustainable, and is the main achievement of the project. Historically, telemedicine has rarely moved beyond pilot projects. The achievement of implementing this number of telemedicine services should not be underestimated. ITTS has provided a demonstration of what can be achieved with transnational collaboration.

Dissemination of findings was achieved through the website, newsletters, leaflets, presentation at international conferences, peer reviewed academic papers, and through social media. In addition, linking up other projects and drawing together policy makers from across Northern Europe generated genuine enthusiasm for taking the required steps to embracing new technology as part of everyday health service delivery.

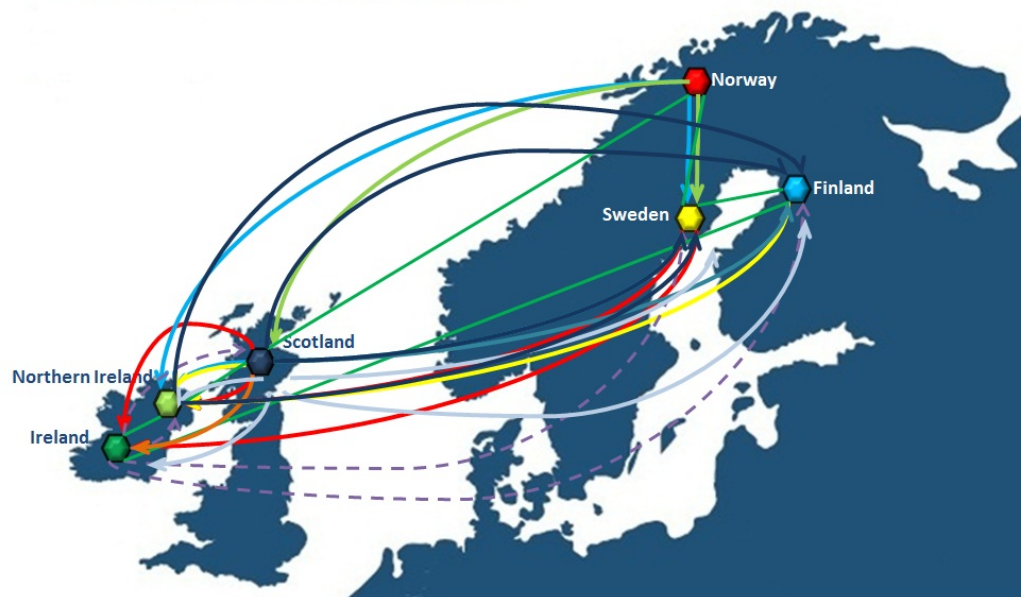
IMPACT

ITTS has supported the development of **25 new services** in **48 site**. In total **3890 patients** have used these services as a direct result of the project, expanding access to timely and local health care. The estimate for potential use of these services is over **27,500 patients**. In total, **560 staff** were involved in the demonstrator projects.

It is estimated that **6.03 tonnes** of carbon emissions were saved as a direct result of travel time saved by the introduction of these services.

The evaluation demonstrated widespread positive feedback from patients and from

ITTS Demonstrator Project Reach



Acknowledgements



Thank you to everyone who helped make ITTS such a great project.

We think we have made a difference to people living in the Northern Periphery and believe we have unleashed the potential for future developments, as technology advances, and as clinicians, patients and service planners get used to telemedicine being part of everyday practice.

¹ This project was part funded by the Northern Periphery Programme.

It was also supported by NHS Highland and NHS Orkney in Scotland, Western Research and Education Network (WestREN) in Ireland, and in Sweden by the Research division for Biomedical Engineering, County Council of Västerbotten, Umeå; Cisco Systems Inc; and Div. of Health and Rehabilitation, Dept of Health Sciences, Luleå University of Technology.

We would like to thank all of these organisations for their support.

As lead partners, University of Aberdeen would also like to thank all our partners for their hard work.

Finally we would like to thank all the clinicians, technicians, health practitioners, staff and patients across the participating countries who took part in the demonstrator projects.

PUBLICATIONS

A Case for Telemedicine

Background and contextual information: a portfolio of the ten individual business cases.

Telemedicine into Everyday Practice

A guide with a checklist for use by policymakers and service planners.

These publications, together with our promotional film and a number of other project materials including newsletters, and peer reviewed papers are available to download from the ITTS website

For further information about the work of ITTS please visit our website:

www.transnational-telemedicine.eu

SCOTLAND | LEAD PARTNER

Centre for Rural Health (CRH),
University of Aberdeen



NORWAY

Norwegian Centre for Integrated
Care and Telemedicine (NST)



SWEDEN

County Council of Västerbotten



FINLAND

Oulu Arc Subregion



IRELAND

National University of Ireland,
Galway (NUIG)



NORTHERN IRELAND

Centre for Connected Health
and Social Care (CCHSC)



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