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A survey assessment of reporting radiographers' scope of practice in the West Midlands region of the United Kingdom

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ABSTRACT

Introduction: Radiographers have been providing reporting solutions for a number of years. Given the persistent radiologist vacancies and the increased demand on imaging services, the utilisation of reporting radiographers is widespread across England. Capacity and demand issues may lead to reporting boundaries being extended. The aim was to generate an updated appraisal of participants' scopes of practice in the West Midlands of region of England.

Method: Reporting radiographers at 11 healthcare institutions across the West Midlands region were invited to participate in an online survey. Topics covered included reporting scope of practice, onward referrals and suggestion of treatments. Descriptive statistics were generated in Microsoft Excel and free responses were analysed manually.

Results: Response rate was 47% (40/86). The majority (n = 34, 85%) report Emergency Department skeletal examinations, only 12 (30%) report adult chests and only three (8%) report paediatric chests. Of those permitted to refer to other modalities, 85% (n = 23/27) actively do so. Of those permitted to refer to specialist teams, 97% (n = 31/32) actively do so. Only 23% of all participants (n = 9/40) suggest treatments in their reports.

Conclusion: An increased number of participants report chest and abdominal examinations than previously identified. Restrictions in paediatric scopes of practice and adult GP chest examinations are also evident. Participants stated they do include recommendations in their reports by referring to other modalities and for specialist opinions. Suggesting treatment is not common practice and is considered an area for further advancement.

Introduction

Reporting radiographers offer a resourceful way of working through the reporting challenges encountered by radiology departments in the National Health Service (NHS) in United Kingdom (UK) in recent years. Radiographers have long been part of the reporting team, accurately providing reports across a number of modalities[1] contributing significantly to reporting workloads.[2] The worth of this is also noted in the key recommendation in the recent Care Quality Commission (CQC) review of radiology services in the UK[3] which stated that staff and resources should be used appropriately to reduce report turnaround times. In the current economic climate utilising radiographers in innovative ways can help to overcome the challenges in healthcare provision and should be considered integral to collaborative radiology team working.[4]

Radiologist vacancies have been persistently high for the previous six years,[5] and the number of trained radiologists in the UK remains one of the lowest in Europe with only 48 per million population.[6] The demand for radiology services in recent years[7] shows no signs of slowing. Cross-sectional scan activity has risen by between 10% and 12%,[6] respectively, and hybrid imaging modalities have yielded up to 37% annual growth in the year to March 2017.[8] Yet the number of radiologists has remained low. In England, 112 Trusts indicated the use of reporting radiographers in March 2018 with wide variance of workload ranging from 0.8% to 78.9% of x-ray reports authored by a radiographer, with a national median of 25.7%,[9] The recent NHS Benchmarking document highlighted that across the 82 corresponding Trusts, 28% of all x-ray examinations are reported by radiographers.[10] This has been documented as providing tangible benefits for patients.[11–13] Recent studies have

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also highlighted the cost-effectiveness and accuracy of reporting radiographers in interpreting chest x-ray images with noticeable impact on the diagnosis to treatment pathway and government targets.[14,15]

With the continued capacity and demand issues facing many radiology departments, utilising radiographers effectively by extending agreed reporting boundaries may help overcome the burden of reporting backlogs. A degree of increased responsibility and accountability is inherent with extending scope of practice and this is reflected in the severity of potential findings, e.g. recognising a lung mass which then requires further investigation. It is stated that a report should provide the referrer with advice on patient management to prompt appropriate care.[16] If radiographers are to provide a report of comparable standards to their radiologist colleagues, then recommendations need to be considered.

The inclusion of recommendations for further action to help refine the diagnosis is considered to impact positively on treatment pathways and is advocated as being good practice.[16,17] Interestingly, a large scale analysis of three million radiological reports over seven years indicated that only 11% of all imaging reports included follow-up recommendations, and the recommendations in general radiographic reports were only adhered to 42% of the time by referring clinicians.[18] Whilst there are many reasons why recommendations are not followed, such as patient condition improving, or the recommendation being incorrect or unhelpful, a question is raised as to the necessity and importance of such suggestions. However, the report should be grounded in achieving better patient outcomes and the inclusion of relevant recommendations should be given due consideration.

Whilst much of the research to date[14,19–26] illustrates the abilities of reporting radiographers in producing reports comparable to radiologists in terms of accuracy, none have specifically evaluated the helpfulness of the report in terms of the types of advice they include. The aim of this study was to generate an updated and detailed appraisal of the reporting scopes of practice of reporting radiographers in the West Midlands region, including referrals for further imaging, to clinical specialities and suggestion of treatments.

Method

This study utilised an online survey method. It was identified that 12 sites within the West Midlands region (i.e. The West Midlands County, Staffordshire, Shropshire, Worcestershire and Warwickshire) employed reporting radiographers. The sites were a mix of major trauma centres and district general hospitals, all of which offered acute imaging services to adult and paediatric patients. The Health Research Authority online tool[27] deemed the study to be service evaluation. The study was given approval by the local Research and Development team and approval was also obtained from each Research and Development department in the identified Trusts.

The lead radiographer or service manager in each of the sites was contacted and asked to forward on the invitation email to their relevant reporting radiographers which included the survey link. There were 11 sites that agreed to forward on the survey link. Participants were sought from all reporting radiographers employed at the 11 sites. Participants who did not report x-ray images and were not employed at one of the selected sites were excluded from this study.

The survey was accessed on two web-based hosts, Google Forms[28] and Online Surveys,[29] due to unforeseen firewall issues at some sites. The survey was self-designed and contained basic demographic questions, multiple choice style questions and options for comments if needed. To avoid reducing the potential sample size in what was originally considered to be a small population and with the known low response rates of survey studies, the survey tool was not piloted. A consultant radiographer reviewed the survey to assess content validity and to ensure the questions were suitably aligned to the aims of the study. Minor wording changes resulted. Topics that were covered included adult and paediatric reporting scope of practice i.e. which body parts are reported and from which referral sources, as well as referring for further imaging and to other specialities, and suggestion of treatments (see Appendix A). All participants gave consent to participate. No identifiable data was attached to responses to encourage participants to describe their practice openly and honestly. The study was open for six weeks during June and July 2018. The data was exported from the hosts in to Microsoft Excel® (Microsoft Excel, Redmond, WA) and descriptive statistics were generated. Free text responses were analysed manually and categorised accordingly e.g. treatments/chest/antibiotics.

Results

Demographics

Responses were received from 11 sites, indicating a target population of 86. The overall response rate was 47% (n = 40). A post hoc power analysis of the study indicated that due to the low response rate the estimated effect was 0.60, and with $\alpha = 05$, power $(1 - \beta)$ was determined to be 0.75.[30] The individual breakdown of responses and reporters at each site is illustrated in Table 1. Fourteen participants (35%) are qualified to Post Graduate Certificate (PgC) level, 19 (48%) are qualified to Post Graduate Diploma (PgD) level, and seven (18%) hold a Masters (MSc) qualification. The mean (SD, range) participants have been qualified in reporting is 9 (5.7, 1–18) years.

Scope of practice

Participants' scope of practice can be analysed by qualification and this is illustrated in Table 2. Figs. 1 and 2 further illustrate the scope of practice for adult and paediatric reporting by referral sources. Figs. 3 and 4 highlight the different combinations of referral sources and anatomical areas reported for paediatric and adult examinations, respectively.

Referring for further imaging

Twenty-seven participants (68%) indicated that they are permitted to refer to other modalities as per local protocol. Twenty-three (85%) of these 27 participants stated that they are active in

Table 1
Number of reporting radiographers at each site and response rates.

Trust	Number of responses	Number of reporters	Response rate (%)
1	6	6	100
2	7	9	78
3	3	14	14
4	9	16	56
5	1	8	13
6	1	9	11
7	1	1	100
8	3	7	43
9	1	4	25
10	6	9	56
11	2	3	67
Total	**40**	**86**	n/a
Mean	n/a	n/a	**46.5**

Table 2
Analysis of scopes of practice by qualification.

Qualification	Number of participants	Anatomical areas covered					
		Adults			Paediatrics		
		Appendicular	Axial	Chest and abdominal examinations	Appendicular	Axial	Chest and abdominal examinations
Pg Cert[a]	14	12	0	2	8	0	0
Pg Dip[b]	19	19	19	5	19	19	2
MSc[c]	7	7	7	5	7	7	1
Total	**40**	**38**	**26**	**12**	**34**	**26**	**3**

[a] Postgraduate Certificate.
[b] Postgraduate Diploma.
[c] Masters.

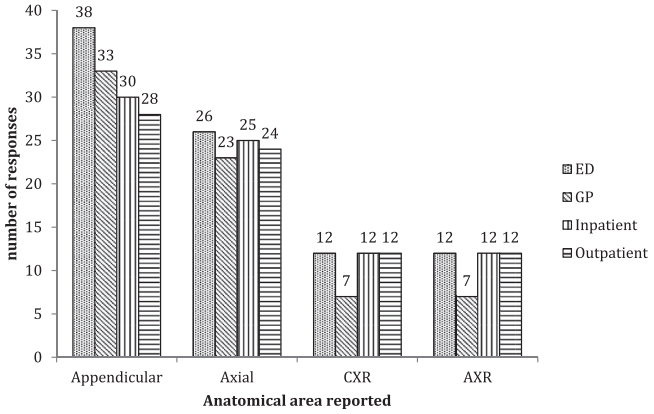

Figure 1. Distribution of participants' scope of practice and referral sources for adults (ED = Emergency Department; GP = General Practitioner).

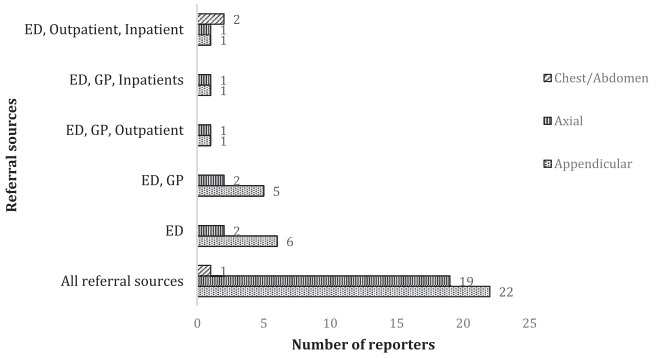

Figure 3. Combinations of paediatric referral sources covered by participants' scope of practice.

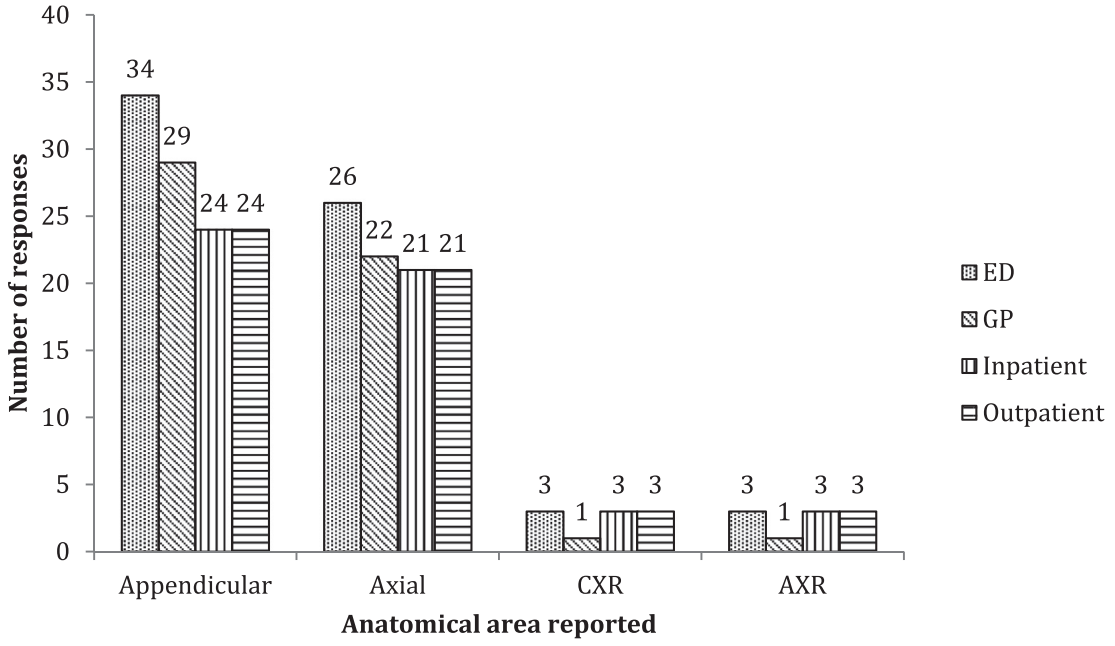

Figure 2. Distribution of participants' scope of practice and referral sources for paediatrics examinations (ED = Emergency Department; GP = General Practitioner).

doing so. Seventeen of the 23 (74%) who actively refer for further imaging can do so by their own accord without discussing with a radiologist. A detailed breakdown of the modalities that participants refer to is shown in Fig. 5.

Referring for specialist teams

Thirty-two participants (80%) indicated that they are allowed to refer to specialist teams as per local protocol, and 98% (n = 31) of

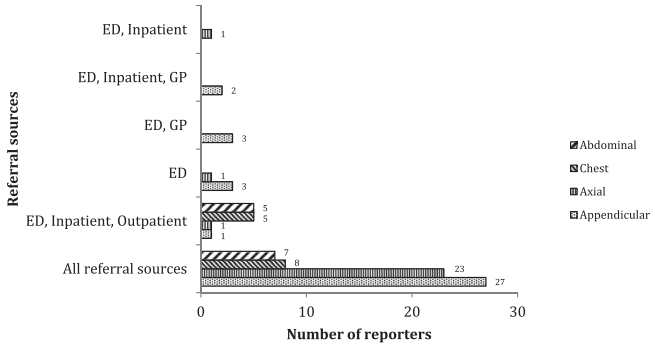

Figure 4. Combinations of adult referral sources covered by participants' scope of practice.

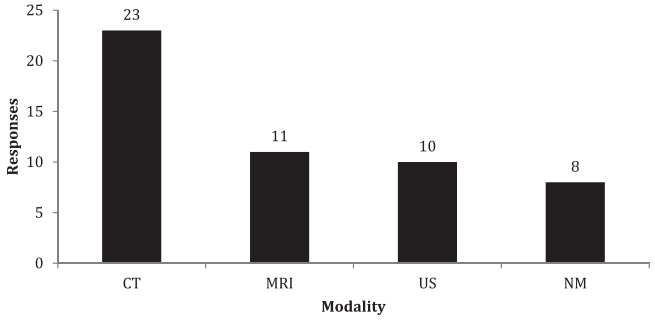

Figure 5. Distribution of further imaging referrals or suggestions.

these participants stated that they actively refer to specialist teams. A detailed breakdown of the specialities that participants refer to is outlined in Fig. 6. Twenty-seven of the 32 participants (84%) who refer to specialities do so by their own accord.

Suggesting treatment

Only nine participants across the whole sample (23%) stated that they suggest treatments in their reports, all of whom report all body parts. These nine participants all suggest antibiotic therapy for infective chest appearances. Two of these nine participants (23%) stated that they also suggest the use of diuretics to treat congestive cardiac failure (CCF), whilst another also suggests the use of anti-inflammatory drugs for treating CCF. Other suggestions for treatment were related to the extremities specifically to immobilisation with wrist splints (n = 2/9, 23%) and neighbour strapping of toes (n = 2/9, 23%).

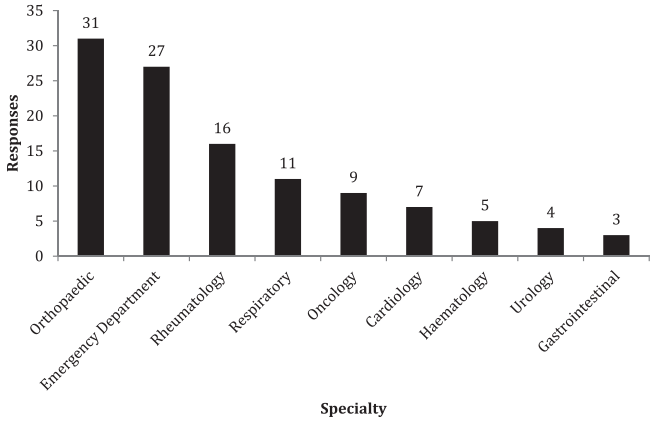

Figure 6. Distribution of the specialities to which participants suggest a referral.

Discussion

The findings of this survey show that the large majority (n = 34/40, 85%) of participants' scope of practice incorporates appendicular examinations from the ED. This is comparable to previous studies,[2,31] and correlates with the increased number of radiographer-led "hot reporting" services previously described.[32] Although, reporting restrictions are still evident regarding the referral sources reported in paediatric and adult categories, with six different combinations of referral sources being reported in each category. This is likely due to local staffing and service needs,[2] and is best illustrated by the fact that only one participant (3%) across the whole sample has a reporting scope of practice that encompasses all body areas from all referral sources for adults and paediatrics. This finding resonates with previous research,[31] which reported that 51% of reporting radiographers have restrictions on their practice (n = 131/259).

The use of teleradiology companies to provide reporting solutions may also prevent the progression of some reporting radiographers extending their scope of practice. In the year to March 2018, outsourcing of reporting was undertaken by 76% of NHS Trusts (n = 102/134) in England[3] with 10% of all x-ray examinations being reported externally.[10] The combination of radiologist shortages and the impact of the CQC radiology review[3] may lead Trusts to pay to externally reduce backlogs with immediate and visible results rather than invest in advanced practitioners who may take a number of years to be as effective.

Twelve participants (30%) report chest and abdominal x-ray images distributed across six different sites, with two sites having the highest number of reporters (three). The number of participants whose scope of practice encompasses skeletal and chest and abdominal examinations has doubled since previous research in 2015,[2] which found that only five radiographers in the Midlands and East region reported skeletal and chest and abdominal examinations. More recent work in 2016[31] suggested there are low numbers of radiographers in the West Midlands reporting chest and abdomen examinations (four and three, respectively). The growth evident in this sample illustrates progression within the region demonstrating an increased reliance on reporting radiographers in meeting demand. However, through analysing the scope of practice of these chest reporters, only seven (58%) report GP chest examinations.

The development of radiographers reporting GP chest examinations can be seen as a key area for progression given the findings from recent studies.[14,22–24] Considering GP chest referrals are the most commonly requested examination, amassing 1.3 million referrals nationally in the year to March 2018,[8] maintaining acceptable report turnaround times might prove to be difficult with added pressure from the upcoming implementation of the 28-Day Faster Diagnosis cancer standard in 2020.[33] These mitigating circumstances should be recognised as drivers for reporting radiographers to report these examinations. The additional increase in demand of cross-sectional and hybrid modalities,[8] along with the current radiologist shortages,[5] strengthens the argument for reporting radiographers to report GP chest examinations.

Only three participants (8%) report paediatric chest examinations, and paediatric GP chest examinations are only reported by one participant (3%). The reasons for this have not been explored in this study but might be similar to previous arguments in which

paediatric examinations may be more likely to receive a discrepant report than adults,[12] with potentially greater consequences.

A high number of participants (n = 23/27, 85%) stated they actively suggest further imaging, and by suggesting further action help to refine the diagnosis.[17] It is interesting to note that a third of participants are prevented from referring for further imaging by protocol, inferring it is perhaps not the individual's choice but their local operating procedure preventing them from including advice relative to further imaging investigations. It would be interesting to explore if all reporters would refer for further imaging if given the opportunity, and any reasons for refraining.

The suggestion of referral for a specialist opinion is also considered to be advice that requires further action.[17] The large majority of participants are allowed to refer to specialist teams as per local protocol, and the large majority of these participants are active in doing so (n = 31/32, 97%). The main specialities that participants suggest referral to are orthopaedics, followed by ED. This reflects the finding that 85% (n = 34) report appendicular ED examinations and 65% (n = 26) also report axial ED examinations. The lesser referred-to specialities reflect the reduced amount of abdominal examinations undertaken and the small number of reporters who cover these areas. The inclusion of content which assists the referrer in furthering patient management is recognised as good practice,[17] and in this respect these participants exhibit attempts to fulfil Standard 1 set out by the Royal College of Radiologists' standards for interpretation and reporting of imaging investigations.[5]

Despite those who suggest treatment having scopes of practice that encompass all body parts, there is a predominance of chest-specific recommendations with only a small number of immobilisation suggestions for extremities. Although research has proven that just over half of the follow-up recommendations in chest radiograph reports are adhered to,[18] a key chest interpretation textbook[34] advises adoption of the “six-week rule” follow-up for infective appearances, stating antibiotic therapy as the appropriate treatment. Experiential learning through comparing gold standard reports during training is possibly another contributing factor in reinforcing the inclusion of this suggestion. The use of diuretics to relieve congestive symptoms and fluid retention is recommended for all types of heart failure,[35] and therefore the suggestion of this treatment can be considered good practice. However, the suggestion of non-steroidal anti-inflammatory drugs (NSAIDS) for heart failure patients should be avoided due to the increased cardiovascular morbidity and risk of death in elderly patients using diuretics.[36,37]

It is unclear why suggesting treatments for extremity injuries is not practiced by more participants. Over half of participants (n = 27, 58%) are afforded the autonomy to refer for further imaging studies, and to other specialities (n = 32, 80%), yet over three quarters of the sample abstain from suggesting treatments. Extremity treatment recommendations may not have been frequently offered during training experiences, and this may simply be a continuation of preceding practices. The absence of treatment and fracture management teaching in reporting course curricula may have also compounded this issue. It is the radiographer's prerogative to practice within their capabilities and by not offering treatment suggestions they demonstrate awareness of their limitations determined by education and the extent of their competence.[38]

It is acknowledged that suggesting treatment options is not widely practiced by reporting radiographers and this is an area where further progress could be made. It is encouraging to see that all chest reporters are active in suggesting appropriate treatment for infective appearances. Further advancement here could potentially include suggesting pneumothorax and pleural effusion treatments in line with the British Thoracic Society guidance,[39] with prior local agreement and training. There is also opportunity for increasing the frequency and range of treatment suggestions for extremity examinations. Progression here may include collaboration with the ED to develop an injury management framework outlining treatment and follow-up plans for report inclusion that might help to streamline patient flow.

Study limitations

A limitation of this study concerns that of the response rate, which is less than half of the targeted population across the 11 active sites. It is important that the potential effects of non-response bias are appreciated by the reader and they recognise that this sample cannot be considered representative of all reporting radiographers in the West Midlands region. However, this is the first study of its type for this region and does provide an interesting insight in to referral allowances and practices and provides routes for further investigation. Another limitation is that the body part that participants are referring and the type of examination they are suggesting further imaging for has not been evaluated. Similarly, this has not been explored regarding referring to specialist teams, but this is recognised as another interesting area for future study. Finally, the survey method is reliant upon participants' honesty and integrity. Analysis of the demographic data shows no duplicate responses and it is assumed that there are no falsified responses. In order to gain a true perspective of the content of reports authored by radiographers, departmental audits would provide defining results. However, this would also provide a number of logistical challenges to undertake on a wide scale.

Conclusion

The low response rate in this study does place limitations on the overall generalisability of study findings. Almost 50% of reporting radiographers within the selected sites participated and as such there are important outcomes which cannot be considered generalisable. Study data does provide an interesting insight in to the reporting scopes of practice of those who participated. Limitations in reporting paediatric and adult examinations are seen across the sample, most notably in paediatric chest and abdominal images from all referral sources and adult chest images from the GP. Consequently, these are identified as realistic areas for further progression. Analysis of the data implies that those participants who are permitted to do so, do actively refer to other modalities and for specialist opinions. A small minority suggest treatments that are mainly chest-specific; as such this is also seen as an area where further progression could be made.

Conflict of interest statement

None.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.radi.2019.01.006.

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