



Digital breast cancer population screening (DigiBOB) Best Practice

The RIVM (National Institute for Public Health and the Environment in the Netherlands) is working hard to digitise the population screening for the prevention of breast cancer. Radiologists will remotely assess the X-ray images

The RIVM started digitising the entire process of breast cancer population screening in 2006. Emile Knops is project leader of DigiBOB. He outlines in brief what is involved in this successful large-scale preventive screening: 'Each woman of 50 to 75 years of age receives an invitation for a screening every other year. The response is high, about 85 percent. This means that 900,000 women are screened voluntarily each year. In the Netherlands we use 63 specially adapted mobile units that visit each district to make the screening as accessible as possible. Laboratory technicians take dozens of X-rays each day in these mobile units.

At the end of the day the results are sent to pairs of radiologists, who will then independently assess each mammogram.

One and a half second

Not much will change for the women who participate in the population screening when the process has been fully digitised. However, the DigiBOB project significantly changes what happens behind the screens. Instead of working with analogue X-rays on film which are developed in the mobile unit, the laboratory technicians will be using digital equipment connected to a hard drive. And in contrast to the current practice of physically transporting the films in cases by couriers to the radiologists' light boxes, the mammograms will be transported over the SURFnet6 fibre-optic network to specially adapted workstations. Emile Knops: 'The radiologists expect the X-rays on their screens within one and a half second. That imposes enormous demands on the infrastructure.'

Excellent reputation

The infrastructure consists of a central database, a workflow application, 29 radiology stations at over 15 locations, and a fibre-optic network. It will become an enormous database, as digital archiving of all mammograms requires gigantic storage capacity. 'Those X-rays are 20 to 50 Mb each. There are three per client on average, with 900,000 clients: you do the math! Moreover all materials are to be kept for fifteen years,' explains Emile Knops. 'We are going to turn it into a single national archive, which is redundantly implemented. The database needs to be scalable and the X-rays need to be retrieved at super fast speeds. In order to ensure that we meet the required response time we will team up with a single provider. Philips will deliver the database as well as the workflow software and the radiology stations.'

The radiology stations consist of two high-resolution screens for assessment of the X-rays, and a regular screen for textual information. They are connected directly to a 1 Gigabit optical network of SURFnet. 'This network connects the radiology stations, which are dispersed over the country, with the central archive. A radiologist views client records, each containing multiple X-rays, at high speed. This therefore requires a network that is fast and that can handle large amounts of data. We have every confidence that we will meet the requirements, as SURFnet has an excellent reputation in this field.'

Getting used

As was mentioned before, the clients will not notice the changes. 'But the working conditions for the laboratory technicians will improve', explains Emile

Knops. 'They no longer need to place the film cartridges in the developer, meaning less carrying and lifting. Moreover the process no longer requires chemicals that tax the environment.'

Instead the X-rays are stored on a hard disk, and they are sent over the network and placed in the archive at the end of the day. The radiologists will have to get used to assessing the images on a computer screen instead of a light box. 'The image itself and the controls are different. Grabbing a magnifier is different from zooming in with the mouse. An advantage of digital images is that their brightness and contrast can be adapted. The image can even be sharper than a physical X-ray.'

Benefits

Most areas in the Netherlands will migrate to the new system in 2008. The DigiBOB project should be completed in 2009. 'Based on this digital foundation we will then be able to get to work on reaping the benefits,' says Emile Knops. 'The exchange of X-rays with hospitals is one such benefit. One and a half percent of the women are referred for further examination. In the current situation she will need to undergo an X-ray examination in the hospital. This is part of the protocol with analogue images. But when the records of the population screening are available digitally this will not be necessary anymore. This situation reduces the radiation load, an important advantage for the women involved.' Emile Knops also envisages opportunities in the area of digital diagnostics. 'Computer aided diagnostics, where the system alerts the radiologist to suspect areas, is still in its infancy. We expect much of it in the long term.'



Further information:

www.rivm.nl

The central archive will be situated in Amsterdam and Almere (one acting as a backup for the other).

The radiology stations are located in: Vlaardingen, Goes, Utrecht, Groningen, Heerenveen, Zwolle, Maastricht, Eindhoven, Venlo, Nijmegen, Elst, Alkmaar, Amsterdam, Laren, Leiden, Enschede.

SURFnet bv
Radboudkwartier 273
Hoog Catharijne
PO Box 19035
NL - 3501 DA Utrecht

T +31 302 305 305
F +31 302 305 329

admin@surfnet.nl