

## Volume 8 - Issue 2, 2008 - Cover Story: Streamlining Emergency Radiology Services

### Restructuring Emergency Radiology Services: Increasing Efficiency and Decreasing Staff Turnover

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#### Author

**Dr. Turid Langli**

*Head of Department*

*Department of Radiology*

*Ullevål University Hospital*

*(UUH)*

*Ullevål, Norway*

[turid.langli@ulleval.no](mailto:turid.langli@ulleval.no)

Ullevål University Hospital (UUH) is one of the largest hospitals in Scandinavia with about 9,000 employees. The hospital functions on four different levels. As well as acting as the local hospital for the largest part of the Oslo region, it is one of five regional hospitals in Norway, a National Centre of Competence in some fields and the trauma centre for the whole part of southern Norway and the south-west part of Sweden.

#### Increasing Efficiency and Decreasing Staff Turnover

The trauma function, which serves approximately half the population of Norway, has been recognised as the most important part in our internal Strategic Plan for the period 2007 – 2010. From January - August 2007, a total of 13,000 patients were admitted to the emergency unit, of which 700 caused chaos for the multidisciplinary trauma team.

When the hospital was reorganised recently, the primary concern was to focus on patient flow in order to optimise both treatment and the use of medical resources.

#### Radiological Services at the UUH

Our radiological service is organised in four radiological departments as well as the department of nuclear medicine. The radiological departments are the departments of neuro-, cardiac and peripheral vessel intervention, and paediatric radiology, relatively small units with between 15 - 40 employees. The central radiological department numbers approximately 180 people. This department also contains a radiological unit for emergency out-patients in downtown Oslo in addition to a breast diagnostic centre and a unit of diagnostic medical physics serving most other hospitals in the region. In 2007, the radiological departments performed around 371,000 diagnostic and interventional procedures between them.

The central radiological department is responsible for the primary radiological diagnosis on a round-the-clock basis, and of the 25,000 emergency examinations carried out in 2007, 22,000 were done by this department. Each radiological department has a consultant radiologist on call at home 24-hours a day equipped with a PC linked to the hospital RIS/PACS system to decrease diagnostic time and reduce the need for the radiologists on-call to go to the hospital.

#### Identifying the Problems

##### Logistics and Domestic Considerations

The department is geographically situated between the surgical and medical wards. This is very convenient for the in-house patients, but less effective concerning the trauma patients entering the hospital. As part of a strategy to separate the patient flow of the emergency patients and those with a planned admission, it was decided to build an intermediate ward of 50 beds for all emergency patients close to the admission area. The maximum stay in this ward is 48 hours. During this time it has to be decided whether to transfer the patient to another in-house department, to another hospital, to a nursing home or back home.

To meet the needs of the emergency department and of course the needs for accurate diagnosis immediately after admission of critically-ill patients, radiology has established a satellite unit in the admission area. This entity is equipped with MSCT, angiography, DR and ultrasound suites. Other examples of decentralisation is an MSCT scanner in the oncology department and a mobile DR unit for bedside use serving the nursing homes in the Oslo region with online transfer of the examinations to UUH for immediate diagnosis.

#### **Working Environment**

Working in a radiological department with a high number of emergency examinations of critically ill patients, combined with in-house and outpatients expecting to be examined at fixed hours are very demanding for the personnel. In the past, major concerns included a high turnover of radiologists, radiographers and other employees and a sick leave percentage of approximately 16. In addition, the building that housed the department was built quite a number of years ago, in an era when a lot of the radiological exams had to be performed in dim lighting. Thus there was hardly any daylight in the premises; a factor we now know has great importance for fatigue.

#### **What are the Improvements?**

The most important change was the separation of emergency and planned examinations with separate core teams for each group. In addition, a focus on making our personnel confident of the huge amount of know-how accumulated in this new organisation has helped, the theory being that acknowledging and increasing this adds to self esteem and better job-satisfaction. Consequently, the organisation was expanded to further develop trade and increase research.

Great emphases are put on the collaboration of all different occupations in the department. Radiologists, radiographers and physicists work together in optimising examinations. This multi-occupational work forms the base for arranging national courses targeting all these professions. Also, the department has lecturing contracts with both the University of Oslo and Oslo College of Radiography, enabling increased participation in international congresses and stays in hospitals abroad to exchange experiences. In addition, more scientific papers are produced and accepted in international publications and investments in ergonomical workstations surrounded with green plants and lightintensive PACS screens allowing for illumination with daylight tubing have helped.

#### **Employees a Core Focus**

Management have also focused on encouraging employees as well as giving them the time and means to undertake new challenges both in their daily work and to venture into research and teaching. Praise is essential, as is taking part in their career planning, listening to their suggestions for organising the work schedule and showing consideration for their wellbeing both on and off work. Examples of this are the distribution of free fruit and making a physiotherapist at the disposal of employees two days a week.

In this period, the percentage of sick leave has dropped from 16 to five. With a total of 180 employees, this means 18 more people present each day. This has a great effect on the working environment as well as allowing time for essential activities like research and studying. Staff turnover has decreased dramatically, and the department is now able to serve the hospital with high-quality radiology.

### **Radiographic Services Now Provided in the New Admission Area**

#### **Workflow Model for Emergency Examinations.**

All requests for radiology are either received online or scanned into the RIS. One of the key factors for effective imaging services is a three grade alerting system in our RIS. These grades are marked with different icons, and for the most acute grade the icon stays with the examination throughout all stages ensuring first priority until the final report is signed.

#### **State-of-the-Art Equipment**

All emergency patients receive immediate radiology service in the admission area. The emergency radiology unit consists of four rooms staffed with radiologists and radiographers. There is a general radiography room with state-of-the-art computer, radiography equipment, an ultrasound room and a modern angiography suite for diagnostic and interventional purpose will be installed shortly. Finally there is a suite with a 64-row CT scanner which can be accessed from the trauma suite through a sliding door. In addition the trauma suite contains a mobile ultrasound unit and a suspended x-ray tube for conventional radiography with free positioning, enabling it to serve three trauma patients in different locations in the room. An additional mobile radiography unit can be used all through the emergency area.

#### **24h/Day Radiologist and Radiographer Service**

During the day the emergency radiology section consists of two staff radiologists and one resident in training, two radiographers and one secretary. All cases are immediately interpreted by one of the in-house residents and read out by staff personnel. In case of special CT and MRI image interpretation, sub-specialists from other radiological departments are alerted online via a red-dot system in the RIS, and they are able to make all necessary post-processing and other diagnostic work on their own workstation without having to rush to the emergency unit.

After 4pm, two residents and a general staff radiologist from the central radiological unit are on duty until 11pm, whereas for the rest of the night two radiology residents remain in the hospital. But there are radiologists on call in general, cardiovascular, neuro- and paediatric radiology both for diagnostic and interventional purposes round-the-clock.

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