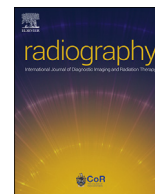




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General Practitioner satisfaction with a radiographer-led general radiography reporting service at a district general hospital in the UK

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ABSTRACT

Introduction: To evaluate General Practitioner (GP) satisfaction with a radiographer-led general radiography reporting service in a single district general hospital in order to identify areas for improvement.

Methods: A mixed method online survey was created and distributed to all GP surgeries in the catchment area of the hospital with a 6 week response period.

Results: Although the majority of GPs are satisfied with the service they receive, there were areas for improvement. Key areas included methods of contacting radiology department with queries, report content/terminology and recommendations for follow-up.

Conclusions: Although the majority of GPs are happy for radiographers to report imaging examinations some resistance was encountered, particularly with regards to chest reporting. Recommendations are made for improvements designed to address these issues.

Implications for practice: This article is one of the first in the UK to assess GP satisfaction with general X-ray reporting services. As the majority of GP reporting in the UK is now completed by radiographers, the results will allow reporting teams to tailor their service, in order to improve outcomes for both commissioners and patients.

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Introduction

Over the past decade there has been a significant shift in decision making power in the NHS from specialists to General Practitioners (GPs). The Government's White Paper, "Equity and Excellence: Liberating the NHS" placed new responsibility on GP consortia for the commissioning of health care services in the UK.¹ This was enforced in 2012 via the Health and Social Care Act. Since 2013, Clinical Commissioning Groups (CCGs) of general practices have been established to commission a variety of NHS services including urgent/emergency care and acute care.² In 2018/19, CCGs spent £85.4 billion out of the £112.7 billion that NHS England spent on the day-to-day running of the health service.² Commissioning continues to evolve and in 2019 NHS England and NHS Improvement proposed legislative changes with onus on joint working between commissioners and providers. With this in mind it is crucial that diagnostic imaging

providers gain awareness of GPs' service requirements if they are to deliver effective services that are value for money.

There has been limited work into the evaluation of GP satisfaction with imaging services both in the UK and in Australia.^{3–5} Only one previous study has been found to evaluate GP satisfaction with UK imaging services.³ A key issue raised by GPs was lengthy report turnaround times and interestingly all of the GPs interviewed supported radiographer reporting as a potential solution. Other key issues included a lack of access to imaging and a lack of sufficient training by radiology in relation to appropriateness of imaging referrals. Despite this there are limitations in the scale of the study and thus the data is not transferrable to other regions. The authors also acknowledge that further research is needed, particularly to address the appropriateness and acceptability of radiographer reporting of GP-referred images.

An Australian study focusing on diagnostic imaging in a rural setting⁴ identified similar key areas affecting GP satisfaction; access to service; promptness and reliability of service; access to training and skill levels and assistance with X-ray interpretation.

The current study was prompted by changes to commissioning services across the NHS and to address the current gap in the

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literature.³ The aim of the study was to undertake an evaluation of the local radiographer-led GP general radiography reporting service, provided in a single District General Hospital in the north of England. Accordingly the objectives were: identify if GPs were aware of who reported their X-rays; determine whether GPs were happy for radiographers to report their X-rays; assess current levels of GP satisfaction with the service; identify any potential areas for improvement and subsequently make recommendations for achieving service improvements.

Method

An electronic survey with covering letter was emailed to the practice manager of all 30 GP surgeries identified within the catchment area for the hospital base site. Surveys have proven to be an effective method of data collection in gathering large quantities of empirical data from a large geographical area at a relatively low cost.⁶ There is no significant difference in response rates between postal and online surveys.⁶

The survey was designed around themes arising from both historical GP feedback of the service and those previously found in the literature.³ The authors also wanted to include specific questions relating to areas of the service they were interested to develop and to identify areas for potential improvement. The survey comprised of 21 questions, including structured Likert-response and multiple choice questions, with open-ended free text comments in order to allow participants to explain their thoughts and assessments. A pilot of the survey was distributed to non-GP colleagues prior to wider distribution in order to gather feedback in relation to grammar, coherence of questions and their appropriateness. The survey was distributed with data collection taking place over a 6 week period during Feb–April 2020.

There has been longstanding debate regarding which terms best describe common radiographic examinations. Authors have historically argued that the term 'plain film' should be replaced by 'projection radiography' or 'conventional radiography'⁷, however radiographers have been unable to agree on a suitable term. In the authors' experience the term, 'plain film' is still the most commonly used, despite being technically incorrect. Consequently, it was decided that this term be used in the online survey as this was considered to be the most understood term by receiving parties.

This term will be used when referring to the survey conducted in the current study.

Approval for this study was sought and received from the local Trust Research and Development Department. This study was classified as service evaluation therefore full NHS Research Ethics Committee approval was not required.

Results

30 responses were received within the timescale, all of which met the inclusion criteria giving a response rate of 19.1% (n = 30/157). Please note that none of the questions were mandatory, and therefore not all results will total 30.

Fig. 1 shows the length of time that respondents have been qualified as General Practitioners. The majority of respondents were between 10 and 30 years qualified (Fig. 1).

80% (n = 24) of respondents stated that they knew which professional group (radiographers, radiologists) reported their plain film X-rays. The remaining 20% (n = 6) were not sure who reported their radiographs.

All respondents were happy for consultant radiologists to report musculoskeletal (MSK) (n = 30), chest (CXR) and abdomen (AXR) (n = 29) radiographs. Almost all respondents were happy for radiology specialist registrars (SpR's) to report MSK (93.3% n = 28) and CXR/AXR (90% n = 27) plain films. Substantially fewer respondents, but still a majority, were happy for radiographers to report MSK (70% n = 21) and CXR/AXR (56.7% n = 17) radiographs (Fig. 2).

Respondents were asked whether they were satisfied with the turnaround time at which plain film X-rays were reported (Fig. 3).

Respondents were given the opportunity to add any additional comments in relation to report turnaround times. Respondents were overwhelmingly positive in their free text comments.

"Excellent turnover & urgent ones are brought to our attention in a very timely manner"

[Respondent ID: 026]

"Excellent rapid turnaround currently; many thanks"

[Respondent ID: 011]

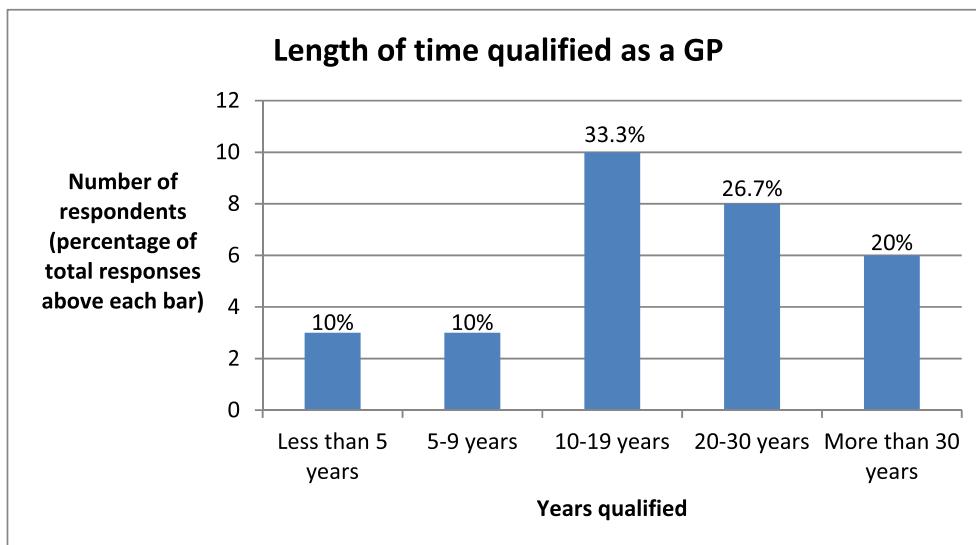


Figure 1. Length of time (years) GP respondents have been qualified.

A significant majority (86.7% n = 26) of respondents were satisfied with the content provided in general X-ray reports (Fig. 4). Free text comments were generally positive.

"I find the quality of the content consistently very good"

[Respondent ID: 010]

However one respondent suggested that radiographer reports were unsatisfactory

"Most of the films reported by radiographers I have to speak to on call radiologist consultant for further advice"

[Respondent ID: 012]

A further respondent commented on the lack of detail provided in Accident and Emergency reports that they may later have access to

"X-rays from A + E often have incomplete reporting for the GP. They have answered the A + E question eg no fracture but not reported arthritic changes."

[Respondent ID: 020]

Most respondents were satisfied with the quality of recommendations and follow up advice (Fig. 5).

Despite the majority of respondents being satisfied with the quality of recommendations and follow ups, several free text comments suggested that improved clarity of follow up may be beneficial.

"There should be more standardisation and clearer follow up recommendations"

[Respondent ID:02]

"Always helpful when a finding includes recommendations eg leave alone/repeat image/refer and if so how urgently is useful"

[Respondent ID:014]

"Few times vague comments/ interpretation on film"

[Respondent ID: 016]

"Comments for follow up not always there"

[Respondent ID: 024]

The vast majority (82.8% n = 24) of respondents were content with the overall length of plain film reports. Most of the remaining respondents (13.8% n = 4) felt that the length of reports was too short and more detail was required, whilst just 1 respondent (3.5%) felt that the reports were too long and too much detail was included.

80% (n = 24) of respondents suggested that the level of terminology used within reports was just right. The remaining 20% (n = 6) stated that the level of terminology used was too complex/specialised. No respondents felt that the terminology used was too basic (Fig. 6).

Free text comments suggest that respondents were confusing general radiography with other imaging modalities.

"Sometimes reports state things are, for example, hyperechoic etc without information to advise what that suggests in the clinical context"

[Respondent ID: 030]

"There is an issue of some MRI scans being full of 'T-weighted' jargon; also Brain CT sometimes simply state the diameter of key structures without explaining the significance"

[Respondent ID: 005]

However issues with terminology of plain film reports were also identified by respondents:

"Very occasionally there has been terminology used that I have had to google"

[Respondent ID: 015]

"Occasional clarity with comments is required"

[Respondent ID: 020]

One respondent also highlighted the potential effect of patients being able to view reports from April 2020 on the terminology used.

"Be aware that patients will be able to view comments as of April so may need to use more basic clear language"

[Respondent ID: 006]

86.7% (n = 26) of respondents either agreed or strongly agreed that the report always answered their clinical question. Just 1 respondent (3.3%) felt that reports didn't answer the clinical question. The remaining 10% (n = 3) neither agreed nor disagreed with the statement.

A slight majority (56.7% n = 17) of respondents felt they were satisfied with the ease of contacting the Radiology department should they have a query regarding a general X-ray report, although a quarter (26.7% n = 8) were not happy with the ease of contacting Radiology (Fig. 7).

Free text comments were both positive and negative.

"This needs to improve ... ? dedicated telephone line"

[Respondent ID: 006]

"We are always put through to secretaries"

[Respondent ID: 012]

"Dedicated number should be available for GPs for any questions"

[Respondent ID: 016]

"Quick response when needed"

[Respondent ID: 020]

"Email advice & guide is excellent & has a quick turnaround"

[Respondent ID: 026]

Most respondents expected chronic conditions to be mentioned in a CXR report, however most did not expect degenerative changes in shoulders to be described (Fig. 8).

One free text comment suggested that although they didn't expect to hear about MSK problems, doing so is helpful.

A significant majority of respondents expected old fractures, prostheses and benign lesions to be described on the general X-ray report (Fig. 9).

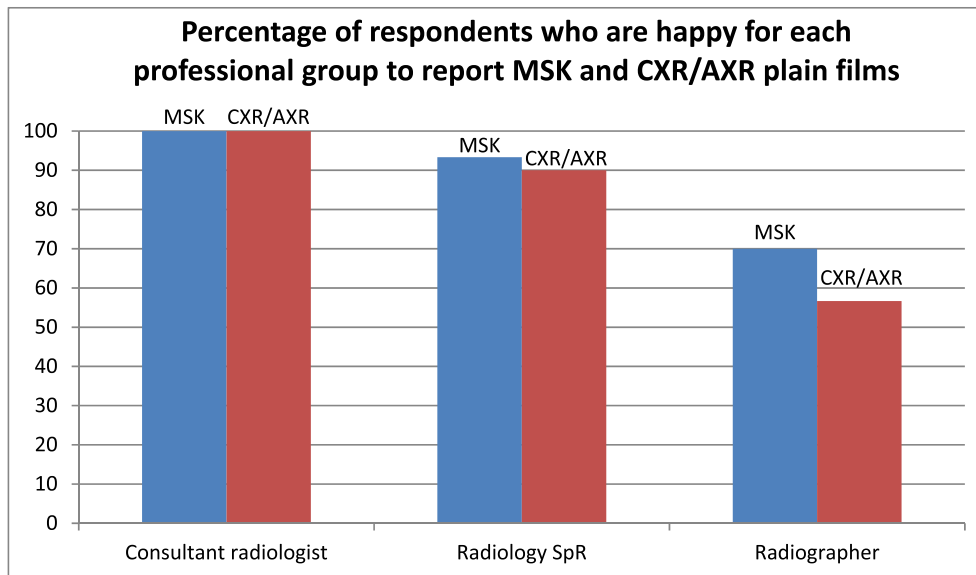


Figure 2. Percentage of GPs happy for each professional group to report their examinations.

Free text comments centred around the importance of further advice or follow up.

“Need for referral if necessary”

[Respondent ID: 002]

“Important if it is a new finding and if it needs

follow up or referral to a specialist i.e. orthopaedics”

[Respondent ID: 012]

“Any unusual finding with advice for follow up would be helpful.”

[Respondent ID: 016]

Once again, benign lesions and post-procedural products such as cholecystectomy/appendectomy/tubal ligation clips were expected to be noted by the majority of respondents (Fig. 10).

Concerning the reporting of osteoarthritis on plain film X-rays, respondents were asked whether they preferred; a descriptive report (joint space narrowing, osteophytes, sclerosis), a simple classification (mild, moderate, severe), or both. The majority (79.3% n = 23) of respondents desired both a description and classification. Just under one fifth (17.2% n = 5) sought just a classification whilst one respondent (3.4%) desired only a descriptive report.

Respondents were asked whether they had any further comments or suggestions for how plain film reporting could be improved, regardless of the professional group reporting the imaging. Of the 11 respondents who provided suggestions or comments, 54.5% (n = 6) stated that clear instructions for follow up or onward referral was important to them.

“Clear follow up instructions. If something is benign and didn't need follow please make clear”

[Respondent ID: 024]

“Timeframes for repeat imaging or recommended onward referral”

[Respondent ID: 014]

“Please state if X-ray needs further action”

[Respondent ID: 012]

“Give clear instructions”

[Respondent ID: 022]

“Clear & concise advice regarding further follow up / referral”

[Respondent ID: 016]

Other suggestions included careful wording of the report.

“Avoid jargon”

[Respondent ID: 012]

“Beware that not too complex terminology if used”

[Respondent ID: 015]

Other comments included satisfaction with the current service and happiness for all grades/profession groups to report the imaging.

“Been very happy with service for the last few years”

[Respondent ID: 011]

“It does not matter who the professional group is,

As long as they are competent to do the job”

[Respondent ID: 029]

“I am happy for all grades to report. It may be worthwhile explaining some of the training to reassure colleagues that appropriate reporting is done by appropriately trained people”

[Respondent ID: 027]

Discussion

The local GP general radiography reporting service is provided almost exclusively by radiographers who reported 98.9%

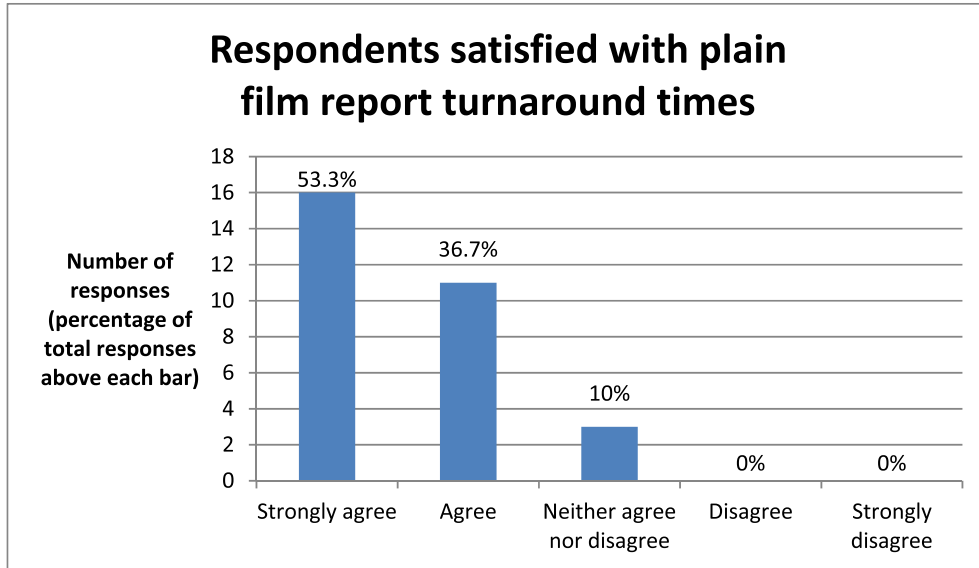


Figure 3. Percentage of GPs happy with plain film report turnaround times.

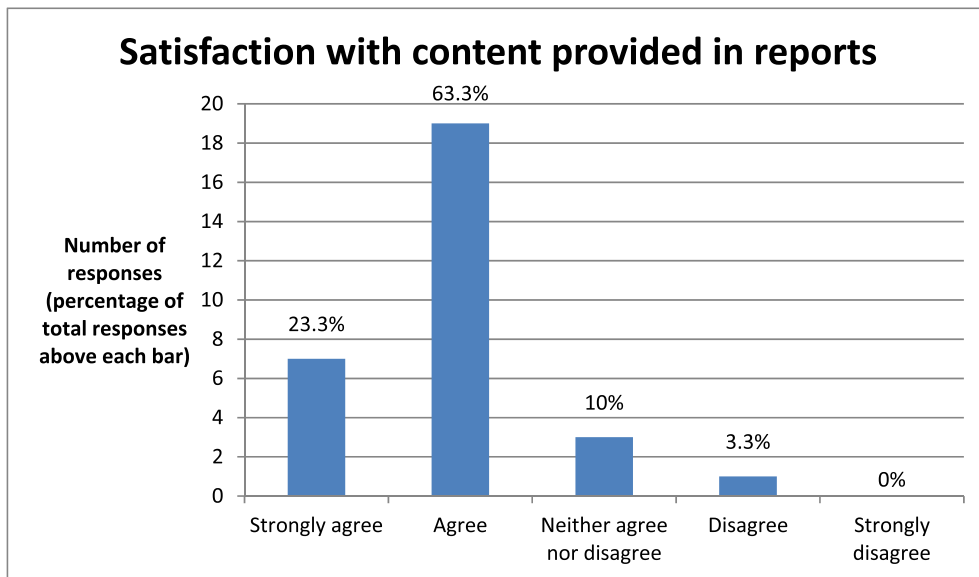


Figure 4. GP satisfaction with report content.

(n = 22,622/22,883) of all GP examinations in 2019. Radiologist reports are primarily provided for paediatric CXR/AXR patients aged <10 years which is currently outside the radiographer scope of practice. The Radiographer reporting team comprises two consultant radiographers, two advanced practitioners and one trainee advanced practitioner. Over recent years significant re-structure of the radiographer reporting team has taken place, including increasing the number of reporting sessions. This has significantly reduced report turnaround times with a current average of 0.7 days turnaround for GP patients in 2020, compared with an average of 5.7 days in 2016.

Previous concerns have been raised in the literature in relation to inefficient report availability for GPs, with a desired turnaround of 3–5 days quoted.³ Results of this study indicate that GPs were

happy with current report turnaround times. 90% of GPs surveyed 'agree' or 'strongly agree' that these were satisfactory and two respondents commented that they found these to be 'excellent'. These findings support previous theory that radiographer reporting could be the solution to reducing report turnaround times to acceptable levels³ and subsequently enable efficient speed of diagnosis.⁸

Although the majority of GPs were found to be satisfied with many areas of the existing service, four key issues emerged from the survey data. These were:

1. Radiographer reporting
2. Contacting the radiology department with queries
3. Terminology and detail of reports

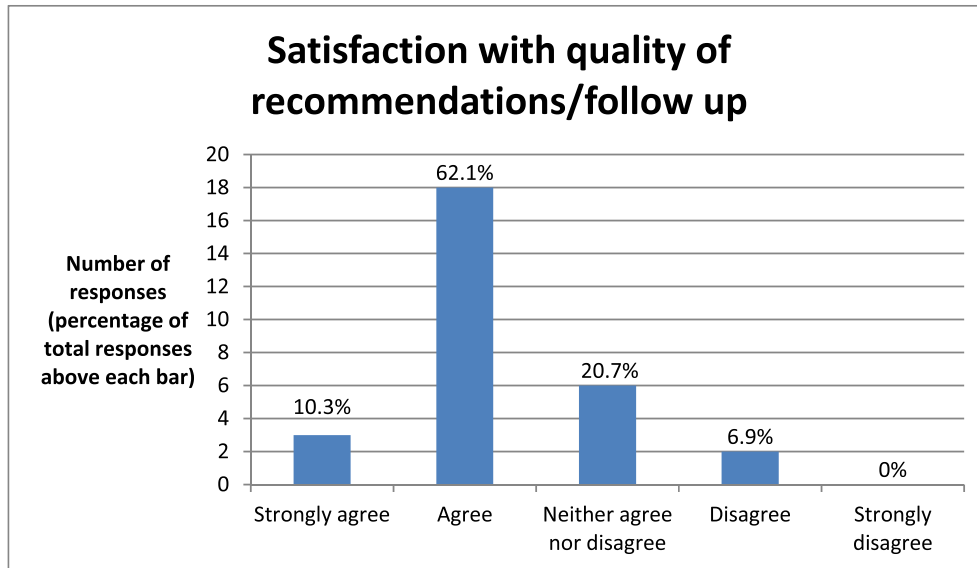


Figure 5. GP satisfaction with report recommendations.

4. Recommendations for follow-up imaging in reports

Radiographer reporting

Whilst there have been historical concerns from radiologists about the contentious issue of radiographer reporting⁹ the opinion of GPs with this regard has rarely been evaluated. GP's in this survey contradicted themselves as 86.7% were satisfied with the content provided in their plain film reports, 46.5% of which were CXR's, however 43.3% were not happy for radiographers to report CXR's. This suggests a degree of resistance to radiographer reporting by GPs in the catchment area, particularly with regard to CXR/AXR studies. Perhaps this arises from the belief that these exams are more difficult to interpret and due to the fact that GPs do not have access to the images to correlate findings. Despite

issues regarding access to images, Cox and Price³ found no resistance to radiographer reporting by the 5 GPs they interviewed. Previous studies have also revealed a very high concordance (92–96%) between radiographer and radiologist CXR reporting, evidencing radiographers can report CXR's with satisfactory accuracy, making similar errors to those made by consultant radiologists.^{9,10}

Responses to other questions in this survey were also contradictory. Of the 13 respondents who said they were unhappy for radiographers to report their examinations, 5 participants stated they 'agree' or 'strongly agree' that the turnaround time, content/terminology and recommendations used in the reports were satisfactory with no comments for any improvements to the service. Given that almost all (98.9%) GP reports are produced by radiographers these comments are surprising. Despite 80% stating they were aware of who reported their examinations, the authors

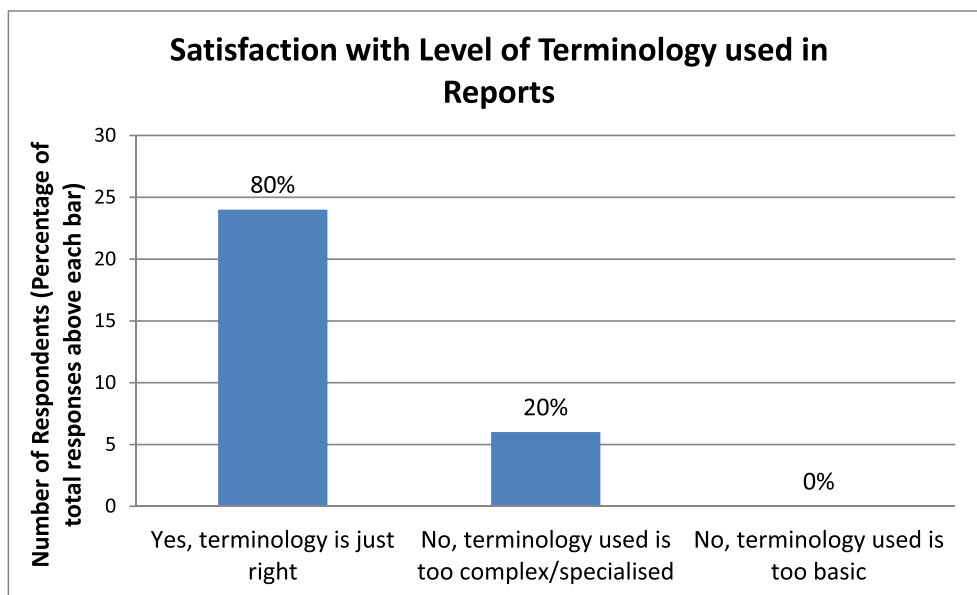


Figure 6. GP satisfaction with level of terminology used in plain film reports.

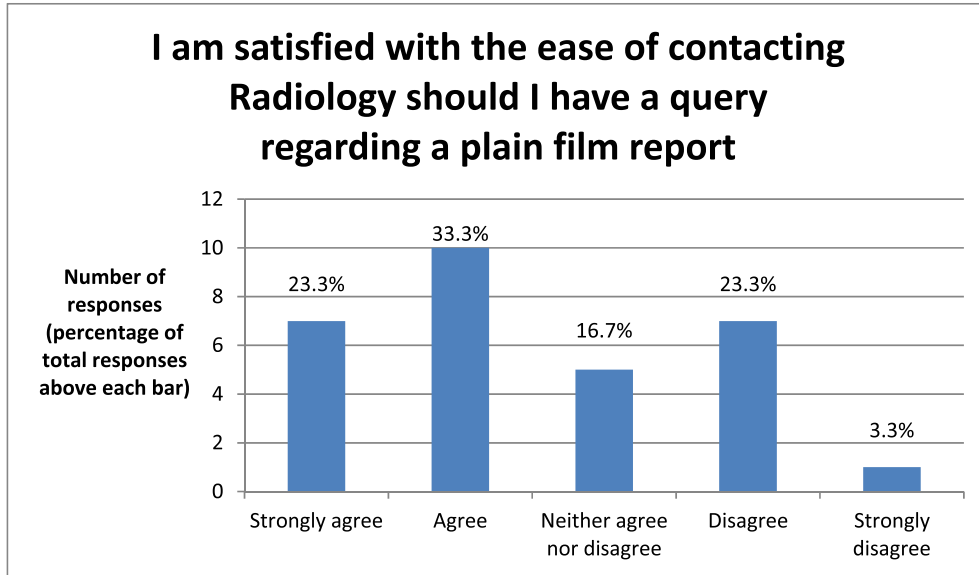


Figure 7. GP satisfaction with ease of contacting Radiology for report queries.

believe there is some confusion between consultant radiologist and consultant radiographer reports.

GPs. Responses in this study suggest that several of the GP's were not aware of this email address.

Contacting the radiology department

Terminology and detail of reports

Just over a quarter (26.7% n = 8) of participants disagreed that the department was easy to contact in times of queries. Several participants commented that this was their main recommendation for improvement of the service with two GPs suggesting that a dedicated phone line should be made available as they are often transferred to the wrong department. Although there were issues with contacting the department by telephone, feedback regarding email contact was much more positive, described as both 'quick' and 'excellent'. The department already provides a generic email account which is manned Mon-Fri by consultant radiographers and consultant radiologists; this allows a specific point of contact for

Whilst the vast majority (80%) of GPs were satisfied with the level of terminology and detail provided within reports, some issues were nonetheless identified. 20% of participants (n = 6) stated that the level of terminology used in reports was too complex/specialised with specific comments relating to difficulty in understanding and objection to the use of jargon. There was no significant link found between years qualified by the GP and issues with understanding terminology. One participant raised an interesting concept that as of April 2020 patients will be able to see their imaging reports and suggested that language may need to be adapted accordingly to allow their ease of understanding. How this may be

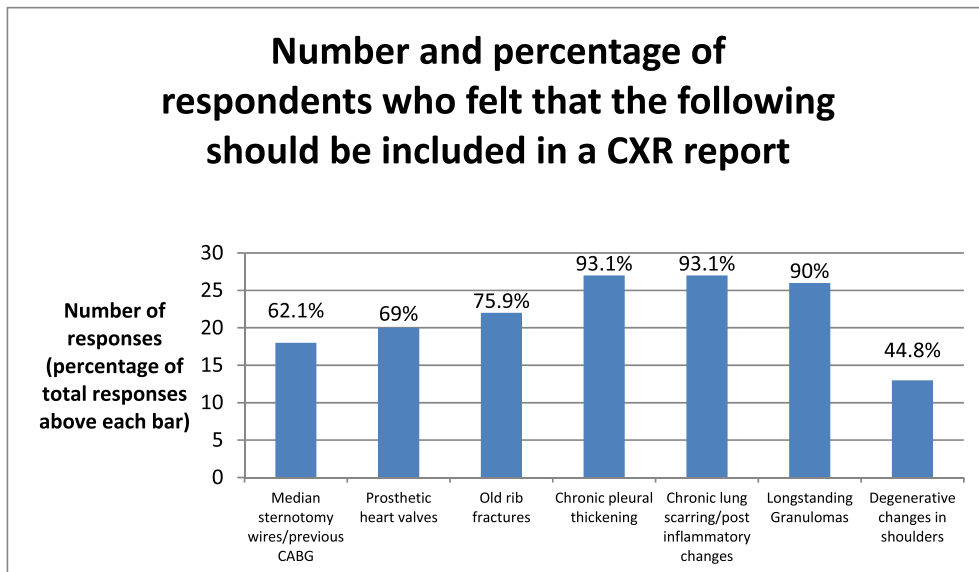


Figure 8. GP preference of chronic conditions to be included in chest reports.

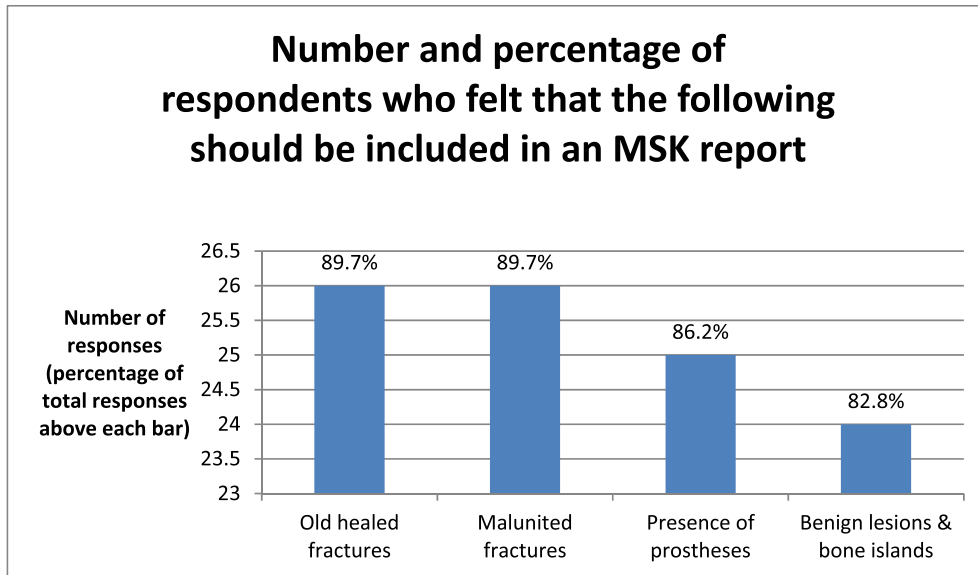


Figure 9. GP preference of chronic conditions to be included in chest reports.

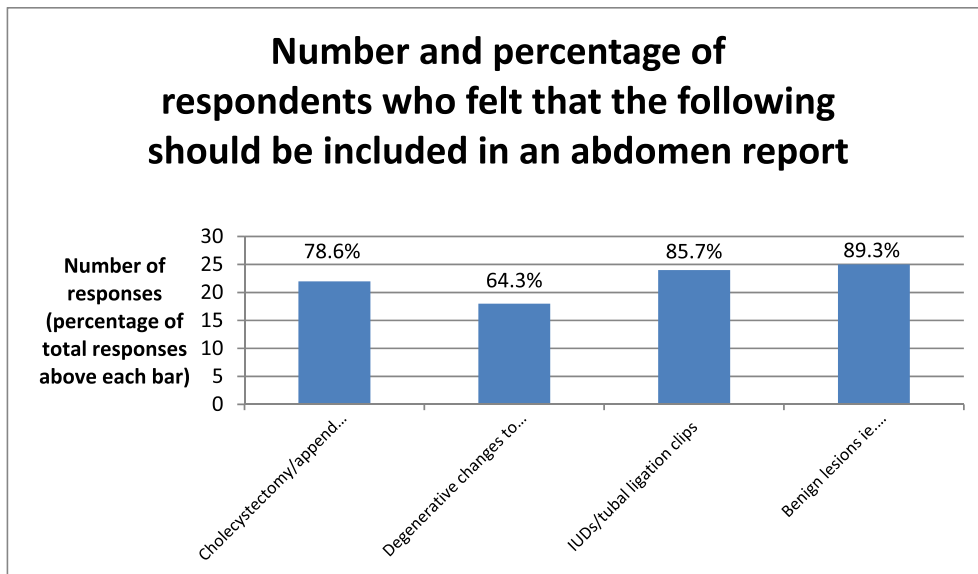


Figure 10. GP preference of chronic conditions to be included in abdomen reports.

achieved, whilst still producing a coherent medical report, is unclear. Further research, both locally and nationally, is needed regarding GP satisfaction with report terminology after this initiative has taken place to assess the impact on reporting practice.

Cox and Price³ identified concerns from GPs in relation to report content; including report quality, reports not answering the clinical question and reports lacking sufficient detail. Our results indicate that a significant majority of GPs were satisfied with the length of reports (82.8%) and that the report always answers the clinical question (86.7%). One participant however raised concerns that reports produced for patients presenting to the Emergency Department are often 'incomplete' and only answer the referral question (i.e. fracture/no fracture). This suggests that documenting other pathologies present, such as arthritic changes, in these reports may be of benefit as these may be referenced later by GPs. The majority of GPs expected chronic features and any medical devices

to be identified on all MSK, CXR and AXR reports. The only exception was degenerative changes of the shoulders on CXRs. For conditions which require grading (such as arthritis), a description of features followed by the grading (mild, moderate or severe) was felt to be most appropriate.

Recommendations for follow-up imaging

Whilst almost three-quarters (72.4%) of GPs surveyed 'agree' or 'strongly agree' that recommendations for follow-up imaging are satisfactory, issues were raised in free-text comments. Several GPs raised concerns that the report recommendations lacked sufficient clarity, particularly in relation to follow-up requirements on chest radiographs with chronic pathologies. Traditionally, comments relating to follow-up have only been provided on CXR reports where there is acute pathology (eg consolidation) and malignancy

needs to be excluded. The results of this study suggest that there is some confusion with GPs where chronic pathology (scarring, granulomas etc) is concerned and that a comment stating that there 'no need for follow-up' on reports would be beneficial.

GPs need the reassurance that advice provided in imaging reports is of expert quality.⁸ A number of GPs commented that on some reports descriptions of pathology were vague and that standardisation of reporting style would be beneficial. A concise interpretation of the findings, along with clear follow-up recommendations was a clear expectation. This correlates with current Royal College of Radiologist guidelines to produce a summary of the findings with clear recommendations at the end of each report.¹¹

Limitations

A significant limitation of both postal and online questionnaires is their low response rates.¹² Response rates of 30% are typical of postal surveys¹³ and rates from online surveys are thought to be even lower,¹⁴ suggesting that although the current study's response rate of 19.1% is low, it is acceptable. It is worth noting that data collection took place during the early phase of the COVID-19 pandemic, which may have affected response rates.

Some of the survey questions were written based on the authors' preconception of issues that they believed to be most relevant to the GPs. This introduces the potential for researcher bias from the outset,³ however the authors attempted to minimise this by referring to issues previously raised in the literature and from previous informal gained from GPs over the previous year.

Recommendations

Three interventions are proposed to fulfil the requirements identified in this study. The first is to ensure that all GPs are made aware of the dedicated email address which provides a direct line of communication between GPs and the reporting team. This should not only ensure ease of contact but greater communication with the radiographer reporting team should also provide the GPs reassurance relating to the expertise of the team.⁸

The local GP general radiography reporting service is provided almost exclusively by radiographers and delivers report turnaround times that are enviable within the UK. Despite significant positive feedback in a number of areas, 43.3% were still not happy for radiographers to report CXR's. This needs further investigation to appreciate the reasoning and whether there is confusion of who currently reports their examinations.

The requirement for more clarity in follow-up recommendations was pertinent in the feedback. The researchers propose that training be delivered to ensure standardisation of report structure and provide clear instruction when follow-ups are or aren't required on both acute and chronic pathologies.

This work represented an evaluation of the local GP plain film reporting service on the back of limited existing research. The findings only apply to this particular NHS Trust and even then the response rate was below 20%. Findings may not be representative of local or national practice and may not be transferable, although they will help inform developments of the local service. Further research is required nationally to confirm their applicability elsewhere. The authors propose that further research would help to assess the potential impact of patients being able to view their reports on the appropriateness of report terminology.

Conclusion

Overall, GPs appear satisfied with general X-ray reporting service that they receive, although there are areas for improvement. The vast majority (90%) of respondents were satisfied with general X-ray report turnaround times whilst 86.7% were satisfied with the content provided in these reports. Most respondents were satisfied with the quality of recommendations and follow up advice and just one respondent (3.3%) felt that reports didn't always answer the clinical question. Over a quarter of GPs didn't find it easy to contact radiology, despite a dedicated email address for queries. The existence of this email address needs to be promoted locally in order to increase uptake in its use. There is evidence that GPs would welcome more clarity and reduced complexity of their general radiography reports, with clear recommendations regarding the need for follow-up imaging in cases of both acute pathology and chronic diseases. Training in relation to standardisation of report structure should help to address this issue. A brief description of chronic pathologies (such as lung granulomas or healed fractures) and the identification of any medical devices were deemed useful by GPs. They also preferred both a brief description and subsequent grading of osteoarthritis within their MSK reports.

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Conflict of interest statement

None.

References

1. Department of Health Equity and Excellence. *Equity and excellence: liberating the NHS [White Paper]. Cm. 7881*. London: HMSO; 2010.
2. Wenzel L, Robertson R. *What is Commissioning and how is it Changing? The King's Fund*. The King's Fund; 2019. Found online at: <https://www.kingsfund.org.uk/publications/what-commissioning-and-how-it-changing>.
3. Cox WAS, Price R. What general practitioners require of diagnostic imaging departments: a case study. *Radiography* 2014;**20**(2):131–6.
4. Sounness BD, Hughes CJ, Winzenberg T. Rural GPs' satisfaction with radiology services to their communities: a qualitative study. *Rural Rem Health* 2008;**8**(902):1–10. 2008.
5. Pallan M, Linnane J, Ramaiah S. Evaluation of an independent, radiographer-led community diagnostic ultrasound service provided to general practitioners. *J Publ Health* 2005;**27**(2):176–81.
6. Lewis E, Hardy M, Snaith B. An analysis of survey reporting in the imaging professions: is the issue of non-response bias being adequately addressed? *Radiography* 2013;**19**(3):240–5.
7. Pope TL. "Conventional radiograph," not "plain film." *Am J Roentgenol* 1998;**170**(6):1426.
8. Royal College of Radiologists & Royal College of General Practitioners. *Access to imaging*. London: A joint statement from the Royal College of General Practitioners and the Royal College of Radiologists; 2010. RCR.
9. Royal College of Radiologists. *Staffing and standards in departments of clinical oncology and clinical radiology*. London: Royal College of Radiologists; 1993.
10. Woznitza N, Piper K, Burke S, Patel K, Amin S, Grayson K, et al. Adult chest radiograph reporting by radiographers: preliminary data from an in-house audit programme. *Radiography* 2014;**20**(3):223–9.
11. Piper K, Cox S, Paterson A, Thomas A, Thomas N, Jeyagopal N, et al. Chest reporting by radiographers: findings of an accredited postgraduate programme. *Radiography* 2014;**20**(2):94–9.
12. Royal College of Radiologists. *Standards for interpretation and reporting of imaging investigations*. 2nd ed. London: RCR; 2018.
13. Jones HC, Manning D. A survey to assess audit mechanisms practiced by skeletal reporting radiographers. *Radiography* 2008;**14**(3):201–5.
14. Frankfort-Nachmias C, Nachmias D. *Research methods in the social sciences*. 4th ed. London: Hodder and Stoughton; 1992.