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PACS ,Telecardiology,Telemedicine and e-Health in Norway

How Informatics are Improving Healthcare

Author

Roald Bergstrom

Senior Advisor

Norwegian Centre for

Informatics in Health

And Social Care(KITH)

Norway

ROALD.BERGSTROM@KITH.NO

Norway provides extensive health services and a welldeveloped social security net. About 35% of the annual Norwegian state budget, or 7 - 8% of the gross national budget, is spent on health and social care, making it one of the European countries – and the Nordic country – with the highest level of public spending on health per capita. The health and social care sector in Norway, as in other modern societies, faces significant challenges. Its part of the nation's GNP is already substantial, and the increasing mean life expectancy and falling birth rates will dramatically increase the future burden. A specific Norwegian challenge is low population density, the consequences of which mean long travelling distances to medical services, to hospitals which are scattered, not all of which offer a full range of services.

National IT Strategies for Health and Social Care

Investment in IT and making broadband available throughout the country is part of the Government's e-Norway plan, which has established ambitious goals for IT development within both the private and public sectors. IT is also an important tool in the process of implementing the latest national health reforms such as:

'Regular GP: Every citizen has one doctor

'Free choice of hospital

'Central government ownership and responsibility of hospitals and specialist health services.

IT is regarded as a useful tool to improve health services, particularly in primary care. With several national action plans for IT development in the health and social sectors, the main objectives in the action plans have been:

'Stimulate electronic interaction and exchange

'Strengthen and increase collaboration and efficiency of health and social sevices

'Improve contact with patients, clients and those in need of care

'Improve the quality of services

'Central government founding of new telemedical pilot projects.

PACS and Teleradiology

During the year 2006, all hospitals in Norway will have digital x-ray with RIS and PACS installed, making Norway one of the first countries in the world to be fully digitised. In Norway teleradiology services have been provided since 20 years ago. Teleradiology is in use for consulting in emergencies, for second opinions and for consulting between hospital and primary healthcare.

Integration is a key requirement for all PAC systems. PACS has to be integrated with RIS and RIS has to be integrated with HIS/PACS. Initially PACS was a departmental unit but nowadays it is a part of an enterprise system. The role of RIS and PACS within the hospital has evolved, and is now moving towards full integration with PACS as the imaging layer of the EPJ (Electronic Patient Journal). In the future the PACS will be invisible for the clinician. They will only see and work with the EPJ with the PACS as an integrated part.

Hospitals in Norway have chosen different solutions for RIS and PACS. Although all image communication uses the

DICOM standard, in our experience, information exchange is not seamless between hospitals. The focus is on integration and exchange of information across hospitals. Norway has joined 'Integrating the Healthcare Enterprise' (IHE) and participates in a Scandinavian mirror-group. The IHE is an initiative designed to stimulate the integration of the information systems that support modern healthcare institutions. Today Norway is pioneering the use of the new IHE Integration Profile, XDS-I, 'Cross-enterprise Document Sharing for Imaging'. By mid-2006 the new XDS-profile will be used for sharing information between different PACS and RIS-systems at different hospitals within a region. The purpose of the XDS-profile is to share clinical documents between hospitals, keep track of every document and to have a common EPR.

Its fundamental objective is to ensure that in the care of patients, all required information for medical decisions is both correct and available to healthcare professionals. The approach employed in the IHE initiative is not to define new integration standards, but to support the use of existing standards. The XDS design principle is that one single registry is a single query/access point and holds indexing data about all documents available from multiple repositories in the Affinity Domain. The information to be shared includes one or more of the following:

'Imaging studies that include images acquired on a broad range of different modalities, as well as evidence documents (e.g. post-processing measurements/analysis outcome), and presentation states

'Diagnostic reports resulting from the interpretation of one or more related imaging studies provided in a ready-for-display form

A selection of diagnostically significant images associated with the report content

Information Security with Shared Physical Storage

Some regions in Norway have implemented PACS as a regional solution for all health enterprises within the region. In such a regional system one solution is that health enterprises share a physical storage unit for the PACS and RIS information. Due to Norwegian health legislation, health enterprises are not allowed to share patient information indiscriminately. This means that a shared physical storage unit must be divided into logical storage areas for each health enterprise so that access can be linked between them. The health legislation also specifies that access to information owned by a different health enterprise must be evaluated and approved for each individual access.

EHR: The Core of Patient Information

According to Norwegian legislation, each healthcare service provider has to keep its own records, which can be in digital form, and information between service providers is only to be transferred on a need-to-know basis. A national EPR standard was released in 2001. This standard mainly covers issues related to architecture, archiving and security. A requirement specification for health stations and healthcare in primary schools, and another for community care, are based on this standard. With few exceptions, all GPs and private specialists have EHR systems and nearly all hospital patients are covered by an EHR.

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