

# Clinical radiology workload: guidance on radiologists' reporting figures

# Foreword

The workload of clinical radiology continues to increase year on year. This puts pressure on radiology services to increase their efficiency while maintaining and improving the quality.

One of the key measurables of radiologists is the number of reported studies. Although this is a significant part of the job plan of a radiologist, there are other valuable activities which must be timetabled or taken into account when agreeing job plans and overall department activity. The most notable of these are the multidisciplinary team meetings (MDTMs) for both cancer and non-cancerous conditions, but as important are those ad hoc clinical contacts with referring colleagues as well as valuable time spent with patients, which may be more difficult to quantify.

However, The Royal College of Radiologists (RCR) is continuously asked, 'What are the standards for number of reported cases that it would recommend?' This is a complex subject but this does not mean we should shy away from producing some guidance with recommendations on how it should be applied.

It is important that this document is considered as part of a package of guidance with that for job planning and multidisciplinary team meetings. Both of these documents are being updated in the immediate future.

Our aim with this document is that it can be used as a framework for agreeing overall activity of radiology services and act as a basis for job plan discussions. It must be stressed that local circumstances will need to be considered when applying such guidance.

We would like to have feedback from those who use this document and hope that you find it valuable.

I would like to take this opportunity to thank Dr Hilary Dobson who chaired the Workload Standards Working Party, whose hard work led to the production of this up-to-date and practical guidance. The Working Party comprised the following members: Dr Giles Maskell, Dr Iain Robertson, Dr Mark Callaway, Dr Tony Nicholson, Dr Gitta Madani, Dr Rob Holmes, Dr John Somers, Dr Rod Robertson, Professor Clive Kay and Ms Alison Meyric-Hughes.

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# 1. Introduction

- 1.1 The development of any method to reflect accurately the workload of the consultant radiologist has to acknowledge and reflect the fundamental evolution of the role in recent years.
- 1.2 The modern consultant radiologist now works as part of a multidisciplinary clinical team, requiring appropriate patient and clinical interaction, in addition to the acquiring and reporting of images.
- 1.3 Technological advances allied to traditional imaging expertise have also resulted in an increasing therapeutic role as well as involvement in more complex and time-consuming diagnostic procedures when compared with historical practice.
- 1.4 Within a digital environment, reliance on crude and unweighted data generated by radiology information systems (RIS) can result in inappropriate and vastly underestimated workload volumes.
- 1.5 Confounding factors, including departmental resourcing as well as patterns, experience and intensity of personal working, add to the difficulties of measuring workload.
- 1.6 Acknowledging the complexity of the radiologist's role, there are increasing requests for a meaningful measure of radiological workload, which can inform individual job planning as well as overall workforce capacity.
- 1.7 The aim of this guidance is to produce a framework in which the full spectrum of the workload of a consultant radiologist can be reflected.

# 2. Background

- 2.1 The RCR's guidance, *Workload and Manpower in Clinical Radiology*,<sup>1</sup> published in 1999, attempted to link workload to service need – recognising both volume and complexity while adding the concept of maintenance of clinical quality. The concept of notional half-days (NHDs) was consolidated and indicative figures for each type of examination were provided. Acknowledged within this guidance was the absence of any measurement of audit, teaching, research, supervision or consultation, including involvement in 'clinico-pathological conferences'. By 2006, this guidance was considered outdated and thus was withdrawn.
- 2.2 In 2002, the RCR publication, *Clinical Radiology: A Workforce in Crisis*,<sup>2</sup> recognised the extension of the consultant radiologist's practice into a more clinically interactive role coincident with a rising departmental workload (of the order 2–5% per annum) and the development of subspecialisation.
- 2.3 Further confounding factors were acknowledged in 2005 by the RCR in *Changing Working Lives*,<sup>3</sup> detailing the practical implications to service delivery of the European Working Time Directive (EWT) and the new consultant contract as well as the higher proportion of doctors who desired less than full-time working.

# 3. Current RCR guidance

- 3.1 Such are the complexities of providing a meaningful measurement of workload, that in the RCR 2008 document, *How many radiologists do we need? A guide to planning hospital radiology services*,<sup>4</sup> emphasis was placed on the multidisciplinary model of modern patient-centred care and the radiologist's particular clinical contributions but without an attempt to specify particular workload numbers per examination type.
- 3.2 Instead, a departmental approach to service planning was encouraged, recognising all elements of radiological contributions including the acquisition and reporting of diagnostic images and performance of therapeutic procedures as well as all manifestations of consultation, audit, teaching/supervision, research and management.
- 3.3 It was recognised that no more than 50% of consultant radiologists' time was spent on image reporting or direct clinical interventions on patients. A 2004 survey of approximately 20% of Dutch *teaching* hospitals revealed that reporting accounted for 30% of radiologists' time commitment.<sup>5</sup>

- 3.4 Of particular note was the increasing impact on consultant radiologists' time of the multidisciplinary meeting – a prerequisite of cancer diagnosis and management and now of increasing importance in non-malignant conditions.
- 3.5 The 2000 RCR job planning guidance,<sup>6</sup> as well as the 2005 RCR guidance *Cancer Multidisciplinary Team Meetings – Standards for Clinical Radiologists*,<sup>7</sup> were developed to detail good practice with regard to preparation for, and attendance at, these meetings as well as follow-up clinical activity ensuing from such meetings.

## 4. Why measure workload?

- 4.1 There are drivers for accurate workload figures at multiple levels in healthcare in all four UK countries.
- At national level: there is a need to match the radiologist manpower to the increasing workload demands so that we can inform the debate on future workforce numbers.
  - At organisational level: provider organisations need to know whether they have the appropriate workforce to match the demand on their services.
  - At individual/department level: all consultants need to have a formal job plan which needs to reflect their clinical activity.

## 5. Confounding factors

- 5.1 Reliance on the generation of raw workload numbers from Radiology Information Systems (RIS) is tempting but, by definition, limited. It is vital to acknowledge both departmental and personal confounding factors to the use of such data for this purpose.

### 5.2 Departmental confounding factors

- 5.2.1 Standards: it is acknowledged that 'there is little formal co-ordination or understanding between UK radiology departments in terms of standards relating to departmental work output or consultant workload'.<sup>8</sup>
- 5.2.2 Resource: radiology departments have largely evolved through various iterations of financial or clinical strategy and as such their structure, equipment and staffing profile may not reflect the current needs of the service.
- 5.2.3 Teaching: the impact on service delivery of training and education in teaching departments can be debated, weighing up the unsupervised and 'out of hours' contributions by trainees versus the reduction of productivity resulting from supervision and tailoring of 'teaching lists'. Additionally, the fact that training future generations is vital for the continuation of service delivery, it has been shown that while difficult to measure, the value of trainees does yield economic benefit to service provision.<sup>9</sup>

### 5.3 Personal confounding factors

- 5.3.1 Work patterns, including personal factors, subspecialisation and its attendant complexity, split-site working and overall experience contribute significantly to the variation in 'productivity' among radiologists.

## 6. Existing models of measuring workload

- 6.1 The use of Korner units in England and Wales and Foresterhill units in Scotland have not been updated to reflect modern costs and clinical practice and thus have been rendered obsolete.

### 6.2 The Royal Australian and New Zealand College of Radiologists (RANZCR) system

- 6.2.1 The RANZCR system uses the concept of relative value unit (the RVU), described by Pitman and Jones.<sup>10</sup> In this system:

- The radiologist's cost is time-based to take into account longer reporting times for either 'complex, large data-volume examinations with multiple images' or 'multiple regions' to be covered
- The radiologist's contribution is identified as separate from that of the 'technologist' and 'equipment/consumables' costs
- The RANZCR system of RVUs has acknowledged limitations,<sup>11</sup> in that it does not take account of procedural work and other so-called 'non-countable' activity.

### 6.3 The Faculty of Radiologists at the Royal College of Surgeons in Ireland (RCSI) system<sup>12</sup>

6.3.1 The RCSI system modified the RANZCR system of RVUs and used this system in a 2010 survey of Irish radiology practices, covering 85–90% of consultant radiologists in the Irish public hospital service. (See Appendix 1 for an excerpt of this survey.)

6.3.2 The RCSI listed the following activities as 'non-countable':

- Interventional/procedural/nuclear medicine activity, accounting for 40% total 'non-countable' activity
- Formal teaching (tutorials)
- Multidisciplinary team meetings (MDTMs)
- Multidisciplinary team meetings (MDTMs) preparation by lead radiologist
- Formal administrative work (meetings, and so on).

6.3.2 The RCSI identified a mean of 32.47% whole-time equivalents (WTEs) engaged in such 'non-countable' activity.

6.3.4 The RCSI listed a number of shortcomings of the RANZCR system of RVUs including:

- The absence of measured impact of the presence of trainees within the department
- The use of voice-recognition systems to contribute to the strategy of reduced departmental turnaround times places the activity of report editing on radiologists and has been shown to have the potential to impact negatively in 'high-volume' reporting situations such as plain film reporting and 'one-stop breast clinics', potentially prolonging the time to 'report' by 20–30%<sup>13</sup>
- The impact of 'double reading' such as for mammographic images or checking those performed by others; for example, trainees
- The capture of highly specialised, low-volume examinations performed in a small number of specialist centres.

6.3.5 The RCSI indicated that the RANZCR system of RVUs could not reflect the other three elements of radiological work as defined by the American College of Radiology (ACR)<sup>14</sup> namely:

- 'Inherent skill and proficiency'
- 'Intensity and mental effort'
- 'Medico-legal risk and stress'.

6.4 North American models exist but are based on the critical linking of resource (that is, radiologist remuneration) to clinical need and, as such, are non-transferable to the UK which reflects a centrally controlled, publicly funded model.

## 7. Methodology to inform the guidance

7.1 Prompted by the 2008 RCR guidance,<sup>4</sup> numerous UK departments have developed 'in-house' measurement tools.

- 7.2 Four of these tools were evaluated by nine departments, representing a range of size and specialisation. The monitoring period comprised six to 12 months.
- 7.3 Both quantitative (that is, measurement of departmental workload) and qualitative (that is, acceptability and reproducibility) feedback were provided.
- 7.4 Of these four tools, the Gishen Ready Reckoner (Appendix 2) was evaluated in all but one department and was found to be reproducible and demonstrated a high level of acceptability.

## 8. Conclusions and recommendations

- 8.1 Recognising the complexities of modern clinical radiological practice, there is no single method which has been proven to capture *all* the elements which comprise the daily work commitment of a consultant radiologist.
- 8.2 There is, however, a need to plan the departmental workload both strategically and operationally.
- 8.3 Important components of any chosen methodology should include:
- A departmental rather than an individualised practitioner-based approach
  - 'Countable' modality-based activities, which should be realistic and time-based, taking account of departmental resources
  - Regular 'non-countable' activity as detailed in RCR 2008 guidance.<sup>4</sup>
- 8.4 Linking any workload evaluation system to the pre-negotiated time-based job plans will give a measure of the available departmental resource.
- 8.5 When interpreting 'countable' modality-based activities, account should be taken of the personal and departmental confounding factors as detailed above.
- 8.6 To obtain annualised figures for sustained radiological reporting output per year, the use of the Gishen Ready Reckoner (Appendix 2) is recommended. This tool takes into account the radiologist's job plan and all other non-reporting activities of a consultant radiologist, including multidisciplinary team meeting preparation and attendance.

The indicative modality-based figures listed below are estimated on 1 hour of uninterrupted time with no confounding factors and are not to be considered as a suitable rate of activity over longer periods as this would not be sustainable. For each modality-based activity, a range has been listed, reflecting the inevitable variability in work rate arising from professional experience in addition to these confounding factors.

Modality (suggested average values/hour of uninterrupted work)	Activity/hour with no confounding factors
Plain film reporting (examinations)	30–60
Checking of reports (eg for trainee)	6–12
CT/MRI	3–6
Complex CT/MRI	1–2
Cardiac MRI	1–2
PET CT	1–2
Mammography – symptomatic <sup>‡</sup>	4–6
Breast work-up (eg, mammo/US/biopsy)	2–3
Barium study	2–4
US <sup>†</sup>	4–6
Complex US+/- biopsy	2–3
Interventional procedures*	Agreed at job planning discussion
<sup>‡</sup> This excludes the reading of screening mammography studies	
<sup>†</sup> Figures would be higher for a radiologist reporting ultrasound studies performed by a radiographer	
* Interventional techniques do not fit with this model due to a number of factors including nature of the procedure, operator experience and departmental resources	

- 8.7 It is advisable that all UK departments adopt a similar methodology of counting activity in order to provide consistency.
- 8.8 This guidance should be used in conjunction with the RCR guidance on job planning and multidisciplinary team meetings which are currently being updated.<sup>6,7</sup>
- 8.8 The impact of departmental and personal confounding factors should be accounted for at the time of job planning, thus providing an opportunity to agree a consultant radiologist's individual contribution to the overall departmental workload.
- 8.9 Recognising the departmental and personal confounding factors precludes interdepartmental workload comparisons which will be inappropriate and misleading.
- 8.10 The impact of speech recognition systems needs to be taken into consideration when applying these suggested figures.
- 8.11 It is good practice to conduct formal double reporting as part of departmental audit. If this is undertaken, it should be acknowledged in the workload activity.

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# Appendix 1. The RCSI system

Table 3. RVU levels assigned to studies in Section 1 data collection

Study type	Relative value units
<i>Plain films</i>	
Extremity	1.5
Spine	2.5
Chest or abdomen	1.5
Skeletal survey	5
IVU	5
<i>Mammography</i>	5
<i>Ultrasound incl. abdomen, urinary, pelvis, breast, MSK, small parts, vascular, other</i>	5
<i>CT</i>	
Brain	5
Spine	7
Thorax (incl. thorax & upper abdomen)	10
Neck	10
Abdomen & pelvis	13
Chest, abdomen & pelvis	27
<i>MRI incl. brain, spine, MSK, body, angio, cardiac etc</i>	20

Table 4. Categories of non-countable (Section 2) activity recorded

## Categories of non-countable radiologist activity recorded (by hours committed per week)

- Interventional/procedural/nuclear medicine activity
- Formal teaching (tutorials)
- Multidisciplinary team meeting (MDT) conducted by lead radiologist
- MDT meeting preparation by lead radiologist
- Formal administrative work (meetings etc)

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# Appendix 2. Gishen's Ready Reckoner

## Is your work output sufficient?

Average no. of cases for the year Per hour	Checking SpR report	CT/MR	Cardiac MR	US	Reporting	Intervention	Complex	Super complex	Neuro Coil	
	100	100	40	100	600	40	20	10	5	
						Breast				
	Barium	Nuclear medicine	PET-CT	SPECT CT/LT therapy	Screening	Symptomatic	Symptomatic + US + biopsy			
60	100	40	40	600	200	40				

### Key

- \* Assume you work 40 weeks in the year (leaving 12 weeks for leave, study leave, illness, meetings, machine breakdown or non-function)
- \* You are contracted to work 30 clinically related hours (+3 hours [10%] for private work)
- \* Use your work output and calculate 'value for money'; ie, does 33 hours of timetabling per week, match your yearly statistics?
- \* Example - you are expected to do an average of 2.5 CT or MR reports per hour  
Therefore: 1 hour x 40 weeks is 2.5 x 40 = 100 reports  
So, if you report 500 CT and 400 MR scans (900), this is equivalent to an average of 9 hours of work per week during your year's work.  
Average salary per consultant including on costs to trust: £120,000 per year

❖ 3000 CT reports = 30 hours of timetable per year

Average salary of consultant and all the added-costs =  
£120,000 pa

∴ Divide 3000 into £120,000 = £40 per scan

❖ Now add in the total time spent on MDTs for each of the medical staff to get your grand total of clinical hours worked.

A maximum of ¼ of your weekly hours for MDT activity

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