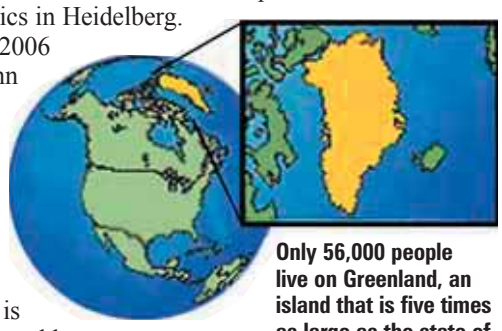
Teleradiology Faces Ultimate Test on World's Largest Island

The race to connect widely dispersed healthcare facilities may face no bigger challenge than Greenland—an island more than 85 percent covered by an ice cap, with no roads or railways connecting its towns and settlements.

Uwe Engelmann, Ph.D, M.S.

"ALL IMAGES of all of Greenland's patients are now available at every hospital," said Uwe Engelmann, Ph.D, M.S., of the German Cancer Research Center's Department of Medical and Biological Informatics in Heidelberg.

Presenting at RSNA 2006 yesterday, Dr. Engelmann explained how the Teleradiology Network of Greenland has improved medical care for people in inaccessible regions.



Only 56,000 people live on Greenland, an island that is five times as large as the state of California.

Part of the Kingdom of Denmark, Greenland is the largest island in the world at more than 800,000 miles. Its population of more than 56,000 lives in 18 towns and some 60 settlements, mainly along the ice-free rim of the coastline. The island is divided into 16 healthcare districts, with 15 district hospitals scattered along the coastline and a national hospital in the capital city of Nuuk.

The national hospital gateway is connected to the network's central picture archiving and communication system (PACS) and radiology information system (RIS), which hold all image data and reports for all of Greenland.

If transmission to the central gateway is interrupted, Dr. Engelmann noted, the external gateways continue the interrupted transfer automatically when the network is up again. In addition, when a new study arrives at a teleradiology gateway, the gateway automatically retrieves information from existing studies of the same patient from the central gateway.

While the network has proven successful, getting it in place was not without its challenges, Dr. Engelmann said. He explained that while most towns and settlements are linked by either radio or satellite, but network is relatively unreliable due to heavy snow storms and power outages.

Another challenge, he said, is the high turnover of medical personnel—many healthcare professionals come from Denmark to work in Greenland for a couple of months and then return home.

"There also are no local Information technology (IT) people in the district hospitals, just a central IT team at the hospital in Nuuk," said Dr. Engelmann. "And with no manufacturer having a branch in Greenland, the reliability of the hardware in the teleradiology network is very important."

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Local gateways, the key components in the network, have been established from software that is easily configured for different application scenarios and protocols. The software also has integrated security and failure measures and runs on powerful PACS servers as well as on personal digital assistants (PDAs). No specific software is necessary on users' computers.

The system also provides critical user authentication with a central directory service and local emergency accounts have been created in the event the directory is not available. All authorized users have access to all images and reports created in the entire teleradiology network of Greenland.

"This is a robust system designed for Greenland's particular needs, that will improve medical care there," Dr. Engelmann said, adding that the study shows it is possible to establish reliable blackbox solutions supporting medical care for people in accessible regions.