



## Service Priorities and Programmes Electronic Presentations

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### **Automatic Reporting of Bone Densitometry (DXA) Studies Using Artificial Intelligence**

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#### **Keywords:**

Radiology reporting

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#### **Introduction**

Radiologists are paid for using both their eyes and their brains, by reading and interpreting findings to write the radiology report. DXA study is a high volume, low complexity examination to diagnose and monitor osteoporosis. Rapid development of information technology has made it possible to use artificial intelligence (AI) to read the DXA machine printouts and interpret the data to achieve automatic reporting.

#### **Objectives**

1. To develop a computer program to generate DXA reports automatically.
2. To devise a simple method to input the DXA reports into the radiology information system (RIS).

#### **Methodology**

In the first phase of the study, a structured DXA report template was developed and installed in a RIS workstation, allowing manual data input using form elements. Rule-based reasoning AI technique built in the form provided interactive changes to the form during the data entry process, automated interpretation of the input data and output of the DXA report to the Windows clipboard.

In the second phase, manual data entry was replaced by automatic data reading using DICOM reader and optical character recognition. The steps involved building a DICOM server and writing a new program running in a NM modality workstation. Another interface program was developed and installed in a RIS workstation for automatic matching of patient ID of the automatic generated DXA report with the RIS report.

#### **Result**

The programming language used was Microsoft Visual Studio 2008. The first phase was launched in 2012. A secretary was trained to input data and reports for the checking and endorsement of the reporting radiologist. More than 3000 DXA studies

have been produced since then. The interpretation of the automated DXA reports was always accurate, but errors in the manual data input process was not uncommon. The second phase was implemented in January 2017, when a new DXA machine was installed and paper printouts were replaced by DICOM images. A DICOM server was setup for automatic reporting and a new reporting program capable of reading and interpreting data was developed. Fully automatically generated DXA reports were produced for the endorsement of the reporting radiologists. We are now testing the accuracy of this new program. We concluded that it is feasible to replace the eyes and brains of the radiologist by AI for reporting DXA studies.