

Measuring Radiologist workload

Position of Faculty of Radiologists, RCSI

Measurements used elsewhere and in the past

Historically, the number of studies reported by individual radiologists was used as a crude measure of radiologist activity.

During the 1980s and 1990s, many Irish hospitals utilized a RIS system developed and supported by **Keogh software**. This system assigned workunits to different radiologic studies. The figures used were often erroneously utilized to assess radiologist activity. In fact, the workunit allocations were originally intended to reflect radiographer workload, and were heavily weighted to reflect the hospital department in which the system was first developed. Thus, workunit assignments existed in the system for procedures commonly performed in that department at the time of the system's development, while there were no assignments for procedures not performed at that particular site. In addition, an arbitrary maximum number of 60 workunits was embedded in the system; thus, even if a department tried to keep the workunit assignments up-to-date, they had no facility to assign an appropriate value to a new, complex and very time-consuming interventional procedure which had not been available when the system was first developed.

Comhairle na nOspidéal used a modification of the Foresterhill system of workload assessment. This system was developed in Aberdeen, and was used in Scotland until the 1990s. A time of 3 minutes was allocated to a CXR report, and other categories of Radiologist work were allocated multiples of the time allocated to a CXR. Comhairle used 3 classes of studies in calculating Radiologist workload:

Class 1 Plain films	1 point
Class 2 Barium studies, US, IVUs, tomograms etc.	7 points
Class 3 CT, Nuclear Medicine, Angio/IR, MRI	24 points

The total points of the workload in a department (as submitted by the Hospital in an application for a Radiologist post) were added, and an additional 10% weighting was added for teaching departments. The total points score was then divided by the number of sessions (based on 11/Consultant and 46 working weeks per year), to give the points per session. Comhairle did not have an absolute figure forming the basis of approval for posts, but sought to achieve an average of 100 points/session for larger hospitals (examples given were Beaumont, Mater) and 65 points per session for small hospitals (an example given was Dundalk).

In the USA, surveys showed that in 2006-2007, an average of 14900 examinations were reported per full-time radiologist per annum, with primarily academic groups performing about one-third fewer studies than others. It must be noted that these published surveys are not in any way intended to act as a template to mandate the number of radiologists required in any department to cover the workload of that department. They simply represent a collation of data indicating the position on the ground; radiologist numbers are not centrally controlled in North American departments, and additional radiologists are recruited by hospitals or practices according to need, determined locally [1]. **Relative Value Units (RVUs)** are a measure of activity utilized in a number of countries, including the USA, Canada, Australia and New Zealand. A variety of RVU systems are used in different countries, some of which measure both professional and technical components of workload, and some of which can be utilized more accurately to determine the specific radiologist component to workload, on a time basis. RVUs are designed to reflect the time required for a procedure and the complexity and/or intensity of the work, but are primarily a tool to determine reimbursement for work done, rather than to measure individual workload [2].

In 1990, **The Royal College of Radiologists (UK)** made recommendations on radiologist numbers based on the total number of studies performed and reported in radiology departments (12500 examinations per annum for a DGH Consultant Radiologist). While it was recognized that individual radiologists would not all necessarily report equal numbers of studies (because of different subspecialty interests, varying non-service commitments, differing modality commitments etc.), it was felt that across radiology departments, workload could be evened out reasonably in this way.

The Royal College of Radiologists (RCR) document on Workload and Manpower in Clinical Radiology produced in 1999 recognized that this old-fashioned method of calculating workload was no longer appropriate. The 1999 document's manpower recommendations were based on suggested levels of appropriate workload in a notional half-day, broken down according to whether the work involved general (plain film) radiology reporting, general ultrasound, barium studies, CT, MRI or vascular and interventional radiology. For example, 3 vascular/IR cases was considered an appropriate consultant workload in a notional half day (3.5 hours), while 70 general reporting cases was the suggested workload in the same time period. These recommendations were withdrawn in 2006. In 2008, the RCR issued their latest guidelines on workforce planning; they no longer utilize specific study number recommendations, taking account of the changing and increasing role of radiology in clinical management, and the varying complexity of radiologic tasks undertaken by Consultant Radiologists.

The **2008 RCR document** summarises the **role of the radiologist** as follows:

- *Direct image acquisition (e.g. ultrasound, fluoroscopy) and image-guided therapy (vascular and non-vascular intervention)*
- *Reporting of images acquired by others (e.g. CT, MRI, plain films)*
- *Consultation and discussion with other clinicians, through one-to-one consultations, multi-disciplinary meetings or other means of communication*

- *Audit, management, supervision, teaching and research*

The balance of these activities, clinical and non-clinical, will vary greatly from individual to individual.

Many factors influence throughput in the different components of the radiologist's role:

- *Image acquisition and image-guided therapy*
 - *The time required for interaction with the patient as well as the technical performance of the procedure*
 - *The complexity of the cases and procedures*
 - *The need to provide access to procedures on an emergency basis in addition to elective booked cases*
 - *The time required for pre-procedural patient assessment and consent, and post-procedural patient follow-up (this is an increasing feature of interventional work)*
- *Reporting*
 - *The complexity of the studies being reported*
 - *The need for comparison with previous studies and other modalities, and the ease with which these can be accessed in a timely fashion*
 - *The reporting technology available, including transcription and report authorisation methodologies*
 - *The frequency and likelihood of interruption while reporting*
 - *The administrative and secretarial support available*
 - *The availability and efficiency of systems for communicating urgent reports and findings to referrers*
 - *Commitments to teaching and supervision*
- *Consultation*
 - *Clinico-radiologic meetings, including the time required to prepare cases for these meetings*
 - *Face-to-face consultations with clinicians (planned or ad-hoc)*
 - *Telephone discussions*
 - *Vetting of requests to determine protocols and appropriateness*
 - *Written and emailed communication with other clinicians*
- *Non-clinical duties*

- *Audit*
- *Participation in departmental, hospital or wider management*
- *Participation in education provision and support*
 - *Teaching and examining medical students, nursing and paramedical staff, specialist registrars and other junior doctors*
 - *Supervision of specialist registrars*
 - *Participation in RCR or Faculty of Radiologists activity*
 - *Research [3]*

Weighting systems have been devised in some countries which may be helpful in assessment of workload in departments with a high proportion of complex investigations and procedures. The British Society of Cardiovascular Imaging published a document in Sept 2008 on this issue, proposing relative scores for different plain film, CT and MR studies relevant to cardiac imaging [4].

Faculty position on measuring Radiologist workload

- The use of crude study numbers to determine radiologist workload and throughput is an old-fashioned, discredited and inappropriate misuse of data. Although the introduction of PACS/RIS technology in many radiology departments makes it possible to acquire this data, it should not be used in an unfiltered and un-weighted manner
- The introduction of PACS/RIS facilities to many Irish radiology departments has resulted in significant improvements in efficiency in terms of speedy delivery of study images and reports to referrers. The forthcoming roll-out of the NIMIS project on a countrywide basis will consolidate these efficiencies. However, most such systems employ voice-recognition dictation facilities for report generation; this places the burden of report editing and correction on the reporting radiologist, thereby increasing the time required to report each individual study by approximately 20% relative to the time required in the older dictate-to-tape (with separate transcription) systems. This factor must be taken into account in establishing workload norms in the PACS era
- Any measurement system used to assess workload and throughput needs to take account of the many variables listed above which influence how a radiologist and a radiology department works
- There is no universally-applicable and universally-accepted weighting system presently in use

- Most weighting systems that exist at present were developed as tools to aid insurance reimbursement or other matters not directly concerned with radiologist numbers
- The complexity of radiologist work has increased very significantly in recent years. For example, 10 years ago, an average CT study of the abdomen and pelvis might have generated 50 images. Today's multi-slice multi-phasic studies of the same body parts may produce thousands of images, thus substantially increasing the time required for reporting such studies
- Efforts to assess workload and efficiency in individual departments must take account of local circumstances and clinical demand. A teaching hospital department, with many multi-disciplinary meetings per week, and a high complexity of work, cannot be expected to report as many studies per individual as a department which has fewer such commitments and less complexity of work.
- If employing authorities in Ireland wish to acquire meaningful information on radiology department workload or individual radiologist workload, this should be done through the medium of an agreed, robust system of measuring the relative values of different studies, procedures and activities, which is adaptable to new professional and technical developments in the future. The Faculty would be willing to develop such a measurement system in conjunction with the HSE, if the HSE wishes to acquire these measurements.

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