

Innovative Healthcare Services Exchange for Baltic Sea Region Improves Efficiency and Flexibility

Executive Summary

CUSTOMER NAME

Government of Denmark Health System, Baltic eHealth Project

INDUSTRY

Healthcare

BUSINESS CHALLENGES

- Reversing the migration of medical specialists from poorer to richer regions
- Rectifying skills shortages
- Addressing issues related to cultural and clinical working-practices when moving services across borders
- Addressing legal issues related to cross-border health services
- Delivering cost-effective healthcare to rural areas

SOLUTIONS

- Secure healthcare network linking 200 hospitals and 6,000 practitioners in the Baltic Sea region
- Ultrasound and radiology trials to validate the concept of a cross-border exchange for healthcare services

BUSINESS RESULTS

- Reduced migration of specialist resources from poor and rural areas
- Validated a model for delivering healthcare services more efficiently and optimizing specialist resources
- Piloted first healthcare exchange in Europe as a model for future development

Many governments are considering new forms of healthcare cooperation and delivery to help them manage numerous challenges, which include rising costs, aging populations, and the migration of specialists from poorer to richer regions. The Baltic eHealth Project has proved the viability of one innovative model: a secure online marketplace for the sale or purchase of virtualized services, such as radiology, across national borders.

Business Challenges

Many countries in the Baltic Sea region are experiencing the migration of highly qualified medical specialists from rural to urban areas and across national boundaries, as enabled by European Union membership. Cross-border migration is disrupting the labor market; countries like Estonia and Lithuania are losing skilled workers to richer areas like Denmark, where skills shortages and higher salaries are generating attractive career opportunities. A common concern among governments in the region is how to deliver high-quality services to rural and remote areas in a cost-effective manner.

To improve information management and knowledge sharing in their healthcare systems, the governments of Denmark, Norway, and Sweden began building national networks in the late 1990s. During that process, it became clear that connecting the networks would facilitate new forms of information exchange and collaboration. Creating a transnational network that connected several countries in the Baltic Sea region could go even further toward helping governments address urgent healthcare issues.



In 2004, health organizations from Denmark, Estonia, Lithuania, Norway, and Sweden set up the [Baltic eHealth](#) Project, which was financed in part by the European Commission's INTERREG III B initiative to promote transnational cooperation. The project's objectives include:

- Encouraging the use of e-health (IT-supported healthcare delivery) in rural areas of the Baltic Sea region
- Piloting a cross-border marketplace for the exchange of knowledge-based health services
- Examining the effect of a cross-border marketplace on reducing the migration of skilled labor from poorer to more developed areas

Solutions

Among the partners who collaborated on the Baltic eHealth Project were hospitals, healthcare administrators, and experts in telematics, the use of networks and telecommunications to deliver healthcare services remotely. The partners worked under the leadership of MedCom, the government-funded organization responsible for the Danish healthcare network. [Cisco](#)® and consultants from the [Cisco Internet Business Solutions Group](#) (IBSG) have supported the project throughout its three-year lifecycle.

The partners' first task was to create a transnational infrastructure for e-health that connected all the participants: the national networks of Denmark, Norway, and Sweden; and networks at the East-Tallinn Central Hospital in Estonia and Vilnius University Hospital Santariskiu Klinikos in Lithuania. The biggest challenge was to provide efficient and secure IP connections between all the points on each network, as the basis for exchanging information and virtual resources.

The Danish national healthcare network offered the most suitable model because it contained a central hub through which all connections between secure regional or hospital networks were directed. A connection-agreement system located in the central hub manages the connection process for all participants. Time and other constraints made it impractical to implement similar systems in Norway and Sweden, so the partners decided instead to connect the Norwegian and Swedish national networks and the hospitals in Tallinn and Vilnius to the Danish infrastructure.

Ultrasound Trial

Having created the first transnational healthcare network in Europe, connecting 200 hospitals and 6,000 practitioners, the project team needed to validate its usefulness. In addition to technical obstacles relating to interoperability between applications and systems, there were also legal, financial, cultural, and linguistic barriers to overcome. The project team designed two clinical trials to address these issues.

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Peeter Ross
R&D Director and
Former Head of
Radiology
East-Tallinn
Central Hospital

The first clinical trial involved the National Center for Fetal Medicine in Trondheim, Norway, and Norrland's University Hospital in Västerbotten, Sweden. The center in Trondheim, internationally renowned for its expertise, used the Baltic eHealth infrastructure to provide second-opinion support on complex cases to midwives and doctors in Västerbotten.

The most widely used method was to send the video clip of an ultrasound examination to Trondheim by secure e-mail. The Norwegian specialists sent back their evaluation of the video clip within one or two days. In some particularly complicated cases, it was seen as advantageous for the Norwegian specialists to offer real-time support. In those cases, the ultrasound examination was streamed "live" to Trondheim, while the Swedish doctor or midwife performing the examination simultaneously discussed the case with the Norwegian specialist via a video-conferencing link.

Radiology Trial

The second clinical trial involved the creation of an e-radiology exchange pilot—a model for cross-border radiology reporting that was designed to evolve into a full-scale marketplace for the buying and selling of virtual services. The participating institutions were Funen Hospital in Denmark, where there is a shortage of radiologists, and the East-Tallinn Central Hospital and Vilnius University Hospital. In Tallinn and Vilnius, hospital managers are struggling to retain skilled professionals, such as radiologists, who can increase their salaries by five or 10 times if they migrate to countries like Denmark.

The objective, therefore, was to create a system that would allow clinicians in Funen Hospital to transmit images to Tallinn or Vilnius over the Baltic eHealth infrastructure. The Estonian or Lithuanian radiologists would examine the X-rays and produce a report, which would be sent back to Funen.

The project team managed the technical demands of the system by combining software they had developed in-house with streaming technology from Danish company Medical Insight. The team created a server that could stream images from both picture archiving and communication systems (PACS) and Radiology Information Systems (RIS) in Funen to Tallinn and Vilnius.

Managing the Language of Health

The trial raised semantic issues that were even more challenging than the technical requirements. The team began by focusing on one modality, X-rays, and on one anatomical region, the knee. Meetings between the radiologists from the three participating hospitals soon revealed significant differences in reporting methodologies that would need to be addressed alongside the more obvious language barriers.

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Henning Voss
Former Project Manager
MedCom

“We found that the three reporting cultures were very different,” says Peeter Ross, R&D director and former head of radiology at East-Tallinn Central Hospital. “For example, a Danish radiologist might report that a chest X-ray was ‘normal’; an Estonian radiologist would typically use about five sentences to convey the same findings. To help the radiologists report accurately, we would have to communicate what they meant and not just provide a word-for-word translation.”

In a series of workshops, the radiologists created a library of standardized phrases that could be used in reports on knee X-rays. From there, the project team developed a structured reporting tool (SRT) that would enable the radiologists to select the phrases they required from pull-down menus for automatic translation into the desired language—for example, from Estonian to Danish.

The SRT can process about 95 percent of all cases. To cover the remainder of reporting requirements, radiologists could choose to write elements of a report in free-form text, in their own languages. The text was then translated by a dedicated team of multilingual medical secretaries, whose training was included in the Baltic eHealth Project. For reasons of quality control, it was decided to obtain two opinions on each set of X-rays submitted over the e-radiology exchange.

In addition to creating clear language, the project team also had to break down certain cultural barriers to effective collaboration. Early in the trial, radiologists from Funen visited their counterparts in Tallinn and Vilnius to better understand each other’s working environments and establish personal relationships. The radiologists also needed to develop confidence in each other’s professional competencies. A workshop in which all the radiologists produced reports on the same X-rays helped build trust when they discovered that they were in agreement about almost every image.

Legal and Financial Issues

A cross-border marketplace for healthcare services raises many issues because of the different legal systems involved. One major concern for the clinicians participating in the project was patient consent and confidentiality, arising from the external use of images. Recent research, however, suggests that patients themselves do not object to data being shared among experts. A survey of 1,000 people conducted by the Danish government found that 72 percent had no problem with external use of confidential data. Another survey carried out by the Baltic eHealth Project found that there was no difference in attitude between patients in rural and urban areas; about 72 percent of each group were in favor of a cross-border healthcare model.

It was equally important to define which institution would be legally responsible in the event of a misdiagnosis or mistreatment. For the purposes of the radiology trial, the organizations behind the Baltic eHealth Project decided that the primary hospital would retain responsibility; this decision was written into the contracts between the participating hospitals.

“In a project of this type, you could allow the complexities of working across different legal systems to become a showstopper,” says Henning Voss, former project manager at MedCom. “A common European legal regime already exists in some measure. Our project has paved the way to a pan-European healthcare model within that framework by providing an example of how the legal issues can be managed.”

The hospitals participating in the trial also had to agree on the financial terms of their collaboration, a process that was facilitated by the project team.

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Claus Pedersen
International Project Lead
MedCom

Business Results

The Baltic eHealth Project has achieved its objectives by creating a functional cross-border exchange for healthcare services. In doing so, the participants have started to address some of the problems within the Baltic Sea region. Funen Hospital, for example, has reduced its waiting lists by removing some of the backlog of X-rays awaiting radiology reports, allowing the hospital to treat patients more quickly and improve the overall quality of care.

Funen Hospital is also better positioned to manage its skills shortages and to meet new government targets of treating all patients within four weeks. At the same time, managers at East-Tallinn Central Hospital and Vilnius University Hospital are finding it easier to reduce the flow of skilled workers to wealthier countries. “Training radiologists is an expensive process that takes 10 or 11 years,” explains Ross. “It’s important to me that I can now offer radiologists the opportunity to broaden their horizons and earn more money, without leaving Estonia.”

The radiology trial has demonstrated its worth as a commercial model: Funen Hospital has signed a contract to purchase reports on X-ray images from the East-Tallinn Central Hospital, independent of the Baltic eHealth Project. The ultrasound project has also proved its usefulness as a model for providing specialist advice to remote locations, both offline and in real time. In addition, the project gave consultants at the National Center for Fetal Medicine access to highly specialized cases, thereby increasing their knowledge and expertise.

Extending the Model

Members of the project team acknowledge that there is much more to be done. On the technical level, the IP infrastructure, and any custom applications, must be readily accessible and easy to use. This may require application providers to find new ways of working across institutional and industry lines so that healthcare institutions do not constantly need to “reinvent the wheel.” In addition, considerable time and investment will be needed to extend the e-radiology system to other modalities, such as MRI (magnetic resonance imaging), and to other anatomical regions.

Nevertheless, on a practical level, the Baltic eHealth Project represents a breakthrough, and its success, albeit on a small scale, may have far-reaching implications for future healthcare delivery.

“The creation of a secure healthcare network in Europe will help to optimize specialist resources by making them available independently of their physical locations,” says Claus Pedersen, international project lead, MedCom. “It will also create a more flexible workforce, enabling healthcare systems to buy or sell clinical services according to need and, thereby, improving the overall efficiency of healthcare provision.”

Next Steps

In 2007, the Baltic eHealth Project moved into a different phase with a new initiative called R-Bay, which is also funded by the European Union. The objective of the initiative is to validate the business case for an e-radiology exchange, beginning with the technology platform. The Kodak data center in Estonia is supporting R-Bay by providing imaging tools for the virtual PACS and RIS services. Finnish company Marvel is enhancing the original structured reporting tool to create a more highly automated portal that can manage the interchange of images, referrals, and reimbursements.

More countries are participating in the R-Bay initiative, including the Czech Republic, Denmark, Estonia, Finland, Lithuania, the Netherlands, and Norway.

“It is becoming more difficult to deliver healthcare appropriately in the West, due to aging populations and limited funding,” concludes Voss. “If we are to ensure high standards of care in the future, we will have to become more innovative about pooling resources and improving the efficiency of our healthcare systems. It’s a matter of being ready with the right tools and applications, and the right mindset.”

More Information

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