

Greenland is a Pioneer in Telemedicine

By Mirko Smiljanic

Greenland has the world's most extensive teleradiology network: All Greenlanders and their hospitals are without exception connected in a telemedicine network. The network was presented at this year's MEDICA in Düsseldorf, the world's largest trade fair for medical technology.

Only a few years ago, the topic of computer technology and medicine was rather modestly represented at MEDICA. But today, things are looking very different. An entire hall is now reserved for information technology in health care. And this does not imply that the other 16 halls have nothing to do with computers and communication. In spite of the high level of diversity, one main trend can be discerned: Networking is increasingly important in all areas of the medical industry. Greenland is at the forefront of this trend: Although the island has an area of 2.1 million km² – in comparison to Germany's 357,000 km² – it has the world's most extensive medical network, the implementation of which presented a huge technical challenge, *"because, for example, the satellite links do not work in winter, there are frequent power cuts and the rapid replacement of broken computers is not possible. This meant that hardware had to be selected that permitted the installation of robust systems, and the software also had to be designed to provide secure data transmission, even when the lines were down,"* explains André Schröter from CHILI GmbH in Heidelberg, the company that won the contract to design the network, together with the German Cancer Research Center and two Scandinavian companies. The hardware problems were relatively straight forward to solve: in order to guarantee secure communication between the clinics, even in the Greenlandic winter, all computers have mirrored hard drives, where the data is backed-up, an interruption-free power supply is standard and back-up computers take over whenever serious damage occurs. The software presented a somewhat more complicated challenge:

"We integrated protocols in our system, which send back receipt confirmations, and thereby ensure that data that has been transmitted once does not need to be sent a second time. All of this is compatible with the DICOM standard produced by the medical equipment. The image data can be viewed at every work station, and as central patient IDs are used across the whole country, the images associated with a particular patient can be accessed in every hospital."

Access to the system is regulated according to a national standard. If, as frequently happens, the network crashes due to weather conditions, the operation of internal hospital networks is maintained using local emergency known-values. X-ray images and computer tomography images are distributed by PACS.

"PACS means Picture Archiving and Communication System, the image management system used primarily in radiology, but in the meantime in other disciplines too. The PACS system is accessed from viewing workstations, which are used to view the image. Web-based image distribution sends the images to different locations, and teleradiology transmits the images between clinics, within the clinic or from the clinic to radiologists who are on night duty at home."

A few meters away from the CHILI GmbH stand at MEDICA, TEMOS have set up their stand. TEMOS stands for "Telemedicine for the Mobile Society," so they are also involved in networking. The TEMOS project was initiated by the European Space Agency, the Technical University of Aachen and the Center for Travel Medicine in Düsseldorf among other organizations.

"TEMOS is an integrated service that provides an information system for patients who are about to travel as well as for doctors and pharmacists. Patients can use the Center for Travel Medicine to inform themselves about particular countries and to request information on particular hospitals, so that they know where to go if they have an emergency while on holiday."

Now if an emergency actually occurs during the holiday, explains Claudia Mika, head of the TEMOS project, the traveler already has the address of a doctor they can trust – so long as they trust the information provided by TEMOS. However, it may be that the patient is still unsure.

"They may then get a second opinion from a German university hospital. The University Hospital of Aachen, for example, offers teleconsultations over the video conferencing system."

In order for the second expert opinion to be obtained, certain technical requirements must first be in place.

"The transmission can be based on three different technical systems; that is, video conferences can be held over an Internet Protocol (IP), ISDN or satellite communication. Depending on the communication options available to the partner hospital, we are able to utilize any of these three systems on the basis of standard protocols."

Furthermore, there is still the language problem. It is almost always possible with English, but TEMOS is also cooperating with a growing number of physicians who have studied in Germany. Which leads to a crucial insight: Technical networks are without question important, but the networks between people should not be forgotten.