(Insight)

Supporting Imaging and Radiotherapy Practice

Edition 7 | Spring 2023

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Leadership in imaging services

What do radiographers need to succeed?

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THE SOCIETY OF RADIOGRAPHERS

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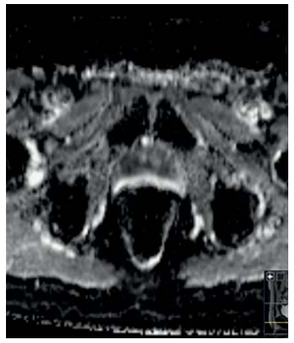

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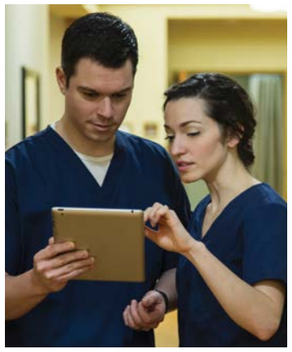
Rectal gas in prostate MRI

What are the options when rectal gas degrades diagnostic performance?

Diffusion Weighted Imaging (DWI) is one of the functional techniques in MRI. DWI is an important component of multi-parametric MRI (mpMRI) of the prostate. However, DWI is prone to susceptibility-related artefacts arising mainly from rectal gas and metal hip replacements in prostate MRI. The rectal gas artefacts may reduce the quality of the DWI of the prostate, which can affect image interpretation, or they may be confused with pathology.

This case study presents what can be done in the event of rectal gas degrading DWI quality and diagnostic performance.



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Senior leadership in imaging services

What skills, experience and qualities do radiographers need to succeed in senior leadership positions in the NHS?

In 2021, the government launched a review of leadership in health and social care in England, led by Sir Gordon Messenger. The Messenger review's aim is to drive improvements in leadership by reviewing good practice and spreading this across the country to ensure all areas of the health service have a standardised approach to leadership development and support.

This discussion paper identifies the specific leadership competencies and/or skills needed for radiographers to become senior healthcare leaders and to support opportunities for leadership development at all levels of seniority in departments and the imaging networks.

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Radiation-induced nausea

Critical analysis of the management of a patient suffering with radiation-induced nausea

This case study refers to a consultation the author undertook in the radiotherapy department, supervised by her practice educator during her non-medical prescribing qualification.

It shows how following a consultation model can be useful when embarking on a new role or building rapport with a patient to provide an element of structure to consultations.

The author explains how she gained an understanding of the presenting complaint and a thorough history of a patient's medical background to reach diagnosis. The case study enabled the author to reflect on her practice, seek feedback from colleagues and service users, and consider potential improvements.

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Research ethics applications

Back to basics: what a research ethics committee is looking for in an application

Many radiographers only approach the purpose and remit of research ethical reviews when applying for approval to start research projects. However, professional bodies, including the Society and College of Radiographers, promote learning about ethics because its principles have a significant impact on day-to-day clinical practice and education as well as on research.

Practical advice on completing research ethical approval forms is often lacking, which can result in the need for amendments, which delay the approvals.

This article aims to dispel some concerns and explains what a research ethics committee looks for in an application.

Also in this issue

New learning

Regulars

Issue 7
Spring
March 2023

Save your learning with *Insight* magazine

Plan, record and evaluate your learning with CPD Now

Insight is the official CPD publication of the Society and College of Radiographers. Our vision is to share research, knowledge and timely evidence of best clinical practice, while providing readers with opportunities for CPD that are relevant to the world of diagnostic and therapeutic radiography.

The emphasis is on practical applications of new ideas to inspire clinical practice as well as encourage role development and highlight advanced practice.

Submissions are welcome from authors with any level of writing experience – part of our role is to be a "gateway" publication for new and developing authors, continuing to build the capabilities of radiographers and the wider evidence base for professional practices. Typical contributions include primary research articles, systematic and narrative literature reviews, case studies, posters and communication pieces to report new developments, as well as correspondence. To find out more, see the guidelines for authors on page 49 or visit *www.sor.org/insightauthor*.

An important part of the *Insight* mission is to provide learning in practical ways and to make it as easy as possible for you to start and record your CPD journeys. Many of the articles will end with a short section offering a list of key points or questions for your own personal reflection (see box).

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Welcome to the spring edition of *Insight*

Guest editorial

Editorial board member Alice Jenkins reviews the new issue

Welcome to the spring edition of *Insight*. Leadership is a term often confused with management when, in fact, we should all strive to be effective leaders in our approach to patients, team members, our hospitals and fields. NHS England states that there is a link between strong leadership, high-quality care and a caring and compassionate culture, and leadership is about thinking differently and being adaptable. All of the articles in this edition have a link to leadership, through undertaking audits and research, advanced practice or looking at senior leadership within imaging services.

Our first article by Sophie Paterson confirms the importance of chest X-rays in a range of pathologies throughout a patient pathway and focuses on those that present with lobar collapse. This comprehensive article discusses how to identify lower, upper and middle lobe collapse and common pathologies that account for the visualisation.

Eric Onwuharine, Emma Hyde and Alexander Clark discuss diffusion-weighted imaging when scanning the prostate in MRI and the challenges that rectal gas can impose on achieving diagnostic images. It demonstrates that a different approach and using initiative when planning scans in different orientations can produce accurate images.

Jennifer Unsworth investigates the characteristics required for successful leadership positions within the NHS. She discusses the competencies required for radiographers to succeed as senior healthcare leaders and looks at leadership through development and training, challenges and key skills.

Nikhil Shah, Katie Norwood, Clarrissa Sanders, Juliet Polkey, Jagadish Kalasthry, Terence McGuckin and Dr Anita Wale have produced a poster showing the results of a departmental audit, looking at the quality of rectal MRI scans for the diagnosis and management of rectal cancer. This audit proves that by scrutinising standard practices and conducting audits, valuable and clinically beneficial changes can be made to current practice.

There are two excellent articles focusing on research, something that is often underrepresented and an area of unfamiliarity in radiography. The first article is a reminder that all radiographers possess the skills and basic knowledge of research fundamentals through our undergraduate degrees but often lack the expertise to know how to begin. It states how important it is to embed research at all levels of radiography, discusses the limitations faced and provides an insight into project choice. Finally, it provides some funding options. Paul Lockwood's article is a review into a successful application process and what ethics committees are looking for on an application form.

"Radiographers all possess the skills and basic knowledge of research fundamentals"

Natalie Excell leads us through a case study of a patient undergoing radiotherapy. She explores the impact of radiation-induced nausea and the importance that clear and effective communication can have when gaining information. It reveals how listening to patient preference after presenting the options is crucial.

A regular feature in *Insight* is Reporting Snippets. In this edition, Nick Bithray investigates the soleal line on the proximal tibia with some interesting cases and informative images for demonstration.

We welcome all ideas for articles and can offer advice to anyone thinking of publishing. You may not think your daily job is interesting enough but there is always learning to share! ■

About the author

Alice Jenkins is a Clinical Specialist Radiographer at Great Ormond Street Hospital for Children. She works in interventional radiology and undertakes a variety of procedures, such as gastrostomy and gastrojejunal tube changes, central venous access and oesophageal dilatations. She graduated with a BSc (Hons) from Birmingham City University in 2010 and completed an MSc in cardiovascular science at UCL in 2018.

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Read a summary of the author guidelines on pages 49-51

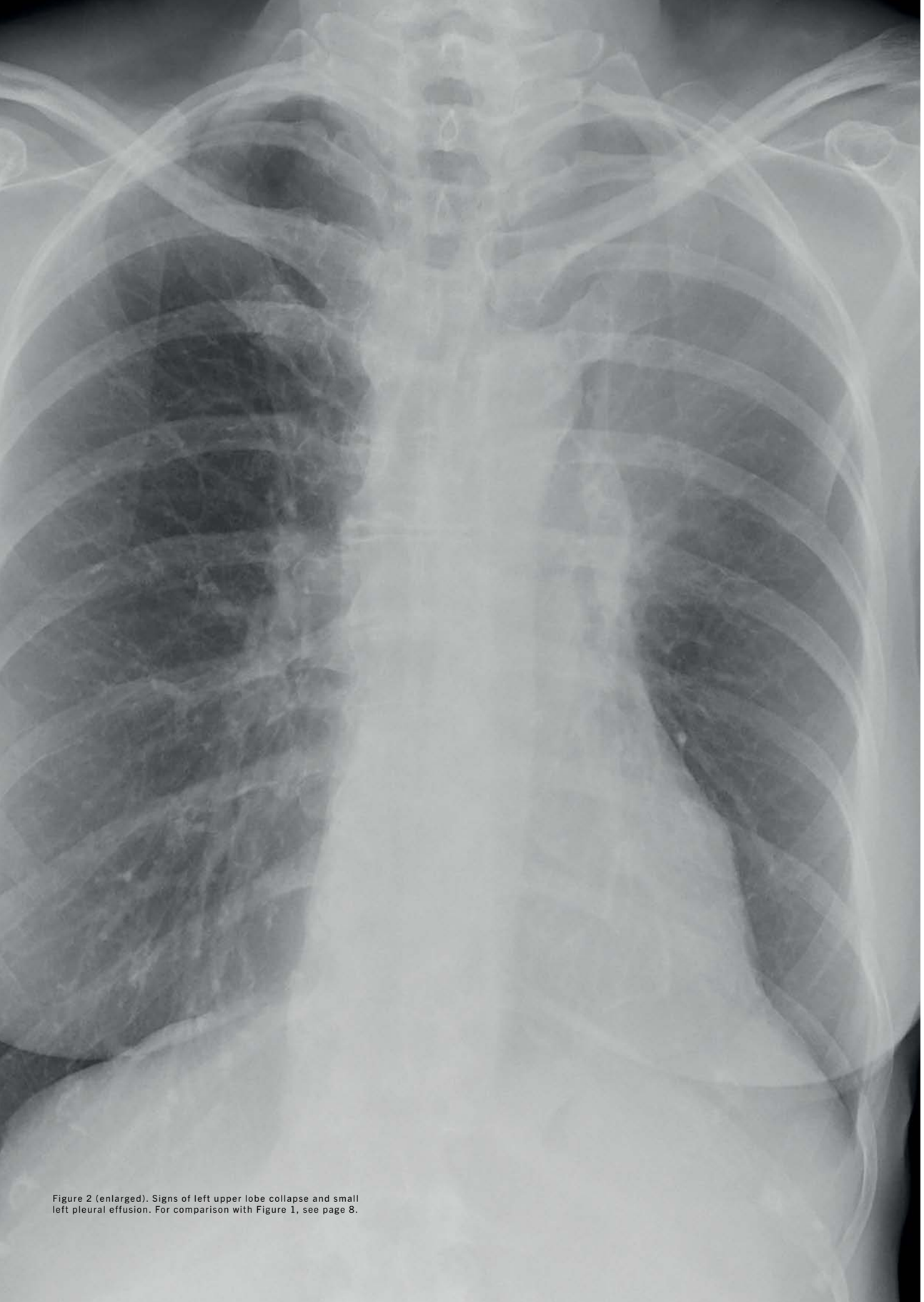


Figure 2 (enlarged). Signs of left upper lobe collapse and small left pleural effusion. For comparison with Figure 1, see page 8.

Left upper lobe collapse

A case study and overview of the X-ray appearances of lobar collapse

Sophie Paterson

The chest X-ray is often the first-line investigation for the adult patient presenting with a range of symptoms via the general practitioner (GP) or emergency pathway. This case study follows the imaging pathway of a patient presenting with left upper lobe collapse, initially diagnosed on a chest X-ray.

Knowledge of the plain film signs of lobar collapse is crucial for any practitioner involved in reviewing chest X-rays. This will improve patient outcomes by guiding the need for urgent further investigation, leading to prompt diagnosis and treatment. The direct and indirect signs of lobar collapse on the plain film chest X-ray are discussed in this article, with review of the obvious and more subtle signs.

Practitioners and reporters should aim to undertake a thorough search strategy to ensure timely diagnoses and further investigations. Departments may consider providing learning materials for teaching and reinforcing knowledge in this area.

Case presentation

A 61-year-old woman presented to her GP with a history of intermittent cough for more than six weeks with white foamy phlegm. She also had pain in her chest and back. These clinical details gave justification for a chest X-ray[1] because they could indicate pathologies, such as infection or lung cancer, requiring active management.

A chest X-ray is a commonly requested first-line investigation and is useful to confirm or exclude a wide range of diseases/disorders, such as cardiovascular, respiratory, trauma and malignancy.

Review of the imaging history revealed a normal chest X-ray in December 2019 (Figure 1). The X-ray was duly performed (Figure 2) and reported the following day by a reporting radiographer. Findings revealed signs of left upper lobe collapse and small left pleural effusion. As lobar collapse can have malignant aetiology as well as benign[2], the patient was placed on the lung cancer pathway, following departmental protocol.

Management

As the chest X-ray appearances could be due to malignancy, the patient was referred on to the two-week-wait lung cancer pathway, following local protocol. The Royal College of Radiologists has produced standards for the communication of radiological reports and fail-safe alert notification[3]. These state that it is the responsibility of the radiologist/reporting radiographer to flag reports where they feel a fail-safe alert is required (Standard 2, page 4).

Timely and effective communication of reports to those who treat patients is essential. Failure to communicate critical, urgent or significant findings can have serious consequences for patients and could result in litigation. Local protocol includes a radiology information system (RIS) alert, which ensures the report is emailed to the referrer and the multidisciplinary team (MDT) co-ordinator.

A standardised text box was also inserted into the body of the report, reading as follows: "This patient seems likely to have a new diagnosis of cancer which has not been noted in the clinical details. This has been communicated to the referring clinician who is responsible for acting on the results and ensuring that the patient enters or progresses on the appropriate cancer pathway. The cancer pathway office has also been notified and may contact the referrer or GP to expedite an urgent cancer referral if clinically appropriate."

The patient was subsequently referred for a computed tomography (CT) scan, which was performed eight days later. A CT scan can accurately determine the presence, size and site of an obstructing lesion, and whether further investigation is required, such as bronchoscopy or biopsy[2].

The CT scan confirmed complete upper lobe and lingula collapse (Figures 3a and 3b) without clear cause evident, and additional findings of prominent aorto-pulmonary and right hilar lymph nodes and sclerotic right ninth rib lesion. The report recommended bronchoscopy.

A positron emission tomography (PET)-CT was performed four days later, which reported left upper lobe bronchus »

Figure 1. The imaging history revealed a normal chest X-ray in December 2019.

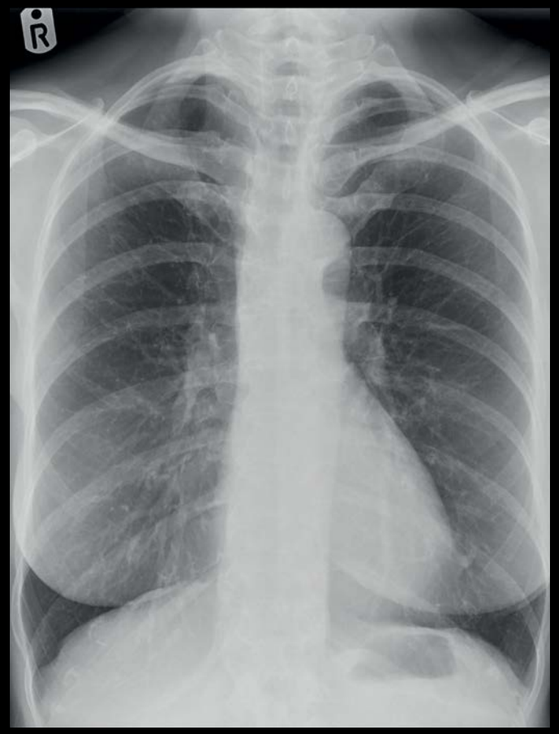
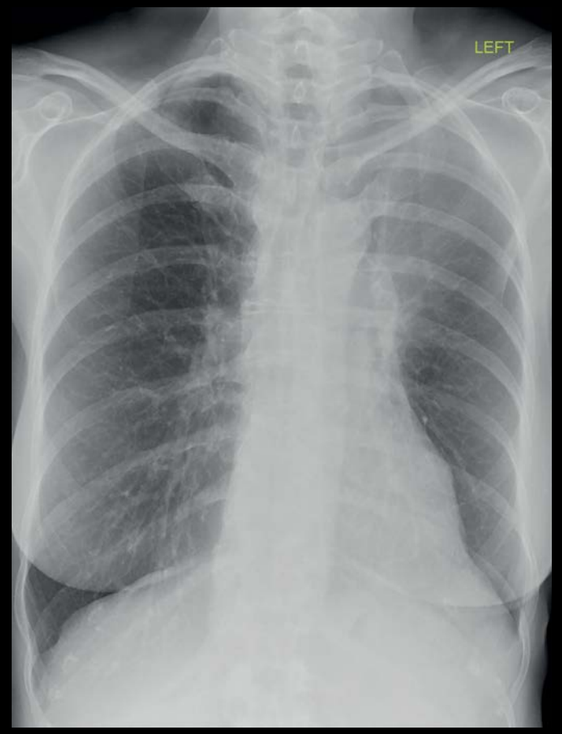
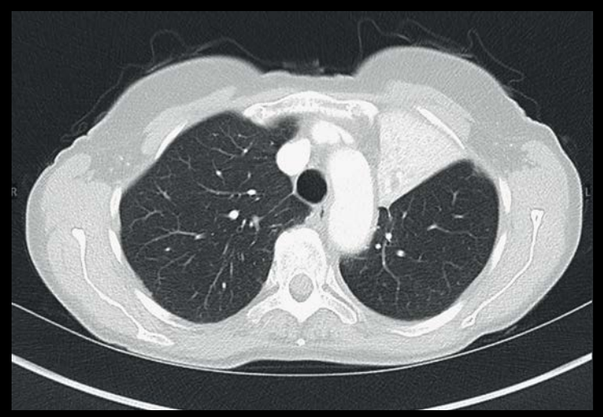
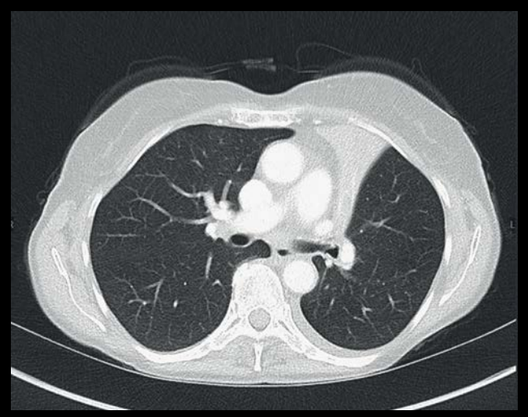


Figure 2. Signs of left upper lobe collapse and small left pleural effusion.



Figures 3a and 3b. The CT scan confirmed complete upper lobe and lingula collapse.





obstruction with associated collapse (Figures 4a and 4b). PET-CT integrates the metabolic and anatomic findings provided by the PET and CT components and improves accuracy and characterisation of disease, guiding management and optimising personalised patient care[4]. FDG (flurodeoxyglucose)-PET scans are useful to distinguish between benign and malignant aetiologies, although they are less sensitive for smaller lung lesions[5]. No overt FDG avid primary was identified and correlation with bronchoscopy was recommended.

Outcome

Bronchoscopy/ endobronchial ultrasound three days later cleared the obstruction, and washings revealed mucoid tissue only. A post bronchoscopy chest X-ray (Figure 5) demonstrated re-inflation of the left upper lobe, residual infective/inflammatory change within the left mid and upper zones and persisting small left-sided pleural effusion. A high-resolution CT (HRCT) four months later (Figure 6) showed improved aeration of the left upper lobe but persistent lingula collapse, now seen with mucoid impaction throughout expanded lingula airways.

Investigations effectively excluded malignancy, suggesting infective/ inflammatory aetiology of the left upper lobe and lingula collapse, and the patient was to have ongoing follow-up to ensure resolution of the changes.

Discussion

Collapse or atelectasis are terms used to describe reduced inflation of the lung, which may be caused, for example, by bronchial obstruction due to neoplasm, inhaled foreign body or mucus plug[2]. Collapse may also be caused by external compression of the lobe due to pneumothorax, pleural effusion or adjacent mass[2].

A plain film chest X-ray is the most common first-line diagnostic investigation for patients with a range of presenting symptoms so knowledge of the plain film appearances of lobar collapse can be pivotal for timely diagnosis and deciding the correct pathway for the patient. A chest X-ray reporter will be familiar in principle with the various appearances but these can be obvious or subtle and in practice may be overlooked[6]. Volume loss in a lobe tends to have a specific radiographic appearance[7].

Left upper lobe collapse (Figure 2)

There are only two lobes on the left. The upper lobe collapses forwards and the lower lobe is pulled with it and expands. Most of the left upper lobe lies anterior to the lower lobe, not above and, when it collapses, a haze appears over the whole of the left lung[8]. Therefore, the usual appearance is veiled or hazy opacification extending from the hilum to the apex, which fades laterally and inferiorly. There is usually loss of definition (silhouetting) of the cardiac and upper mediastinal contour, if the collapse is significant. There is elevation of the left hilum and the lower lobe artery moves outwards. The left main bronchus appears horizontal and lower lobe bronchus more vertical, and there is tenting of the hemidiaphragm[2].

On the lateral view, the whole of the oblique fissure is displaced upwards and anteriorly[9].

“Plain film chest X-ray is the most common first-line diagnostic investigation for patients with a range of presenting symptoms”

The Luftsichel sign is a band of translucency adjacent to the aortic arch, where, in some cases, the apical segment of the left lower lobe is hyperinflated and becomes interposed between the collapsed lung and adjacent aortic arch[6]. The aortic silhouette remains visible due to hyperlucency extending from the apical segment to the superior pulmonary vein. This results in the collapsed left upper lobe being displaced laterally from the mediastinum[10].

Collapse of the lingula segment of the left upper lobe causes obliteration of the left cardiac border[7].

Left lower lobe collapse (Figure 7)

The major fissure rotates posteriorly and medially, and the upper half swings inferiorly. This results in the collapsed lobe lying posteromedially on the hemidiaphragm and mediastinum. It is projected behind the heart and will be seen as a triangular opacity or “sail sign” on an adequately penetrated film[2]. The apex of the triangle is the left hilum and the base of the triangle is the left hemidiaphragm[11]. This may be difficult to identify in the unwell patient with an AP underpenetrated film or cardiomegaly[12].

In practice, there are three silhouette signs for left lower lobe collapse – the descending aorta, the left hemidiaphragm and triangular density behind the heart. Volume loss signs include hyperinflation of the rest of the lung, the left main bronchus is pulled down or has a steeper angle and the left hilum is pulled down.

Right upper lobe collapse (Figure 8)

Right upper lobe collapse is thought to be the easiest to recognise on plain film. The major and minor fissures are pulled superiorly towards each other and rotate towards the mediastinum, and there is tracheal displacement to the right[2]. As a result, the upper lobe is pushed against the mediastinum and lung apex and there is compensatory expansion of the middle and »

Figures 4a and 4b. PET-CT scan. No overt FDG avid primary was identified.

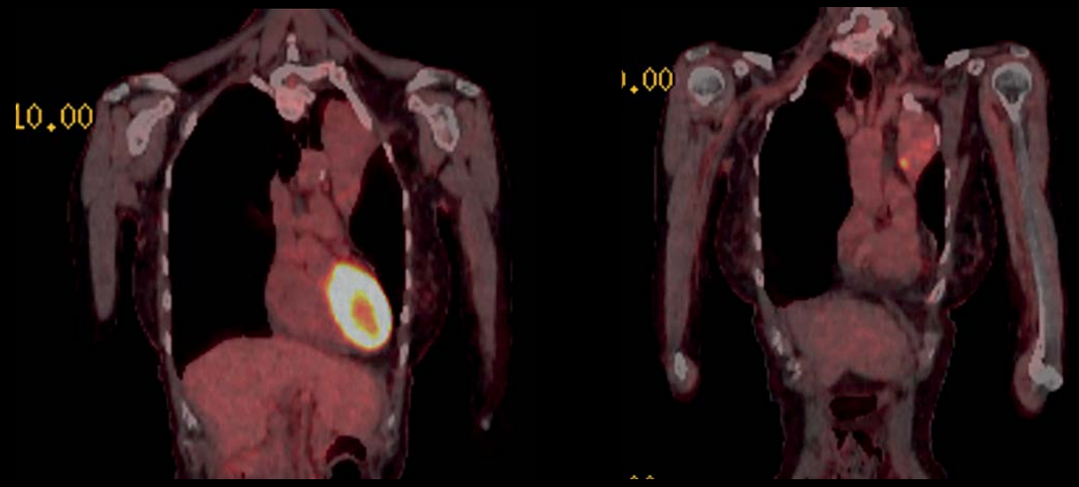


Figure 5. A post bronchoscopy chest X-ray demonstrated re-inflation of the left upper lobe.

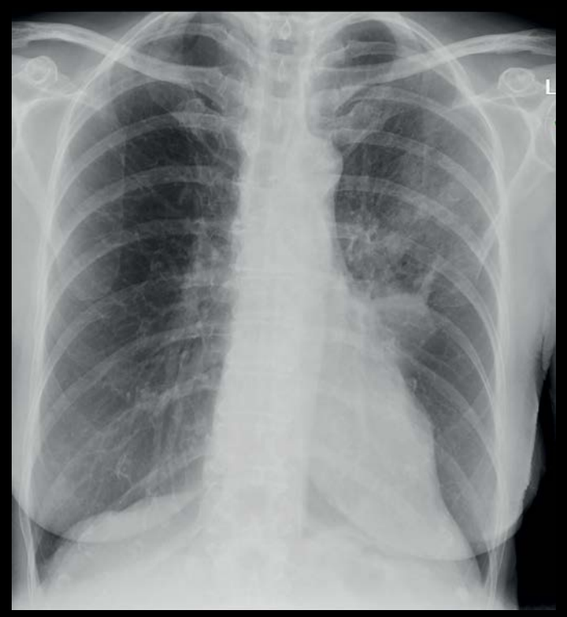


Figure 6. A high- resolution CT four months later showed improved aeration of the left upper lobe.

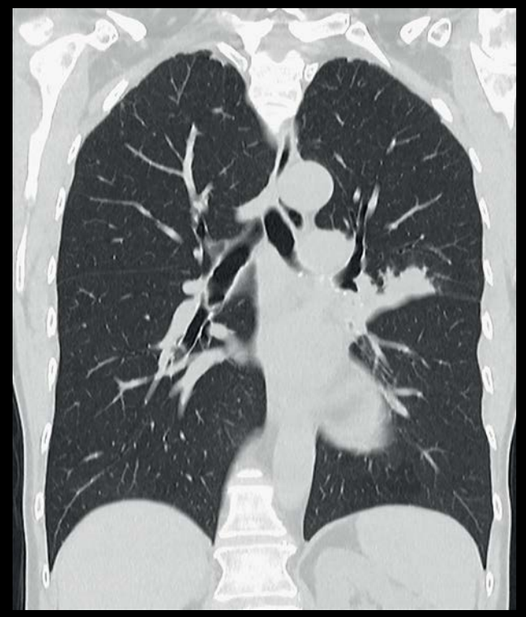


Figure 7. Left lower lobe collapse.

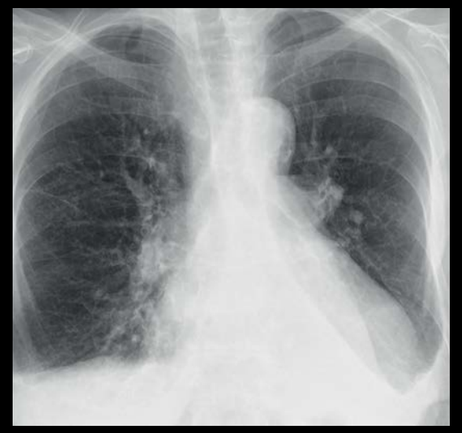


Figure 8. Right upper lobe collapse.

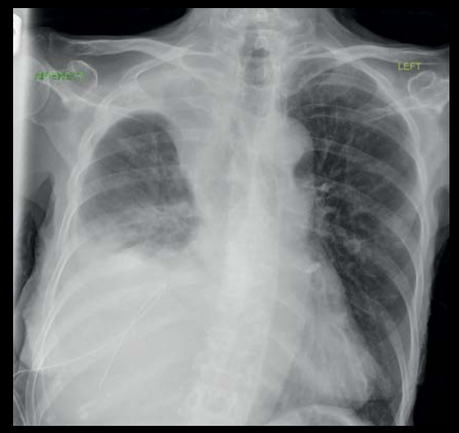


Figure 9. Right middle lobe collapse.

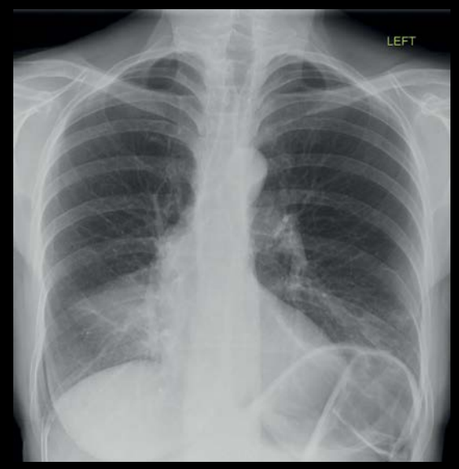
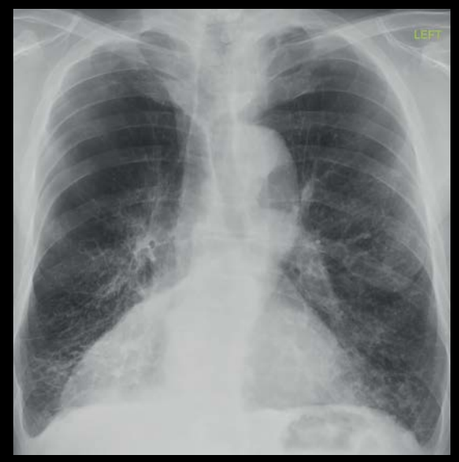
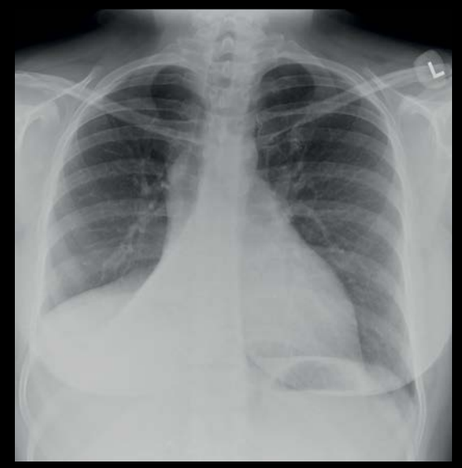


Figure 10. Right lower lobe collapse.



“Knowledge of the plain film appearances of lobar collapse can be pivotal for timely diagnosis and deciding the correct pathway for the patient”

Figure 11. Right middle and lower lobe collapse.



lower lobes, and the lower lobe artery moves superiorly and laterally. This can be seen on plain film[2]. On the lateral view, there is an additional anterior displacement of the major fissure[11]. The horizontal fissure moves superiorly, the right hilum is elevated and the collapsed lung is dense[6]. Golden's S sign may be present when a tumour at the right hilum is the cause of the collapse[6].

Right upper lobe collapse is rarely caused by mucous plugging or foreign bodies, so should raise suspicion of underlying malignant process occluding the right main bronchus[13].

Right middle lobe collapse (Figure 9)

A distinguishing feature of right middle lobe collapse is loss of the silhouette of the right heart border. This can be easily overlooked and there is usually no recognizable compensatory shift due to the middle lobe being small[2]. On the lateral view, this can be seen as a wedge-shaped density overlying the cardiac shadow, extending inferiorly and anteriorly from the hilum, with a concave inferior margin[2].

Right mid to lower zone opacification may be subtle; the normal horizontal fissure is often no longer visible as it rotates inferiorly[14]. The right hemidiaphragm may be slightly raised[8].

Chronic collapse of the middle lobe is known as "middle lobe syndrome" and is commonly caused by bronchiectasis. Tubular densities can be seen in the collapsed middle lobe[14]. It can also be caused by extrinsic lymph node compression of the lobar bronchus and poor collateral ventilation[9].

Right lower lobe collapse (Figure 10)

Right lower lobe collapse results in opacification immediately above the hemidiaphragm causing loss of its outline[8]. The right hilum is depressed, the right lower lobe pulmonary artery is not visualised and the lateral margin of the adjacent vertebrae is effaced[6]. The right heart border is usually preserved.

Right lower lobe collapse is usually obvious on the lateral view, with triangular opacification in the lower posterior chest, with the right hemidiaphragm obscured posteriorly and the lower thoracic vertebrae appearing denser than normal[15].

Combined right lower lobe and middle lobe collapse can be seen with obstruction to the bronchus intermedius (Figure 11). The appearance is similar to right lower lobe collapse except the density extends to the lateral costophrenic angle[2].

Appearances that can mimic lobar collapse

As always, it is important to view previous comparison chest X-rays and to be aware that some benign appearances can mimic lobar collapse.

A prominent azygos fissure and unfolded neck vessels can mimic right upper lobe collapse. A depressed sternum (in pectus excavatum), with vessels or fat touching the right heart border, can give appearances similar to right middle lobe collapse. An unfolded aorta and hiatus hernia can sometimes mimic the "sail sign" in left lower lobe collapse. A prominent epicardial fat pad or accessory fissure (developmental variant) can cause opacification and loss of definition of the medial right hemiphragm, mimicking right lower lobe collapse[6].

Also, longstanding changes due to tuberculosis, radiotherapy or pulmonary fibrosis can cause fibrotic contraction/volume loss, which could also give appearances similar to lobar collapse or partial collapse[6].

Learning points

There can be a variety of causes of lobar collapse, malignant and benign. However, it is essential to exclude malignancy in a timely manner.

A chest X-ray can identify the appearance of lobar collapse but not the cause and further investigations will be required.

There are several investigations that can be used to confirm or disprove malignancy, with varying sensitivity and specificity. A radiology department alert system can ensure the patient is promptly placed on an appropriate pathway to ensure timely diagnosis and treatment. ■

About the author

Sophie Paterson is a Reporting Radiographer at Maidstone and Tunbridge Wells NHS Trust.

Use this article for CPD

Reflect on the article and scan the QR code to record your learning on CPD Now.

- Research/revisit the "silhouette sign" and its importance in identifying pathologies on a chest X-ray.
- Look into your department's reporting alert guidance to see how critical and urgent reports are communicated to referring clinicians – and whether the guidance is followed.
- Review the imaging modalities used in the lung cancer pathway, for example PET-CT, bronchoscopy/EBUS.

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Rectal gas in prostate MRI

What are the options when rectal gas degrades diagnostic performance?

Eric Onwuharine, Emma Hyde, Alexander Clark

Diffusion Weighted Imaging (DWI) is one of the functional techniques in MRI. DWI is an important component of multi-parametric MRI (mpMRI) of the prostate. However, DWI is prone to susceptibility-related artefacts arising mainly from rectal gas and metal hip replacements in prostate MRI. The rectal gas artefacts may reduce the quality of the DWI of the prostate, which may affect image interpretation, or they may be confused with pathology[1].

Different recent studies[2-5] are in support of a prostate MRI without the use of a gadolinium contrast agent known as bi-parametric MRI (bpMRI). An excellent quality DWI is invaluable in bpMRI. In mpMRI, a poor-quality DWI can be complemented by a Dynamic Contrast Enhanced (DCE) sequence in the assessment of prostate diseases.

The difference between mpMRI and bpMRI is that bpMRI does not involve the injection of gadolinium-based contrast agents. On the other hand, mpMRI involves the administration of a gadolinium-based contrast agent and a continuous acquisition of images usually over a few minutes during and after the arrival of the contrast agent in the tissue of interest[6] – a technique known as DCE.

This case study presents what can be done in the event of rectal gas degrading DWI quality and diagnostic performance.

Case presentation

An 83-year-old man with a clinical history of elevated prostate-specific antigen (PSA) level of 18.07 ng/mL. There were no specific normal or abnormal PSA levels in the blood[7], however, in general, a man's risk of having prostate cancer increases with his PSA level[8]. A digital rectal examination revealed a smooth prostate gland. He was referred for MRI for suspected prostate cancer (PCa) and to determine the Prostate Imaging Reporting and Data System (PIRADS) score, Likert score, PSA density, and position of the lesion.

Management

The patient underwent an mpMRI, including T2 Weighted Imaging (T2WI) in sagittal, coronal and axial orientations, DCE imaging in axial orientation, and DWI. The DWI was acquired in the conventional axial orientation.

Outcome

The image quality of the DWI was poor and non-diagnostic, mainly lesions in the prostate gland's peripheral zone (PZ) due to artefact arising from rectal gas, as can be seen in Figure 1.

A repeat of the DWI was then performed in a coronal orientation and planned in such a way as to avoid most of the rectum in the field of view. The images produced demonstrated less rectal artefact and, as a result, were of better diagnostic accuracy and quality (Figure 2).

Discussion

The barrier to the management of males with PCa is the ability to assess the presence of clinically significant lesions reliably. Research into how to reliably distinguish indolent PCa from aggressive PCa is still ongoing.

MRI is an important imaging tool in the diagnosis and management of PCa. The current standard practice is the acquisition of DWI, T2WI and DCE images that gave rise to the technique known as mpMRI. The application of the technique without DCE is known as bpMRI and it is gaining in popularity. Recent evidence has shown the DCE sequence to be less important for MRI of the prostate and, therefore, proposed MRI without DCE (bpMRI)[9,10]. For example, a comparison of pre and post gadolinium imaging is frequently insufficient to detect PCa since a normal prostate might be just as highly vascularised as a pathological prostate[11]. Prostatitis and vascular benign prostatic hypertrophy (BPH) nodules are examples of benign prostate pathology that can exhibit enhanced features that are similar to PCa, decreasing the specificity of DCE-MRI[12]. This has strengthened the need for a good-quality diagnostic DWI.

DWI assesses the movement of water molecules due to Brownian motion[13], the random movement of a particle in a medium, such as dust within a fluid[14]. DWI exploits the disproportionality of the cell densities between cancers and normal tissues. PCa with high cellular density appears as focal high signal on DWI and focal low signal on the corresponding apparent diffusion coefficient image[15].

DWI is an important component of mpMRI of the prostate and shows promising results as a tool for risk stratification[7]. However, DWI is invaluable in bpMRI. In mpMRI, a poor-quality DWI can be complemented by a DCE sequence in the assessment of prostate diseases.

Problems associated with DWI

DWI is prone to susceptibility-related artefacts and occurs when there are different magnetic susceptibilities at the interfaces of structures, such as air and soft tissue[16]. During DWI acquisition, rectal gas may significantly diminish image quality due to pronounced distortion artefacts[17].

Figure 1a: DWI in axial orientation

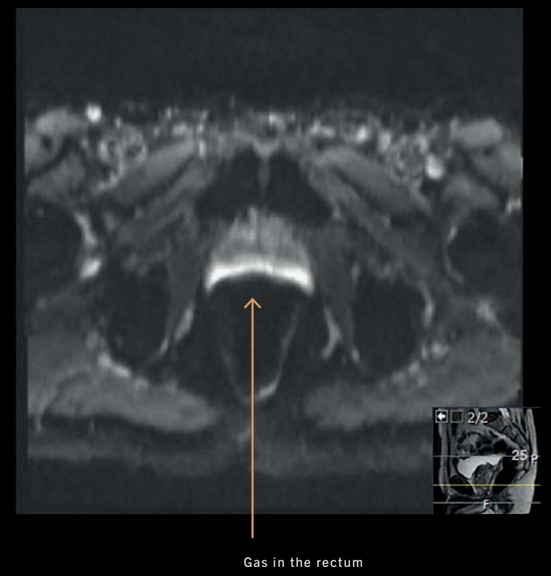


Figure 1b: DWI in axial orientation

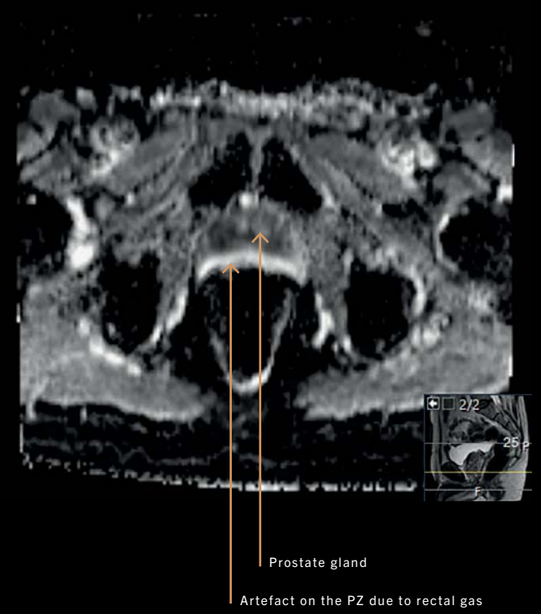


Figure 2a: DWI in coronal orientation

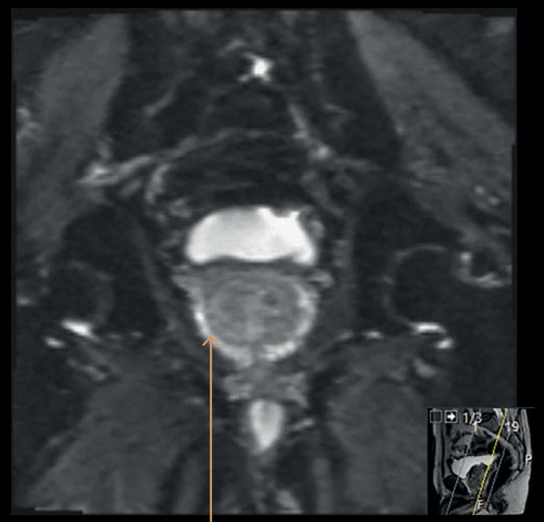
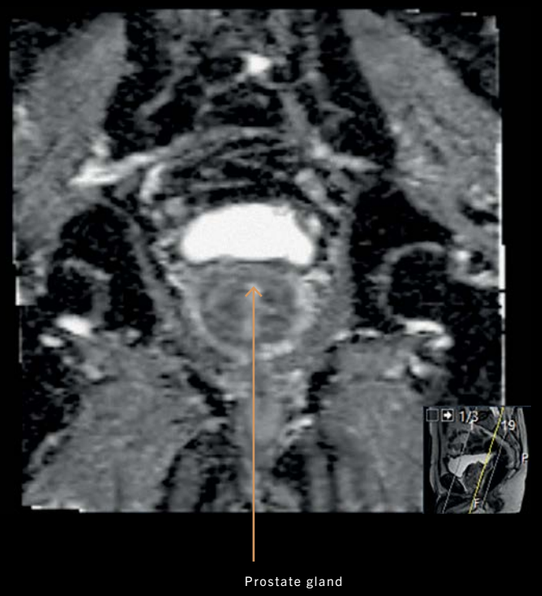


Figure 2b: DWI in coronal orientation



Conflicting results have been reported by different studies on the use of a preparatory enema prior to mpMRI of the prostate to improve the image quality. In the past, endorectal coil was used in prostate imaging. There is a growing trend away from using endorectal coils, and it is unclear if they are always beneficial to quality and diagnostic performance[18]. However, the problems presented by rectal gas persist.

Learning points

This case study presents what can be done in the event of rectal gas degrading DWI quality and diagnostic performance. DWI that will be degraded by air in the rectum can be obvious in the scout images. In our case, we acquired DWI in coronal plane (not standard practice) to complement the conventional axial plane acquisition. This allowed the avoiding of rectal gas as much as possible when planning the sequence. The coronal DWI was then reconstructed to an axial plane. This helped to reduce the artefact and increased the diagnostic quality of DWI. The acquisition of DWI of the prostate when a rectal gas artefact is a problem should be considered. ■

“Rectal gas artefacts may reduce the quality of the DWI of the prostate, which may affect image interpretation or they may be confused with pathology”

About the authors

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- **What are the different pitfalls of DWI?**
- **What part of the prostate gland does rectal gas artefact affect more in DWI?**
- **Why does the DWI acquisition orientation make a difference in the presence of rectal gas artefact?**

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Senior leadership in imaging services

What skills, experience and qualities do radiographers need to succeed in senior leadership positions in the NHS?

Jennifer Unsworth

Demand for imaging services within the NHS has been rapidly growing for several years with advances in technology providing improved diagnostic capability. Imaging has grown so rapidly that demand has been exceeding capacity even pre-pandemic. This has brought some significant challenges with delivery and concerns for the sustainability of the workforce.

In October 2020, the report also known as "the Richards review", entitled *Diagnostics: Recovery and Renewal. Report of the Independent review of Diagnostic Services for NHS England*[1], stated in recommendation 21 that: "Clinical and managerial leadership should be put in place for all diagnostic disciplines at a national, regional, and local/network level, to support implementation and drive the change programme. Development programmes to support network leadership will be required."

In response to the Richards review and its wider focus on workforce planning and development, a North West England imaging workforce strategy was developed by the North West Imaging Cell in collaboration with Health Education England (HEE), NHS England and Improvement and the Cheshire and Mersey Radiology Imaging Network[2]. The strategy aligns to the HEE "star model", which has leadership as one of its five key areas for healthcare improvement and clearly outlines the need for leadership development across all imaging staff at all levels.

In the North West strategy[2], there is a strong focus on developing the leadership and management skills of radiographers to support service delivery, improve patient care, improve succession planning and promote the profession of radiography in line with other allied health professional (AHP) groups.

Both national and local strategy support the need for further investment in leadership development for imaging teams, and anecdotal evidence supports the theory that leadership development programmes for radiographers are not yet well established or widely accessible.

In October 2021, the government launched a review of leadership in health and social care in England, led by Sir Gordon Messenger. The purpose of the Messenger review is to drive improvements in leadership by reviewing good practice examples and spreading this across the country to ensure all areas of the health service have a standardised approach to leadership development and support[3]. At the time of writing, the review has not yet concluded so the results are not yet available.

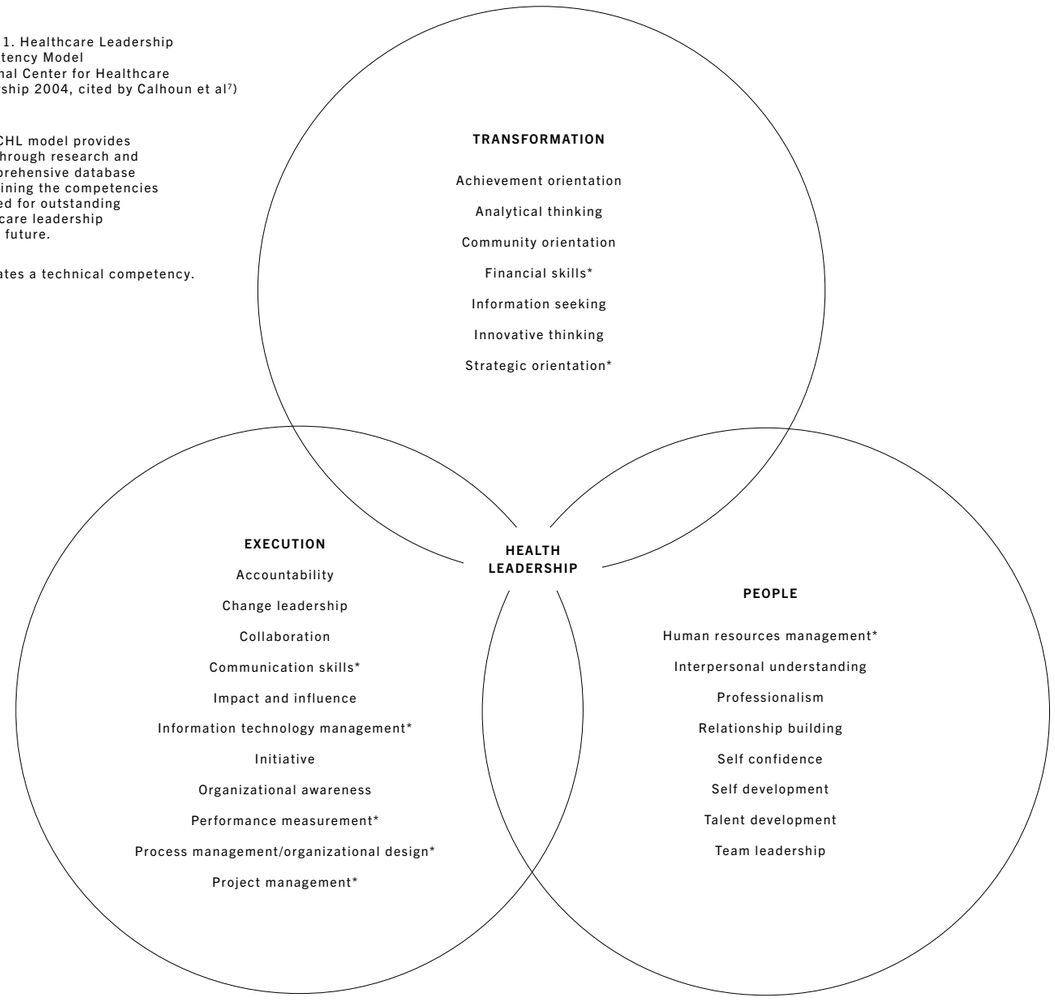
This discussion paper will identify the specific leadership competencies and/or skills needed for radiographers to become senior healthcare leaders and to support opportunities for leadership development at all levels of seniority in departments and the imaging networks.

The main themes to be discussed are key skills and competencies for effective leadership, effective leadership development and training, and key challenges for leadership in radiography.

Figure 1. Healthcare Leadership Competency Model (National Center for Healthcare Leadership 2004, cited by Calhoun et al[7])

The NCHL model provides breakthrough research and a comprehensive database for defining the competencies required for outstanding healthcare leadership for the future.

*Indicates a technical competency.



Workforce shortages

Diagnostic imaging has been highlighted as a key area of focus in both elective recovery and delivery of service expansions, such as the community diagnostic centres described in the Richards review[1]. It is perceived that the development of imaging networks and creation of strategic diagnostic plans have increased the profile of imaging, both in acute organisations and at a wider integrated care system level. The expansion of services will require significant investment in the workforce, equipment and digital transformation to realise the benefits of these schemes.

Workforce shortages in imaging are widely recognised, with the Royal College of Radiologists' Clinical Radiology UK Workforce Survey[4] reporting a shortage of 1,876 radiologists and a predicted shortage of 3,331 radiologists by 2024. The Richards review recognised the need to expand the workforce and recommendation 12 of the report states: "There should be a major expansion in the imaging workforce – an additional 2,000 radiologists and 4,000 radiographers (including advanced practitioner radiographers, who undertake reporting) as well as other support staff and 'navigator' roles" (p11).

The College of Radiographers' Diagnostic Radiography Workforce UK Census 2020[5] provided data from 65 of the 198 providers surveyed, showing that 11% of the total workforce surveyed were aged 55 or above and had the potential to retire in the next five years. Of the workforce identified in this group, this accounted for 50% of the 8c grade whole time equivalent (WTE), 32.7% of the 8b grade WTE and 26% of the 8a grade WTE, indicating that a considerable proportion of the senior management/ leadership teams are expected to retire in the next five years.

This level of expected natural retirement and the planned rapid expansion of imaging will require significant investment in leadership to help services adapt to the changing landscape. We need services that are fit for purpose, that use available technology and techniques that are efficient and cost effective but, most importantly, that provide a good patient experience with improved access for patients.

Leadership capacity

The Richards review[1] states that without highly skilled and committed managers and clinicians "there is a real risk that the much-needed changes will not be realised" (p45). What is not clear in the guidance from Sir Mike Richards is how we can ensure our imaging departments and networks are able to develop the leadership capacity and capability to support our services.

Leadership is described in multiple papers using John Kotter's definition[6], which states that leadership is "a set of processes that creates organisations in the first place or adapts them to significantly changing circumstances. Leadership defines what the future should look like, aligns people with that vision, and inspires them to make it happen despite the obstacles"[6].

Development of the key skills and competencies to become an effective leader are discussed in several papers with reference to validated frameworks or models of leadership competencies.

Calhoun et al[7] describe the need for a common set of leadership competencies like those driving the development of the Healthcare Leadership Competency Model (HLCM) by the National Center for Healthcare Leadership. The HLCM is an evidence-based US model that focuses on 26 behaviours and technical competencies required of healthcare managers. The 26 behaviours are collated into three domains: transformation, execution and people. These are demonstrated visually by the Venn diagram in Figure 1.

Key competencies

Each of the three domains contains a list of required competencies for effective leadership in healthcare, which are further defined on page 379 of the text. The purpose of this study was to develop a model that identified key behavioural competencies for effective leadership. The methodology for the study was to hold "behavioural event interviews" with 84 high-performing healthcare leaders at a wide range of career stages to understand what characteristics could be identified among high-performing individuals. This involved a two-hour interview, in which candidates were asked to reflect on events in their careers that they had found to be successful or frustrating. The behaviours were then collated, coded and benchmarked against other validated leadership competency models.

"The expansion of imaging services will require significant investment in leadership to help services adapt"

In addition, the model identified that different depths or scales of behavioural competence (ranging from one to five) are required, depending on a person's career stage, with level one being the basic entry level and level five described as leading at an advanced career level.

The resultant model provides a comprehensive competency framework that leaders across all career levels can use to benchmark their own practice. It provides a clear guide of how they can develop the skills and behaviours required to be effective at different leadership levels.

A systematic review by Kakemam et al[8] provides a review of literature relating to leadership and management competencies for hospital managers. The inclusion criteria were purposefully limited to between the dates of 2000 and 2020 due to the changing healthcare landscape in Iran, which has evolved significantly in the past 10 to 20 years. The authors again recognised the need for consistency in knowledge, skills and behaviours in leaders and managers.

The skills and competencies identified from the literature were mapped against a validated framework called the Management Competency Assessment Programme (MCAP)[8], which provides six core management competencies and 18 sub-themes (Figure 2).

Professionalism

Competency mapping is a two-stage process whereby the skills and competencies identified were first mapped against the MCAP framework to a "best fit" framework synthesis method. The second stage identified any competencies that did not map to the current MCAP framework, and these were categorised separately.

The final process was to develop a new leadership framework using the findings of the review. The final model designed by Kakemam et al[8] incorporated the six MCAP competencies but also identified a seventh key competency from the literature, which was professionalism.

The paper provides a clear definition of professionalism as: "The ability to align personal and organisational conduct with ethical and professional standards that include a responsibility to the patient and community, a service orientation, and a commitment to lifelong learning and improvement."[8]

The final generated model of management and leadership competencies (Figure 3) demonstrates the original six MCAP competencies with the recommended additional "professionalism" competency.

In clinical professions, professionalism is an essential quality for all staff and the expectation would be that a leader would be a role model for their team. Professionalism is outlined in the standards of proficiency set by the Health and Care Professions Council[9], the regulatory body for »

Figure 2. Management Competency Assessment Programme (Liang et al. 2013 cited in Kakemam et al. 2020[8])

MCAP competencies	Sub-themes
Evidence	1. Evidence appraisal 2. Evidence application and decision-making 3. Evaluation of decision
Resources	1. Staff management 2. Financial management 3. Organisation management
Knowledge	1. Knowledge of healthcare environment 2. Knowledge of organisation 3. Application of knowledge in legal and quality practices
Communications	1. Relationship management and teamwork 2. Communication 3. Personal quality
Leadership	1. Leading people and teams 2. Leading organisation 3. Leader quality
Change	1. Change preparation 2. Change implementation and evaluation 3. Leader quality in change

Figure 3. Model of Management and Leadership Competence for Hospital Managers (Kakemam et al. 2020[8])

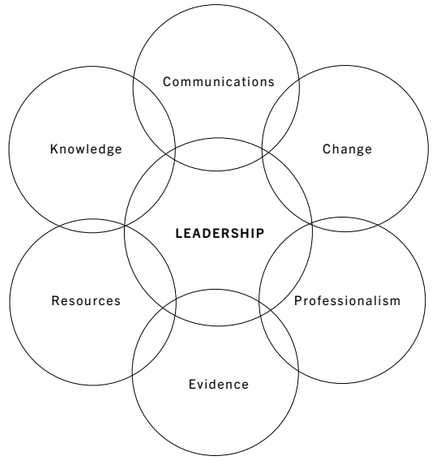


Figure 4. Leadership Qualities Framework (Institute for Innovation and Improvement 2006, cited in Hiscock et al. 2008[13])

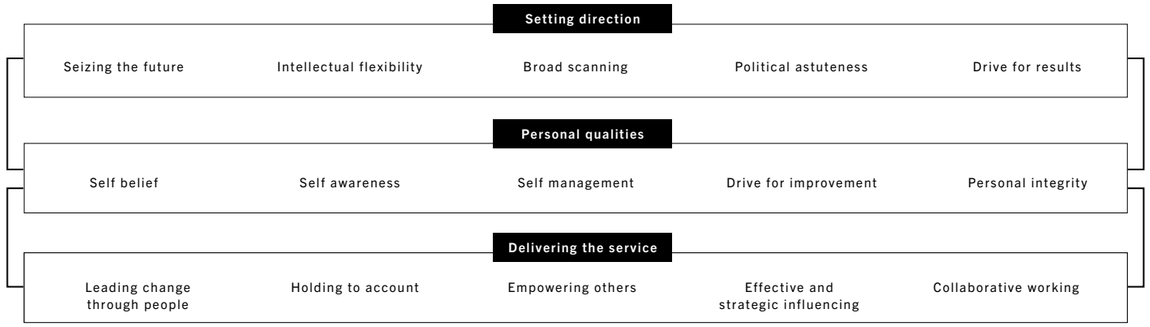
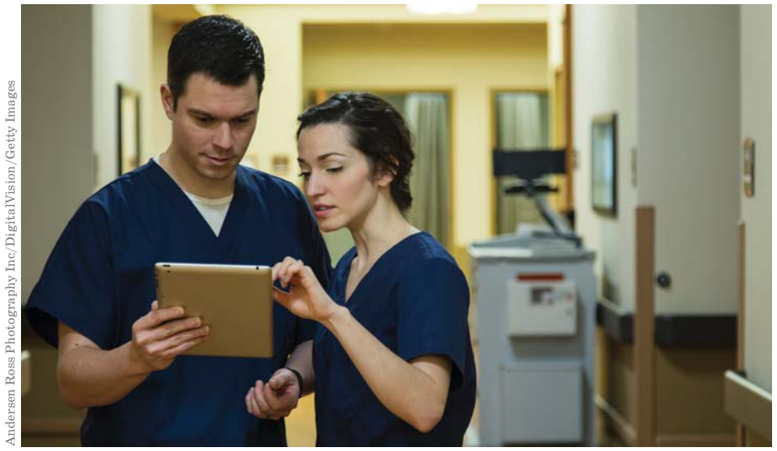


Figure 5. The leadership context (NHS Leadership Academy 2011[14])

The leadership context		
Stage 1	Own practice/ immediate team	Building personal relationships with patients and colleagues, often working as part of a multidisciplinary team. Staff need to recognise problems and work with others to solve them.
Stage 2	Whole service/ across teams	Building relationships within and across teams, recognising problems and solving them. Staff will be more conscious of the risks that their decisions may pose for self and others for a successful outcome.
Stage 3	Across services/ wider organisation	Working across teams and departments within the wider organisation. Staff will challenge the appropriateness of solutions to complex problems.
Stage 4	Whole organisation/ healthcare system	Building broader partnerships across and outside traditional organisational boundaries that are sustainable and replicable. Staff will be dealing with multifaceted problems and producing innovative solutions.



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Training needs to be developed to focus on the different levels of leader, ranging from essential to exemplary

radiographers: "Registrant radiographers must be able to practice as an autonomous professional, exercising their own professional judgement."

The College of Radiographers also set out clear professional standards in its Code of Professional Conduct 2013[10].

Yielder[11] reviews the key traits for a professional leader in her article "Leadership and power in medical imaging". The key themes that emerge in the paper are emotional intelligence, honesty and integrity, good communication skills, courage and insight, self-awareness, and recognition that knowledge is a key factor in professionalism and enables a leader to gain the respect of their team.

Leadership in the NHS

In a 2008 paper by Hogg et al[12], leadership is discussed in the context of the NHS, radiography and, specifically, consultant radiographers (a clinical leadership position). They describe the context of leadership in the NHS as being transformational and suggest that the NHS Leadership Qualities Framework is a realistic representation of leadership behaviours in the health service. The framework focuses on three key elements: personal qualities, setting direction and delivering the service (Figure 4).

The Leadership Qualities Framework was later combined with the Medical Leadership Competency Framework to create the NHS Leadership Framework in 2011[14]. This provided seven specific domains for leadership:

1. Demonstrating personal qualities.
2. Working with others.
3. Managing services.
4. Improving services.
5. Setting direction.
6. Creating the vision.
7. Delivering the strategy.

This was combined with four stages or levels of leadership competency as shown in Figure 5. This model supports the same approach as the HLCM model developed by Calhoun et al[7], who also advocated a scaled level of competency across different leadership domains and the need to work at distinct levels of leadership dependent on seniority of position.

In 2013, the NHS Leadership Academy[15] developed the Healthcare Leadership Model, which is the current NHS leadership framework model, made up of nine leadership dimensions:

1. Inspiring shared purpose.
2. Leading with care.
3. Evaluating information.
4. Connecting our service.
5. Sharing the vision.
6. Engaging the team.
7. Holding to account.
8. Developing capability.
9. Influencing for results.

For each of the nine leadership dimensions, there are subcategories or "levels of leadership behaviours". These are described as essential in demonstrating proficiency and strong and exemplary leadership. This model provides a clear self-assessment process for the individual by asking questions to allow a benchmarking of skills and behaviours to take place. It can be used in conjunction with the related 360° appraisal model to formulate development plans for individuals.

Barriers for radiographers

Hogg et al[12] describe leadership in radiography as a pattern of behaviour that can be modelled by any individual and is not necessarily determined by a position in a management or leadership role. They state that managers should be able to demonstrate leadership abilities but a managerial position is not always required for an individual to become a leader.

Using the Healthcare Leadership Model could support conversations with staff at all levels of radiography and help to guide discussions around developing leadership behaviours and competencies appropriate to their role.

The UK is highlighted as having the lowest number of clinically qualified managers, pointing to organisation barriers – such as a lack of protected time and funding – as inhibiting the development of leadership skills[6].

Radiographers were quoted as "not seeing themselves as leaders" in a 2008 article by Paterson in *Synergy News*, cited by Hogg et al[12]. The article also stated that radiographers were less likely than other AHPs to take up opportunities for leadership development.

Wylie et al[16] found in their multifactorial leadership questionnaire that radiographers and podiatrists scored consistently lower on transformation behaviours than the other surveyed AHPs. They also reported that radiographers' inspirational motivation and view of influence on their behaviour was statistically significantly lower than that of the other professional groups surveyed, supporting Paterson's findings.

Wylie et al[16] provide a theory to support the differences in leadership acumen between AHP groups and suggest that radiographers and podiatrists work in a more structured and process-driven environment, with radiographers' work strictly controlled by the Ionising Radiation Regulations (IRR 17) and Ionising and Medical Exposure Regulations (IR(ME)R 17).

The paper concludes that because radiographers work in an environment where deviation might be viewed as irresponsible, there are more barriers to developing transformational leadership behaviours in radiography than there are for some other professional groups. This is an important consideration for the design of leadership programmes that are intended to support radiographers in transformational leadership.

Organisational barriers to training may also affect leadership development by radiographers. With a recognised shortage of radiographers, many departments are struggling to cover clinical duties and time out of clinical work could be seen as detrimental to patient care. The cost of training courses may prohibit multiple staff members from attending, which will also limit the leadership capacity of radiography teams. Organisations will need to consider different approaches to learning, such as mentoring, shadowing and e-learning, in addition to traditional formal learning using virtual and face-to-face delivery.

Conclusion

Tailored leadership training for radiographers needs to be established rapidly and needs to include the key core competencies identified in the literature – the NHS Healthcare Leadership Model is recommended as a structured approach to developing competency. Training needs to be developed to focus on the different levels of leadership, ranging from essential to exemplary. Expectations of leadership behaviours should be built into job descriptions and appraisals for all levels of staff, ranging from students to senior leaders, and not just be available for those perceived to be in management roles.

There is significant work required to improve leadership development for radiographers. It is essential that leadership training is improved to ensure teams are prepared and can facilitate the changes required to respond to the development of new technology and adapt to new ways of working across local and regional imaging networks. ■

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MRI and rectal cancer

Poster: an audit of the quality of rectal MRI for the diagnosis and management of rectal cancer

Nikhil Shah, Katie Norwood, Clarrissa Sanders, Juliet Polkey, Jagadish Kalasthry, Terence McGuckin, Dr Anita Wale, Radiology Department, St George's Hospitals NHS Foundation Trust

Introduction
High-quality rectal MRI plays a key role in the clinical staging of patients with rectal cancer, ensuring patients receive appropriate evidence-based treatment[1-2]. MRI technique is therefore crucial.
We audited our rectal MRI scans to determine if they were optimal for the diagnosis and management of rectal cancer.

Standard
The Royal College of Radiologists' guidelines[3] and Mercury findings[1-2] recommend that all patients with rectal cancer without contraindications to MRI should be staged by MRI, performed and reported following the validated standards.

Indicators
Image quality of rectal MRI scans were measured against the criteria below:
1. Anterior saturation band used.
2. Appropriate coil positioning.
3. Adequate tumour coverage.
4. Mesorectum imaged to L5-S1 on small field of view sequences.
5. Antispasmodics given to reduce bowel wall motion artefact assuming no contraindications.

Target
100% compliance (unless exception of antispasmodics).

Methodology
A retrospective analysis of one month of rectal MRI studies collected from RIS and PACS. Studies included all stages of rectal adenocarcinoma only. These were re-reviewed by a consultant GI radiologist with more than 10 years' experience.

First audit findings (September 2020)
- Studies were not 100% compliant with the validated standards.
- Protocol was limited by issues with bowel wall motion and suboptimal resolution.

First action plan
1. A multidisciplinary process of sequence optimisation and testing with MR physicists, radiographers and radiologists.
2. MR radiographers' seminar and regular case review.

Second audit findings (September 2021)
- Good coil positioning in 92% of studies.
- Full tumour coverage in 83% of studies.
- Only 50% of studies included the mesorectum up to L5/S1 to account for lymph nodes.
- All studies could have benefited from Buscopan.

Second action plan
1. Further anatomy training and continued case review for radiographers.
2. IV Buscopan given as an interim, awaiting PGD for IM Buscopan.
3. Department presentation.

Third audit findings (February 2022)
- Increased adherence to validated standards.
- Improvement in full tumour coverage and imaging of mesorectum to L5-S1.
- Better image quality seen in all studies where Buscopan was given.

Future work
- Ongoing radiographer-led work to produce a handbook to help with disease identification and MRI technique.
- IM training for radiographers.
- Radiographers to attend lower GI MDTs.

Conclusion
Following our interventions, there have been significant improvements to the quality of our rectal MRI scans and our team's technical performance. It has optimised the staging of rectal cancer in our department and led to increased confidence in multidisciplinary decision-making. ■

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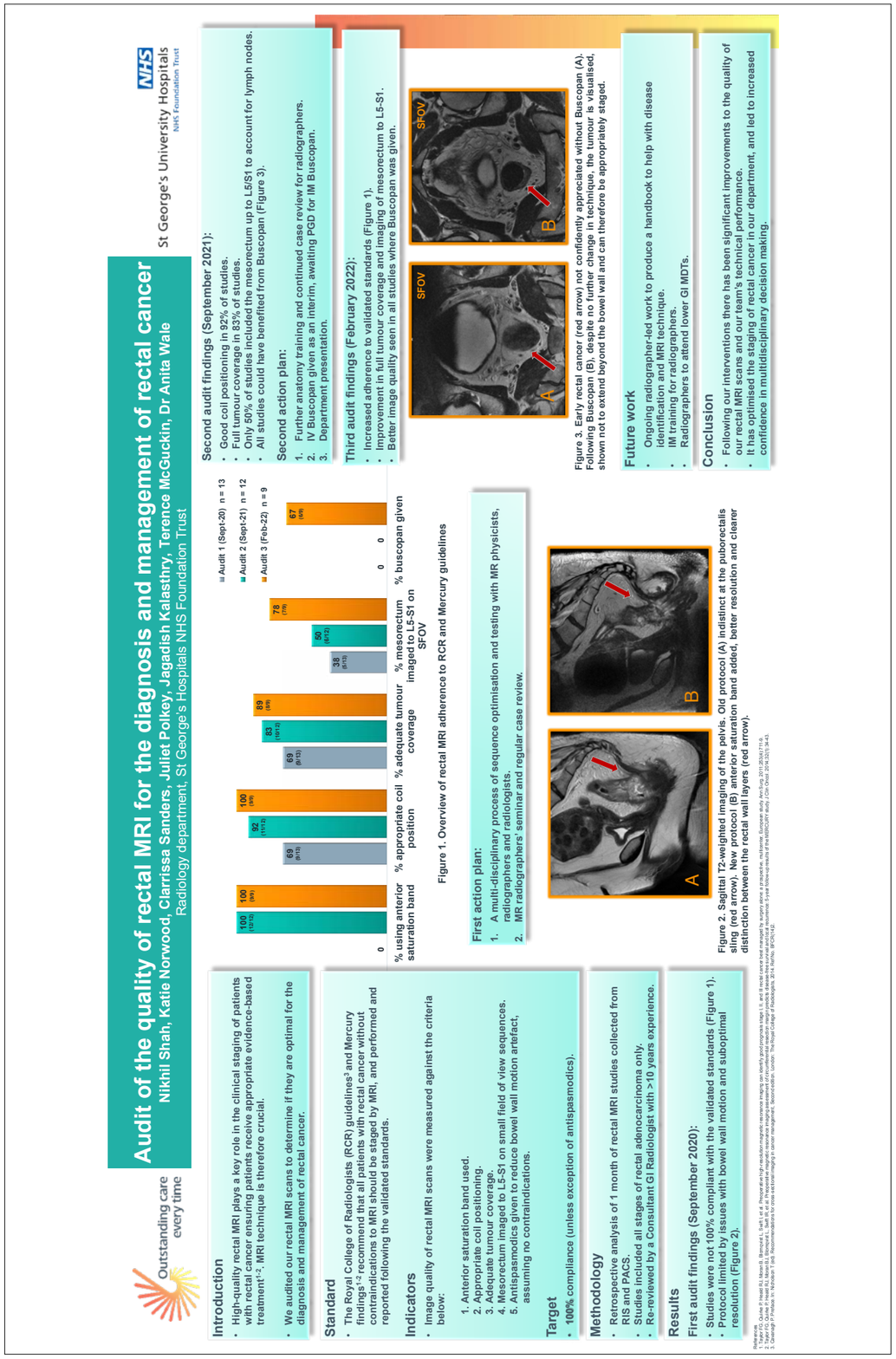

Radiography

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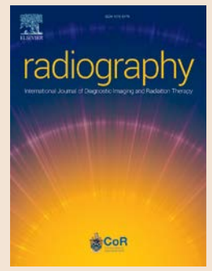

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How to get started in research

There are many topics in radiography just waiting to be investigated but undertaking research can seem daunting. So how can you get involved early in your career?

All members of diagnostic and therapeutic radiography teams can undertake research. Radiographers initially gain experience of research during their foundation, undergraduate and/or postgraduate programmes of study. Beyond that, there are opportunities to undertake or facilitate research in a variety of settings – clinical, academic, educational, management and business arenas – working independently or as part of a team.

The Health and Care Professions Council standards of proficiency for radiographers state that registrant radiographers must engage in evidence-based practice and be able to evaluate research.

A core function of radiography research is to provide and update the evidence base for practice; research and evaluation activities are, therefore, integral to delivering high-quality patient care.

The College of Radiographers published an ambitious Research Strategy for 2021-26 with three aims:

- To embed research at all levels of radiography practice and education.
- To raise the impact and profile of radiography through high-quality research focused on improving patient care and service delivery.
- To expand UK radiography research capacity through the development of skilled and motivated research-active professionals.

Getting involved

Radiographers are ideally placed to investigate a multitude of areas and there are many topics of research just waiting to be investigated, including establishing practice, innovative practice, radiation protection, service provision, patient care, patient voices, and the use and development of equipment protocols.

There are also many ways to get involved in research, including image acquisition or data collection, study recruitment, leading a small local project or being the principal investigator of a research group.

Research projects can be complex and getting involved in someone else's study can be a good way of making a start. Undertaking your own project can be immensely rewarding, however, having regular access to the support of an experienced researcher, supervisor or mentor is invaluable. This will happen naturally if your project is for an academic qualification but, otherwise, seek out a local research mentor even if they are from a different professional background. The Council for Allied Health Professions Research (CAHPR) facilitates regional hubs that run a range of activities to support AHPs (*www.cahpr.csp.org.uk/regions*).

The CoR has produced a guide to help radiographers navigate the world of research, *Getting into Research: a Guide for Members of the Society of Radiographers*. The SoR also has an online workspace for researchers with a discussion board to aid networks. For access to the workspace, please email pande@sor.org.

Research training

As part of your undergraduate/pre-registration radiography degree, you will have gained a good grounding in the basics of research methods and design. However, once in clinical practice it can be difficult to access further research experience and development to build research into your career. Informal training and CPD activities, such as online or short courses, can provide training in specific research methods and design.

Experiential learning as a member of a research team, in a research radiography role or working in a research-rich environment (where you have access to support and networks) can increase your confidence to lead on smaller projects.

Funding for research

Lack of funding is often cited as a barrier to undertaking research. Certainly having support and funding for your research can really help with the research costs and even cover backfill for your time.

Applying for and securing project funding is not easy, even for experienced researchers. Competition is often high and funding bodies have limited budgets so proposals need to be high quality and value for money. Therefore, it is recommended that those new to research join established research teams on other projects to gain experience and develop a research reputation before attempting to go it alone.

It may also be worth looking for funding bodies that target novice researchers or those who are in the early stages of a research career. These funding bodies often have a remit to broaden research activity and, in order to build capacity, they may look positively on less-experienced researchers, offering support to nurture a research environment.

The CoR has a number of funding streams available to members, for post-registration and student radiographers, that will support research projects where a radiographer is the principal investigator.

What will we be looking for?

You may want to consider some of the following points when completing application forms for funding.

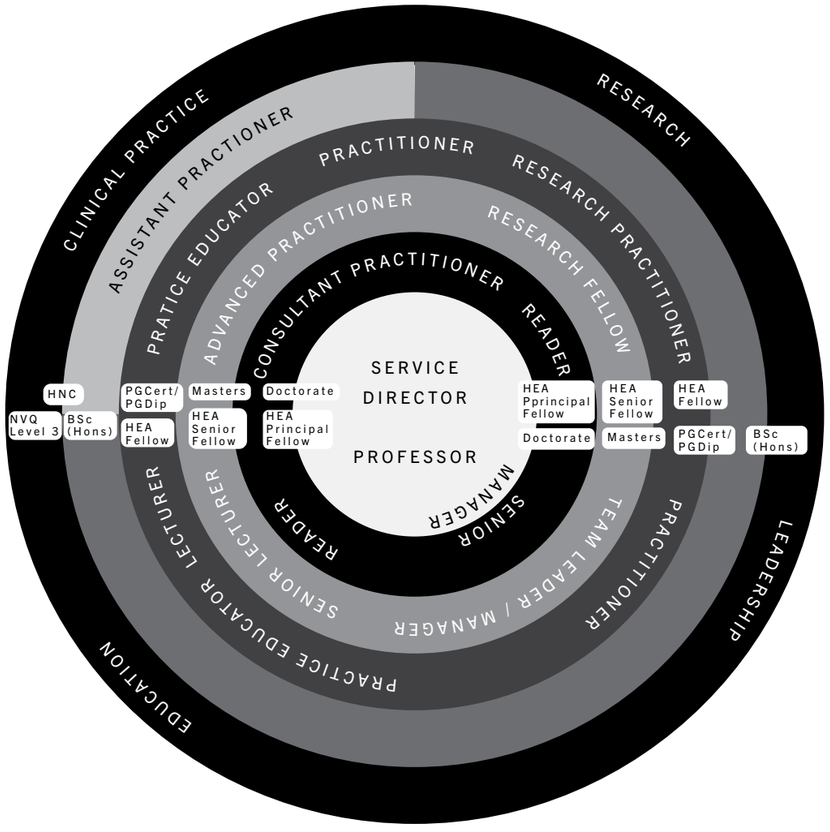
"Research projects can be complicated and getting involved in someone else's study can be a good way of making a start"

Starting out with data collection for a study will help instil experience of the research process, knowledge of research governance and will help to develop an analytical clinical culture.

Building towards proficiency in research design is important in the longer term and usually requires formal training, such as within a master's degree or doctorate.

- Value for money – can your project produce results efficiently? The budget should be reasonable, believable and justified, with rational arguments for including consumables, equipment and other items. Personnel costs need to be considered carefully; do they meet the guidelines set out here? Have you obtained agreement from your employer »

Figure 1. College of Radiographers Career Framework



With thanks to the College of Paramedics

that it will match the costs of staff time?
- Is the research topical and relevant within the current NHS/social care environment and political context? Does it fit with national and CoR research priorities? Mention the research priorities that fit with your project.
- Is it designed well? Consider the scientific quality of your proposal: is it robust?
- Is there potential for follow-on projects?
- What impact will the research have? Does it have the potential to change practice or improve outcomes?
- Demonstrated ability to do the work – the panel will have greater confidence in the proposal if the research team has evidence of a good track record. This does not mean that you have to be an experienced researcher. If you are a novice researcher, make contact with a local academic department with research experience (or an experienced research practitioner in your institution) and ask if someone would consider mentoring you through the study. If you cannot find a suitable individual, contact the SCoR Research Group, which can put you in touch with a suitable person. You can add a small cost to the budget to cover the mentoring.
- Quality of presentation – typos, formatting, etc. This is crucial. If the application form is littered with spelling mistakes and typographical errors, the panel may have limited confidence in your ability to complete the proposed research to a high standard. A well-organised proposal that is simple and logical will be expected.
- Demonstration of innovation.
- Demonstration of stakeholder involvement.
- Identify the impact you perceive your study outcomes (outputs) will have on service delivery or patient care.
- A clear dissemination strategy where you identify key audiences, journals and conferences relevant to your research topic. Identifying specific meetings/ conferences and journals shows the panel you have thought hard about the best ways to disseminate your findings.

- Matching to current professional and/or funders' research priorities. (See the current CoR research priorities.)
- If applying for funding, the National Institute for Health and Care Research (NIHCR) Research Design Service can help researchers at all stages of preparing for grant applications. For example, it can provide advice on the quality, practicality and feasibility of research questions and methods; ensure that the research topic is within the scope of the chosen funding programme; identify enhancements to the proposal to improve chances of success; and advise on the common pitfalls encountered with funding applications.

Getting help with your research
CAHPR is supported by 13 AHP organisations and is a free resource for radiographers to access. The council comprises a strategy committee, a professoriate and a UK-wide network of regional hub. Its mission is to develop AHP research, to strengthen evidence of the professions' value in enhancing service user and community care, and to enable the professions to speak with one voice on research issues, thereby raising their profile and increasing their influence.

With excellent opportunities for learning, sharing, networking, collaboration and access to advice and support, CAHPR strengthens the profession's research activities, helping to translate research findings into practice and education.

CAHPR resources are produced by subject experts in hubs and committees to support researchers and research capacity. The hubs run a range of activities to support AHPs, such as small award schemes, events and mentoring. Join your local hub and find out how it can help you. CAHPR's *Top Ten Tips* series is written and produced by the hubs and offers advice on key topics for novice, early-career and experienced researchers.

As a starting point, CAHPR also recommends working through its short e-learning module, Attributing the Costs of Health and Social Care Research and Development (AcoRD). This module explores how AcoRD guidance is applied to commercial and non-commercial research, the categories of research activities described in the AcoRD guidance, how costs associated with these categories should be met, and special arrangements for charity-funded research.

These key principles are demonstrated through real-life examples and scenario-based questions. Although only the arrangements in England are referred to, the principles of AcoRD have been agreed across all UK countries. Northern Ireland, Scotland and Wales each have an AcoRD policy and links to further information on these policies can be found in the e-learning module.

Your Local Clinical Research Network is a great place to find further support. These networks have AcoRD specialists, who can help you tailor specific questions about costing grant applications.

SoR mentorship scheme
The SoR has funded a Formal Radiography Research Mentorship (FoRMM) scheme since 2017 to help novice researchers develop the knowledge, skills and confidence to conduct independent research and help build research capacity in the profession.

The mentees are selected according to their commitment to research. They must have undertaken a master's programme before starting their mentorship and must have at least three years of clinical experience in imaging or oncology.

Twelve mentees are usually selected per round and paired with experienced radiography research mentors across the UK. The mentor–mentee partnership lasts for one year and involves some formal training on mentoring and research methods. The scheme has helped its mentees to submit abstracts, present at conferences, write papers, submit research funding applications and begin funded doctorates. ■

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Case study: Anna Southworth and CoRIPS funding

The College of Radiographers Industry Partnership Scheme (CoRIPS) offers a Student Research Award to encourage radiography students to consider a career in research. Students are asked to propose an achievable project to be carried out in a 12-month period with appropriate supervisory support. The award provides a stipend of up to £1,000 and/or funds for equipment and resources required to complete the project.

Anna Southworth, a specialist research and innovation radiographer at St James's Hospital, Leeds, started her research career with a CoRIPS student award.

"My research is centred on breast radiotherapy and my aim is always to improve the patient experience. I started with a small student CoRIPS-funded project that allowed me to have six weeks to carry out a research project. The topic stemmed from the Support4All study and looked at the feasibility of tattoo avoidance in breast cancer radiotherapy.

"When I began working clinically, I knew I wanted to continue my research career and go into advanced practice. I began by getting involved in audit work in my clinical department and, wanting to continue improving the care we give to breast-cancer patients, I undertook an audit of skin reactions for breast-cancer patients.

"This audit gave me the confidence to apply for the NIHCR and Health Education England Integrated Clinical Academic Programme, which provided nine months of academic support and funding. The programme enabled me to develop my audit work, which has since been published in *Radiography*[1].

"It also gave me the skills to complete my MSc, which I finished in 2020 and was also published in *Radiography*[2].

"My current role allows me to promote research and innovation in the radiotherapy department while maintaining my clinical skills. The NIHCR and CoRIPS are true supporters of research and investors in people who they believe will deliver results for research."

Funding and grants

Research funding from the CoR in 2023

The following funding opportunities are open for applications. Our College of Radiographers Industry Partnership Scheme (CoRIPS) Research Awards are open to students and members and we welcome innovative applications from those with research experience or none at all.

Student CoRIPS Research Award

This award is an excellent starting point for students thinking of a career in research and wanting to explore a research idea.

- **Grant value: up to £1,000.**
- **Projects: individuals or small groups.**
- **Application deadlines: Monday 3 April 2023 and Monday 2 October 2023.**

To apply, you need to be registered on a College of Radiographers-approved pre-registration programme and be a student member of the Society of Radiographers.

CoRIPS Research Grant

Designed to support radiographers with little or no research experience, the CoRIPS Research Grant can fund a collection of small projects or one larger project.

- **Grant value: up to £5,000 for small projects; up to £10,000 for one larger project.**
- **Projects: individuals or small groups.**
- **Application deadlines: Friday 28 April 2023 and Monday 2 October 2023.**

The awards are part of the CoR's Research Strategy (2021-2026) commitment to support radiographers in undertaking research-based practice.

Doctorial Fellowship Grant

There are two Fellowship Grants of up to £25,000 available for candidates in the following research topics:

- **Accuracy and safety.**
- **Technological innovations.**
- **Public and patient experience.**
- **Service and workforce transformation.**
- **Education and training.**
- **Application deadline: Monday 3 April 2023.**

Applicants must be full members of the SoR and registered with the HCPC or appropriate voluntary register. They should be in receipt of a full or conditional offer for doctoral studies at a UK university in one of the five research areas mentioned above and they must provide at least one submission to *Radiography* journal. Applicants must also provide evidence of support from their employer if remaining in part-time employment because research will require time out from normal work duties.

Overseas Conference Attendance Grant

If you would like to attend a professional conference outside the UK to present your work, this grant can help to fund your trip.

- **Grant value: up to £1,000.**
- **Support for: individuals or a small team to travel overseas to present the findings of their research as an oral paper.**
- **Where: outside the UK, however, consideration will also be given to virtual event attendance.**
- **Application deadlines: Friday 28 April 2023 and Monday 2 October 2023.**

Applicants should submit a 1,500-word proposal outlining their work, how their paper is expected to make an impact on patient care and the expected outcomes from the work.

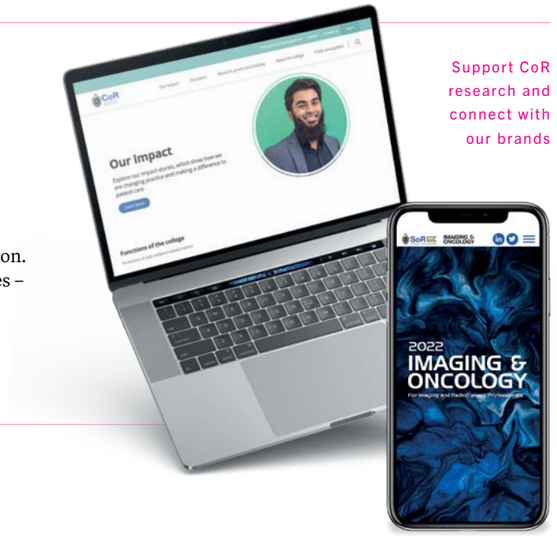
It is never too early to start thinking about research. If you have any questions about the funding available or to discuss your research idea, please contact Dr Rachel Harris at rachelh@sor.org

For more information, scan the QR code or visit www.collegeofradiographers.ac.uk/funding

Industry partnerships

Our newly updated industry partnership scheme

CoRIPS provides financial support and funding for our research and educational projects. By becoming an industry partner, you'll contribute to vital research and position your brand as an active partner of the College of Radiographers.



Support CoR research and connect with our brands

All CoRIPS partners benefit from:

- **Prominent branding** on *www.collegeofradiographers.ac.uk*
- **Brand positioned** as a generous benefactor of industry research.
- **Logo displayed** on CoR event stand promoting the scheme.
- **Invitation to the annual CoRIPS seminar**.
- **New partners profiled** in editorial content on *www.sor.org* news section.
- **25% discount** on CPD Now endorsement of partner-sponsored courses – 40% discount if 10 or more.
- **Discounts on advertising** in SoR's publications and on website.
- **10% discount** to exhibit at SoR conferences and events.
- **20% reduction** on advertising in the annual *Imaging & Oncology*.

Partnership tiers and special benefits

Different partnership tiers now offer you the flexibility to contribute in different ways.

Diamond Plus partner £9,600

- Invitation to half-yearly meetings with the College to discuss the status of the grants awarded and opportunity to suggest research topics.
- Assistance in recruiting radiographers for focus groups and other non-commercial initiatives.
- Invitations to speak at one SoR event per year in a non-promotional capacity.
- Exclusive invitation to attend the SoR Radiography Awards and the Presidential Inauguration.
- Opportunity to have a speaking or advisory role at the annual CoRIPS seminar.
- "Diamond Plus partner" CoRIPS-branded digital banners to show affiliation and support for the scheme.
- Additional 20% reduction on advertising in *Synergy*, *Insight* and digital opportunities through *www.sor.org*

Diamond partner £6,000

- Opportunity to have a speaking or advisory role at the annual CoRIPS seminar.
- "Diamond partner" CoRIPS-branded digital banners to show affiliation and support for the scheme.
- Additional 20% reduction on advertising in *Synergy*, *Insight* and digital opportunities through *www.sor.org*

Premier partner £3,600

- "Premier partner" CoRIPS-branded digital banners to show affiliation and support for the scheme.
- Additional 15% reduction on advertising in *Synergy*, *Insight* and digital opportunities through *www.sor.org*

Industry partner £1,200
(reserved for small companies or charities)

- "Industry partner" CoRIPS-branded digital banners to show affiliation and support for the scheme.
- Additional 10% reduction on advertising in *Synergy*, *Insight* and digital opportunities through *www.sor.org*

To join the CoRIPS scheme, email soradvertising@haymarket.com or call +44 (0)20 8267 4873

Radiation-induced nausea

Critical analysis of the management of a patient suffering with radiation-induced nausea (a prescribing case study)

Natalie Excell

This case study refers to a consultation I undertook in the radiotherapy department, supervised by my practice educator during my non-medical prescribing qualification. The qualification entails the completion of an approved MSc module, which, for me, included 80 hours of educationally led prescribing practice supervision, the successful completion of numeracy and pharmacology exams, submission of a learning log of prescribing evidence, including reflections on practice, and a personal drug formulary. This case study has allowed me to reflect on my own prescribing practice, seek feedback from colleagues and service users, and consider potential improvements to my practice.

Case presentation

Jane was receiving radiotherapy for malignant neoplasm of the vulva. She was one week into her radiotherapy and a brief history is provided in Figure 1.

I made the necessary introductions, including my role as well as prescribing role, introduced my practice educator and confirmed Jane's identity. Gibson[1] explains that positive patient identification is essential for delivering patient-centred treatment, guaranteeing patient welfare and successful coordination of care. Failing to successfully identify a patient can result in incorrect prescriptions.

My aim at the beginning of this consultation was to follow the revised Pendleton Model; shown in Figure 2[2]. Following a consultation model can be useful when embarking on a new role or building rapport to provide an element of structure to consultations.

I took and documented a full history. It is crucial to obtain an understanding of the patient's presenting complaint and a thorough history of their medical background to reach diagnosis, eliminating differential diagnoses[3].

Ahead of the consultation, I assessed Jane's previous medical records to gain awareness of management to date. I took a medication history – Jane could relay her medications without an issue. I checked adherence to medications and she confirmed she took them daily as prescribed.

Based on the history, it was apparent Jane was suffering with nausea. This could have been for several reasons. It could be due to radiotherapy, particularly treatment of her para-aortic (PA) nodes[4]. Jane also mentioned that she had been anxious regarding starting radiotherapy, which could have been contributing to the nausea[5]. This was discussed – anxiety can cause both physical and psychological responses, and feeling overly anxious can cause nausea[6]. Jane expressed that her anxiety had settled now that she was a week into radiotherapy and therefore this cause was ruled out.

A study[7] investigated toxicity received in 96 gynaecological cancer patients receiving radiotherapy to the pelvis +/- PA nodes. The results showed 30% of the PA node group experienced nausea, compared with 15% in the pelvis-only group, demonstrating a larger quantity of patients receiving PA nodal radiotherapy were likely to experience nausea. This study was conducted in the US but its results are transferable to the UK because radiotherapy techniques are similar, meaning the toxicity experienced will be similar.

Management

When analysing differential diagnoses, it was most likely that Jane's nausea was caused by radiotherapy. After discussion, a prescription was completed for Metoclopramide oral tablets, 10mg to be taken up to three times a day (TDS).

Jane was hard of hearing and this, coupled with mask-wearing due to the ongoing Coronavirus pandemic, added a level of difficulty to the consultation. One in two over-70s in the UK have hearing loss[8] and a large proportion of radiotherapy patients are in this age group, highlighting the importance of awareness of strategies to effectively communicate with this patient group. Without effective communication, the results of healthcare outcomes can be reduced, including increased medical costs, readmissions and reductions in treatment adherence[9]. This article introduced several management techniques for consultations with patients who are hard of hearing, including wearing clear face masks, using sign-language interpreters and using captioning apps on smartphones.

During this consultation, simply increasing the volume of my voice meant Jane could hear and understand what I was saying. If this had not have been the case, I could have worn a visor instead of a face mask. Feedback from my practice educator and Jane demonstrated I had maintained good communication skills throughout, was able to build a good rapport, and Jane had a good understanding of the advice given.

As this was a routine review, Jane had not entered the consultation with an agenda to gain a prescription. She had not previously mentioned feeling nauseous but, when I asked, she confirmed that she had been nauseous since commencing radiotherapy. I discussed management options with Jane, both pharmacological and non-pharmacological.

Non-pharmacological options for the control of nausea include ginger and peppermint. Ginger has been shown to increase digestive responses and increase stomach emptying, which can reduce nausea[10]. A study conducted with 100 patients to compare treatments for nausea concluded peppermint oil could significantly improve symptoms, with 65% of patients in the study using peppermint oil alone to control nausea[11]. When discussing these options with Jane, she disclosed she did not like ginger and was not keen on peppermint, meaning these options were not appropriate. Jane said she would prefer a pharmacological option.

Pharmacological options to manage nausea include Metoclopramide and Ondansetron. Stevich-Heemer[4] suggests that for patients receiving radiotherapy alone, Metoclopramide is a more beneficial option, whereas for patients receiving chemo-radiotherapy, Ondansetron +/- Metoclopramide is an effective management strategy. This made Metoclopramide an appropriate strategy for Jane to manage her nausea and, after discussion, she wanted to try Metoclopramide.

A safety alert was published by the Medicines and Healthcare products Regulatory Agency (MHRA) in 2014, restricting the dose and duration of treatment with Metoclopramide in certain cases. Due to potential adverse neurological effects, the review recommended changes to help minimise serious adverse effects[12]. After this review, Metoclopramide remained appropriate for use in adults for radiotherapy-induced nausea[13] and therefore remained an appropriate treatment regime for Jane.

Outcome

The side effects of Metoclopramide were discussed and Jane was to stop the Metoclopramide and inform us if she developed diarrhoea or involuntary movements. She was advised that the information leaflet in the Metoclopramide box would contain all the information she »

Figure 1. History taking notes

Jane Bloggs, 82 years, confirmed malignant neoplasm of vulva.	
Presenting complaint (PC)	Nausea
History of presenting complaint (HPC) using OLDCART	**Onset** – last week, started alongside radiotherapy. **Location** – stomach feels upset, retching but not vomited. **Duration** – settles throughout the day. **Characteristics** – feeling nauseous, particularly in the morning. **Associated factors** – loss of appetite, weight loss, having one meal per day, still managing to drink water. **Relieving factors** – nothing. **Treatment tried** – not tried any treatment.
Previous medical history (PMH)	Hypertension, hay fever, no renal/hepatic problems.
Family history (FH)	nil relevant.
Social history (SH)	Son helps with shopping and housework, good supportive neighbours.
Drug history (DH)	Ramipril 10mg OD, hay fever medication PRN.
Over-the-counter (OTC) medications	Paracetamol PRN.
Allergies	Penicillin causes swelling.
Review of systems (ROS)	Headache.
On examination	Not examined.

Figure 2. Revised Pendleton Consultation Model[2]

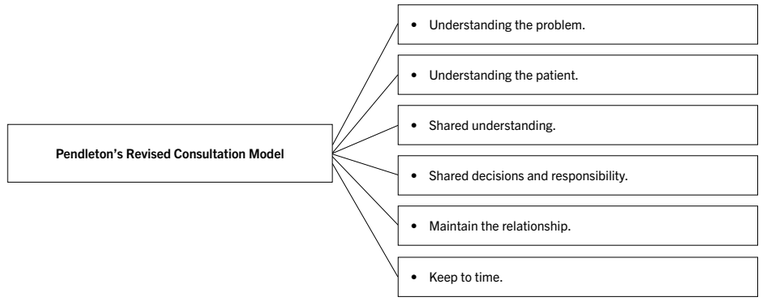


Figure 3. EASE table to assess the effectiveness, appropriateness, safety and cost-effectiveness of the product choice

	Metoclopramide 10mg	**Ondansetron 8mg**
E: How clinically effective is the product?	Metoclopramide encourages normal peristaltic action and therefore is clinically effective[22].	Bioavailability of around 60%, peak plasma concentrations reached around 1.5 hours after oral administration[23].
A: How appropriate is the product for this specific patient?	There are no interactions or contraindications. for Metoclopramide with this patient[22].	There are no interactions or contraindications for Ondansetron with this patient[23].
S: How safe is it?	There is no pre-clinical safety data for Metoclopramide[22]. Side effects include diarrhoea, extrapyramidal disorders, depression[22].	Data has revealed no special hazard for humans with repeated-dose toxicity[23]. Side effects include headache, flushing, constipation[23].
E: Is the prescription cost-effective?	28 10mg tablets cost £1.21 to the NHS[24].	10 8mg tablets cost £1.92 to the NHS[2].

would need. She had reviews booked weekly during radiotherapy so I advised Jane that if she had issues before her next review, she could ask to be seen again and we could adapt the management plan.

I discussed and documented in Jane's record how to take Metoclopramide. I informed Jane that her other medications had no interactions, and she could continue to take these as normal. A prescription for Metoclopramide, which met all legal requirements set out in the British National Formulary[14], was written.

Clinical record keeping is not only vital for good quality care, it enables other practitioners to see the patient's management to date and is a legal requirement of prescribing. Hay, Wilton, Barker, Mortley and Cumerlato[15] cite the benefits of good quality clinical documentation as enhanced quality and patient safety outcomes. As the Health and Care Professions Council has adopted the Royal Pharmaceutical Society Competency Framework for all Prescribers, I must ensure compliance with my professional code of conduct, including maintaining accurate, legible documentation[16]. The importance of working within my professional code of conduct is heightened by the demonstration of how a lack of detailed and accurate clinical documentation can lead to revoked professional registration[17], further supporting the importance of prescribing within my scope of practice, recognising limitations and asking for support when necessary.

Discussion

As well as non-pharmacological options, there were alternative medications that could be prescribed. Using the EASE mnemonic (Figure 3)[18] helps ensure the most appropriate prescribing decision is made, considering effectiveness of medications without influence from commercial factors. The most common first-line medications used in the management of radiation-induced nausea are Metoclopramide and Ondansetron[19].

Metoclopramide is an effective treatment for radiation-induced nausea and works by blocking antiperistaltic effects of apomorphine, increasing gastric emptying[20]. Ondansetron is also an effective antiemetic for both the treatment and prophylaxis of radiation-induced nausea. It is more effective than Metoclopramide when used for single-dose radiotherapy treatments prophylactically[21]. Figure 3 compares Metoclopramide and Ondansetron using EASE.

Based on this information, both options were appropriate for Jane, with Metoclopramide being the more cost-effective. Ondansetron could be reserved and used second-line if Metoclopramide alone did not manage the nausea.

The side effects from radiotherapy are cumulative[26], so, without an appropriate management strategy, Jane's symptoms were likely to worsen. She did not have any drug-drug or drug-disease interactions with Metoclopramide; if Jane were taking Levodopa or dopaminergic agents, these have mutual antagonism with Metoclopramide[22]. Clearance of Metoclopramide is decreased by 70% in patients with severe renal impairment, while half-life increased. In patients with liver cirrhosis, plasma clearance is reduced by up to 50%, resulting in an accumulation of Metoclopramide[22]. Both would need to be considered if prescribing for a patient with these issues. Jane had no issues with her liver or kidneys so this was not necessary.

Jane had no issues with swallowing so prescribing tablets was the correct option; if swallowing difficulties had existed, then liquid Metoclopramide could have been more appropriate. If an alternative formulation were not available, I could seek support from another prescriber or pharmacist to discuss options.

Learning points

Reflective practice is essential in healthcare to ensure practitioners strive for constant learning and seek improvement[27]. A lack of reflection on practice has been identified as a barrier to a patient-centred approach in the long-term management of patients[28]. Personal and peer reflection can improve professional learning and highlight areas for improvement, emphasising the importance of encouraging and supporting others with their prescribing practice and seeking support for my own.

I managed to follow all aspects of Pendleton's Revised Consultation Model throughout my encounter with Jane. A large focus of this model is on shared decision-making and I was able to include Jane in all aspects of this choice. It was Jane's choice to not attempt non-pharmacological management and to try a pharmacological option. During the consultation, I discussed Jane's issues to gain an understanding of the problem – we discussed the decision and Jane was agreeable to the plan. Shared decision-making helps improve patients' knowledge, reduces anxiety and enables them to have more accurate perceptions of risks involved[29].

Feedback from my practice educator highlighted my ability to conduct a clear, concise consultation that accurately identified the patient's problem and provided an agreeable solution. Jane was hard of hearing, which could have presented an issue, but feedback showed this did not and should not impact on the quality of care. Feedback from colleagues and service users is important to consider when reflecting on practice, particularly prescribing decisions, as this can influence the direction of future practice. In this case, feedback was positive from my practice educator and the patient, therefore no adjustments were required.

I am acutely aware that prescribing errors can happen. In 2004, the World Health Organization introduced the World Alliance for Patient Protection in an attempt to minimise critical and avoidable drug-related errors[30]. Common causes of prescribing errors include lack of knowledge surrounding drug interactions, dosage errors, illegible documentation, lack of communication and incorrect routes of administration[31].

There are many ways we can look to reduce these errors, for example, by advocating educational actions for prudent prescribing directed at prescribers, implementing tools to guide appropriate prescribing and by encouraging a multidisciplinary approach to patient care[32]. If these prescribing processes are not in place, the risks of prescribing increase so I must, therefore, seek to minimise risks within my practice and look for ways to implement change.

Reporting errors that happen helps gain clarity and create opportunities for prevention of future errors. If an incident occurs, the initial focus should be on the patient, who must be informed of the error. The error must be reported via local reporting systems and escalated, where necessary, to the Care Quality Commission/MHRA/NHS England and safeguarding team[33]. It is important to understand the reporting processes to ensure the accurate reporting not only of errors that I may be involved in but also errors I may uncover in the future. ■

Use this article for CPD

This case study analyses a prescribing decision undertaken as part of training for a non-medical prescribing qualification. It discusses the evidence to support the prescribing decision made with respect to our department.

- Non-medical prescribing students could use this case study to develop their knowledge of the options available in different cases and the rationale for using alternatives. This will help create a strong knowledge base to help evaluate their own practice.
- Radiographers could look at the management of radiation-induced nausea in their department and consider the evidence base to support this. Do you use a different approach? Is there good evidence to support this? Would you change your practice?
- Consider the use of radiographer non-medical prescribing within your own department. Do you use it? Is this something you could consider training in and implementing with respect to your speciality?

Reflect on the article and scan the QR code to record your learning on CPD Now.

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Research ethics applications

Back to basics: what a research ethics committee is looking for in an application

Paul Lockwood

Many radiographers only approach the purpose and remit of research ethical reviews when applying for approval to commence research projects. However, professional bodies, including the Society and College of Radiographers (SCoR)[1-3] and the European Federation of Radiographer Societies (EFRS)[4-6], as well as regulatory bodies such as the Health and Care Professions Council (HCPC)[7-9], promote learning about ethics because its principles have a significant impact on day-to-day clinical practice and education as well as on research.

Generally speaking, education on the theory of ethics follows "do no harm" principles and the four tenets of "autonomy, beneficence, non-maleficence and justice"[10]. But practical advice on completing research ethical approval forms is often lacking, causing amendments that delay the approval[11], which results in the opinion that research ethics applications are bureaucratic processes, are abundant in the duplication of paperwork or have idiosyncratic approaches[11-13].

This article aims to dispel some of those concerns and answer basic questions on what a research ethics committee (REC) looks for in an application. This perspective comes from 10 years of UK radiography research experience, five years of reviewing on a REC and as the current Chair of a »

university's Faculty of Medicine, Health and Social Care REC. The following article, therefore, takes a position based on a university perspective for radiographers on pre-registration (BSc) or post-registration (MSc). However, there is transferable learning for post-qualification research within the NHS that will require Health Research Authority (HRA) and other healthcare providers' ethics applications[14,15].

The overarching principle of a REC's scrutiny of ethics applications is not a scientific review of the research methodology proposed because this is not a research proposal sent to a supervisor or mentor at the start of a project[12,16]. It is to consider the consequential level of risk and/or harm[17,18] to the researcher, participants and, to some extent, the reputational harm to the institute of completing the proposed research, and what reasonable steps the researcher has taken to minimise this[12,18].

Ethical reviews often lead to philosophical discussions on morality and the potential implications of completing the proposed research. Although there are different ethical schools of thought and philosophical approaches – such as Utilitarian (consequence-based), Kantian (obligation-based), Liberal Individualism (rights-based) and Communitarian (community-based) – each theory has similar virtues, principles, obligations and responsibilities[19]. Theoretical differences, concepts and conflicts aside, REC consensus on pragmatic decisions and an agreement in principle for ethics applications often rely on the interpretation of Consequentialism[19]. Defined as the "best" outcome of theorising what is "good" in an act (in this example, research), as opposed to the "new school" Consequentialists' argument for morality through an evaluative lens, which has more reliance on "values and constraints"[20].

There are advocates and critics of all ethical theories and approaches, dependent on the judgment and evaluative differences of the "expected/anticipated" versus the "actual" future effect of the research. In reviewing an ethical application, the REC will assume the neutral position that acknowledges the actions (of the research) will affect the researcher, the participants and the institution[12] taking overall responsibility and liability.

Often evaluations are based on assumptions and theoretical positions of what the term "good" implies (understandings of rightness, rules, reasons, rationality and values)[20]. In a Consequentialist approach, the outcome is also bounded by an evaluation of the future downstream actions and effects (of the research)[20]. In contrast, "new school" Consequentialists approach the review from a broadened conception of outcomes, based mainly on values of not just the future downstream effects but the act itself and the potential "constraints" that may be needed[20].

What a REC expects in an application

It is impossible for a REC to approve a project with missing information, often termed "process issues"[21], such as lapses in submitted paperwork. This could include, for example, missing or inadequate detail on the sample size or recruitment of participants, lack of clarity in questions, bias in the study design, or a lack of information on the data analysis approach[11,16]. Most applications require attachments of additional evidence, such as recruitment materials, when this is omitted it may be difficult for the REC to assess for the risk of any potential coercion or any distressing/offensive (culturally, discriminatory, prejudicing, political, etc.) material being used[10,21,22].

The following sections will discuss what a REC will require to assess a research ethics application and why. It is acknowledged that the following is not exhaustive of all UK RECs[23] and there are variations and differences with European ethics requirements[24,25]. It is acknowledged that there are many healthcare research categories, such as audit and service evaluation, which may not require an ethics application to a REC, such as the Integrated Research Application Service (IRAS)[26] under the HRA[14,27] but may require local NHS trust research and development department approval or university REC approval. For example, most participant engaged research of ethnographic[28] or observer performance studies[29], if recruited and conducted in the NHS, would require an ethics application to IRAS[26].

Project summary

It is important to provide a clear but brief layperson summary of the research background and project. The summary should not be a full research protocol and, if possible, refrain from technical terminology. It is helpful to know if the research is evidence based and if there has been any stakeholder partnership or patient and public involvement[30] in the study design.

A common ground for amendments to ethics applications is often that the data collection start date has already passed (retrospective) before REC review and is required to be in the future (prospective). Most RECs cannot issue approval retrospectively, as any harm or risk would have already occurred. It is worth clarifying that ethical approval for auditing data already held by an institution is generally for changing its originally intended purpose from "records" to "research purposes". This is required before any new analysis of the stored data and public dissemination in peer-review journals or conferences can occur. Generally, this would be a desktop paperwork exercise (research) of retrospectively held data, but the research itself is prospective in action, and thus a review of the level of risk of changing the intended purpose of the data is required[31].

The majority of research, unless it is a literature search or uses publicly available research data (such as TriNetX[32] or National Institute for Health Research (NIHR)[33] Open Datasets), will be collecting data that is not "already" in the public domain. As such, some grant funders have requirements (NIHR[34] projects) that require data to be anonymised and post-research made available on open-access repositories; these requirements should be highlighted in the data storage of the ethics application

Gatekeeper access confirmation

If the research collects data primarily from an external organisation/institution, a copy of the gatekeeper approval/access from the relevant position of authority in the external organisation/institution should be evidenced in a letter/email and submitted with the ethics application. This will confirm that the appropriate authority has been given for this activity for insurance liability purposes, as the REC will not have the authority to approve research on behalf of external organisations/institutions.

If the research is collecting data on NHS property or with NHS staff, an HRA online decision tool confirmation[35] result is helpful to attach to the ethics submission so the REC knows if NHS/HRA[14,27,35] ethical review is required or not.

If data is to be shared with multi-site external organisations and institutions, a data protection agreement from a

Figure 1. Personal data[22,30]

Any information identifying the participant, such as:	Any information about the participant, such as:	Any information linked to the participant, such as:	Any information expressed by the participant, such as:	Personal data related to criminal convictions and offences includes:
Name. Surname. Age. Address. Physical characteristics. Gender.	Comments, feedback and/or judgments about an individual. Employment and/or career history. Education and/or any professional training. Work, study or performance level of the individual.	Vehicle registration plate number. National Insurance number. Job title. Employee number. Student number. Personal laptop and/or mobile asset number. IP address.	An individual's opinions. Answers provided in an interview or questionnaire. Valuations and assessments performed by an individual.	Offences. Criminal proceedings. Outcomes and/or sentences recorded.

Figure 2. Special category personal data[22,31]

Any information relating to the participant, such as:
Personal data revealing racial or ethnic origin.
Personal data revealing political opinions.
Personal data revealing religious or philosophical beliefs.
Personal data revealing trade union membership.
Genetic data.
Biometric data (where used for identification purposes).
Data concerning health.
Data concerning a person's sex life, or
Data concerning a person's sexual orientation.

Figure 3. Lawful basis for processing personal and special category personal data[22,32]

Consent The participant provides unambiguous and clear affirmative consent to processing their personal data.
Contract A contract often implies selling a service, not necessarily discernible for research.
Legal obligation – often to comply with the law (such as the police).
Vital interests – such as lifesaving circumstances in emergency medical care, etc.
Public task – exercise of official authority or power in law, such as the government.
Legitimate interests – most flexible, but not always the most appropriate, such as the processing of data to assess the performance of a healthcare task carried out in the public interest.

"Practical advice on completing ethical approval forms is often lacking, which can cause delay"

governance office may also be required. These agreements confirm the reciprocal exchange, sharing and disclosure of data[36], who the "data controller"[37] is, the "data processor"[37], the responsibilities and rights of both parties, and compliance with the General Data Protection Regulation (GDPR) 2018[31].

International projects

When research proposes data recording with a partner institute in a country or countries outside the UK, the lead organisation applies for research ethical approval. If the UK researcher is the lead, then the REC may request an overseas ethics declaration form be completed by all the overseas/external partner institutes to confirm compliance with local data protection laws, ethical procedures and protocols within each country as well as all necessary permissions pertaining to access to participants and research equipment have been approved.

Human participants

The majority of human-related research is aimed at improving human welfare, knowledge and understanding, as well as studying social or cultural dynamics. Such work is done for various reasons, including improving diagnosis, validating social or scientific theories, improving service delivery, evaluating policy and understanding human behaviour. Such research has significant responsibilities and moral imperatives but needs to adhere to ethical principles.

Often ethics application forms have specific sections on who the participants of the research will be. In these sections, details should be explicit and provide precise information on who, how many (sample size), inclusion and exclusion criteria, recruitment (including advertising

materials) and what they will be expected to do to allow RECs to assess any consequential level of harm or risk.

Participant information form

The recruitment materials are essential to the REC review process to understand how the project will be explained to the participants to enable them to give informed consent. A participant information form should include the following: the researcher's details (and any supervisor's details) so the participant can contact them with any questions in the future or to withdraw. A summary of the project (the background helps the participant understand why you are undertaking the research). What is expected of the participant (for free and informed consent). How the results will be disseminated (the participants should have a right to see an end of project report). Whether the data recorded will be anonymous or if personal data, such as demographics, will be recorded (including the GDPR 2018[31] lawful basis for the data collection and processing[38]). Where and how the data will be stored, for how long (check local research policies on data retention requirements for future audit and governance purposes[31]) and how it will be destroyed.

A participant information form template can often provide helpful subheadings to guide the format and structure to conform to local legal and governance requirements[31,36]. Under GDPR 2018[31], clear details of what "personal data"[39] (Figure 1) or any "special category personal data"[40] (Figure 2) will be collected and the specific circumstances it will be processed under[31] are required. Specific measures must also be provided to safeguard and protect the rights and interests of the participants[31].

Also, to comply with GDPR 2018[31] the REC will review the specific "lawful basis"[38] for collecting the data. There are six possible options (Figure 3) for the lawful basis and the appropriate one should be detailed in the participant information form.

The lawful basis for processing personal data for the majority of research projects carried out for and on behalf of healthcare research often comes under "consent" or "processing is necessary for the performance of a task carried out in the public interest"[31].

"Distress to participants caused by inappropriate or controversial subjects and questions can occur so the REC will want to know what strategies the researcher has put in place to handle these situations"

Rights and withdrawing

The participant information form should provide participants with their rights[11,31] (examples shown in Figure 4). When data, such as interview transcripts, is to be anonymised, it should be made clear to the participant to ask to review the data at the end of the interview before it is anonymised – afterwards it may be difficult to confirm which anonymous transcript belongs to which participant.

Likewise, for surveys, it would be good practice to explain at the end of the survey that the participant could either download a copy of their responses (data) or have the opportunity to review it before submission. Otherwise, it may be challenging to identify which anonymous survey response belongs to which participant.

Consent

Radiographers may use a template consent form or design their own as long as it complies with GDPR 2018[31] participant rights and demonstrates a recordable positive opt-in to the research. But an REC will look to confirm that consent is a precondition before participation in the research.

The consent form should provide the researcher's details and a recordable indication that the participant has read information about the project so they know what is expected of them (for informed consent). It should also include details of how to withdraw if the participant changes their mind, whom to contact to request this, and, if required, a cut-off date for withdrawal. Generally, a cut-off date should be set before submission of any final reports to funders or manuscripts to peer-review journals in case participants wish to withdraw and have their data deleted, which may change the results and outcomes of the project.

If the study involves participants who are particularly vulnerable or unable to give informed consent[41-43], the HRA[14] and the Mental Capacity Act 2005[44] advise who in the UK is the appropriate body to approve ethical reviews for these projects. In the UK, governance arrangements recommend university RECs are not recognised as appropriate bodies under the Mental Capacity Act 2005[44] to provide ethical approval when there is a concern about a participant's ability to consent. When carers/relatives are also asked about the participant's health data, these will require HRA[14] approval.

Research materials

With any submission to a REC, it is essential to supply any and all associated documents, including recruitment material, such as leaflets or posters or planned social media content, for the REC to check for appropriateness. For surveys, a copy of the data collection tool to review the question wording is required. Likewise, for interviews and focus groups, a copy of the guidelines for data collection of what will be recorded (audio, video, written testimonies) and the types of questions or prompts are needed.

Distress and disclosures

Distress to participants caused by inappropriate or controversial subjects and questions can occur, so the REC will want to know what strategies the researcher proposes to handle these situations, whether it be psychological (stress, anxiety, hysteria, etc.) or physical (confusion, exhaustion, injury, etc.) distress. The REC would not expect the researcher to intervene themselves as this may bias the research outcomes and potentially put the researcher in a difficult position. But they need to understand what support services can be signposted for assistance or directed to qualified and registered healthcare professionals for appropriate intervention and management of unexpected situations.

Likewise, potential disclosures (be they of a personal or professional nature) of anything sensitive or potentially criminal will require control measures, such as a plan of what the researchers will do in these situations. For example, details of contacting designated safeguarding officers to act as intermediaries to assess the risk and threshold required for action and/or referral onwards to counselling services or professional or regulatory bodies (dependent on the disclosures of concern regarding professional behaviours and/or fitness to practice concerns). Regarding criminal intent or immediate danger to vulnerable participants or patients, details must be given of the appropriate authorities to be contacted.

Data governance

In the participant information form, the researcher should state who the data controller is, where the data will be stored, and how long it will be retained[31,36,37]. To conform to GDPR 2018[31], personal data should be held for no longer than is necessary for the purpose for which it was originally collected. For example, personal data should be anonymised as soon as possible (if anonymisation is part of the method). All data is recommended to be stored on a password-protected online cloud storage repository and not stored at home addresses or on home/personal computer storage due to the potential for data breaches or loss.

It is worth investigating your local policy for the recommended storage period for research data. Often these are around five years after the completion of the research (taken as the date of publication or presentation to the sponsor) unless subject to conditions set by external funders. Data retention is generally for reasons that include follow-up studies, academic purposes of awarding qualifications, GDPR 2018[31] audit or retrospective examination of data in cases of research misconduct.

There must also be adequate safeguards to protect personal data while in storage, including periodic checks to ensure the data is safe. Additionally, a plan is recommended in case of a data breach leading to loss or unauthorised disclosure of personal data and what will happen, including an assessment and identification of the data involved (be it sensitive, protected or confidential data), the incident (loss, stolen, or unintentional disclosure), damage limitation and containment (in the case of hacking), an assessment of the risks (future likelihood occurrences, and the risk to the participant's rights and freedoms), and what action will be taken (notifying affected individuals and governance departments). If potentially serious, it may require your governance department to notify the Information Commissioner's Office(ICO)[45]. »

Figure 4. Participants' rights[22]

- The right to be informed – who will share their data, such as within project reports to the funder, the sponsor, and in a final peer-review journal article and conference presentation.
- The right of access – if they wish to view their responses from an interview/survey/observer performance assessment/etc.
- The right to rectification – if they wish to amend their interview/survey/observer performance assessment/etc.
- The right to restrict or object to processing – if they wish to restrict/object to prevent any processing of their responses from an interview/survey/observer performance assessment/etc.
- The right to erasure – they are free to withdraw their consent to participate in the research project at any time without having to give a reason. To do this, they should contact the project lead/researcher. The participant's rights allow them to request that any inaccurate or personal data be erased if they withdraw.
- The right to data portability – if they wish to view or copy their responses.
- Rights related to automated decision-making and profiling – however, this rule may not apply in the study if there is no artificial intelligence (AI) data automation to make decisions that might affect the participant.

Figure 5. Health and safety risks

Risk area	Potential hazards
International travel	• Researcher safety due to lone travel in an unfamiliar location. • Loss of travel documents/money. • Potential of extreme weather due to season, e.g. monsoon/cyclones.
Domestic travel	• Lone travel on public transport. • Driving long distances.
Lone working	• Potential emotional/physical harm to the researcher from participants • Researcher fatigue due to intense research schedule over multiple locations
Environment	• Site-specific safety. • Electrical safety. • Fire safety. • Radiation/chemicals. • Signage and emergency evacuation areas. • Access to emergency services/healthcare due to the remote location.
Mental overload/ stress	• Harm to researcher wellbeing from overworking due to intense research schedule.
Emotional harm/hurt	• Distress to participants due to sensitive research topic. • Distress to researcher due to participant/general public negative reactions.
Disclosures	• Potential for participants to divulge criminal, unprofessional, or harmful disclosures. • Who to signpost to for assistance/help.
Covid-19	• Testing, room ventilation, masks, hand washing, etc.
Data loss	• Who to inform, how the data is stored, who the data controller is and where data is stored.

There should also be details of the proposed destruction of sensitive research data (personal data and special category personal data) when it is no longer required (after the agreed storage period). For the secure destruction of data held electronically on computer discs and other media, such as memory sticks, DVDs and audio, it is advisable in the first instance to check with the local data protection officer for the appropriate method to limit data breaches occurring.

Health and safety risk assessment

The REC will specifically assess that the researcher has a full concept of what is involved with the project and that they have the skills and training to use any equipment required in a safe manner or have adequate supervision agreed upon[46] before the use of any unfamiliar equipment.

Often risk assessments are required once the completion of health and safety risk assessment training[46] has occurred to stratify what and how the research project might cause harm (physical, mental health, or safety) and the people who might be affected (researcher, participants or the general public[12]). Risk assessments should detail any control measures already in place and identify what, if any, further controls are required, including strategies to report and document adverse events, incidental harm, and any safeguarding concerns. The potential hazards, controls and risk levels in research are many and varied and may require specialist risk assessments – for example, Control of Substances Hazardous to Health (COSHH)[47,48], Ionising Radiation[49-51], Control of Electro-Magnetic Fields at Work (CEMFAW)[52], Dangerous Substances and Explosive Atmospheres Regulations (DSEAR)[53] – associated with the proposed research activity, environment or equipment to be used. Each research project is different, but general recommendations are shown in Figure 5.

Dissemination of findings

An integral part of research funding comes from the impact of how research outcomes are used and implemented as agents for change. The REC will want a clear dissemination plan of your research outcomes to align with funding cycles such as the Research Excellence Framework[54]. Examples include peer-reviewed journal articles[55], conference papers/posters/talks, reports to funders or presentations to professional bodies.

Conclusion

It is hoped this article has provided insight into what a REC looks for in a research ethics application. If in doubt, always refer to your institute's ethics and governance policies before submission and seek advice from your local REC representative if you have concerns over the level and detail required in the ethics forms specific to your study. Furthermore, it is always sound advice to solicit a colleague with experience from previous research ethics submissions to peer review your ethics application to gain an independent opinion and highlight any corrections or suggestions to improve the proposal before submission.

Lastly, although frustrating, feedback requiring amendments to an ethics application provides the opportunity to support and strengthen your application. You might feel the original submission details provided in the application might have been lost in translation or that you disagree with the feedback or find it conflicting, and the level of clarity in the amendments required is unclear. In this case, it is always recommended to contact the REC for guidance to support your application resubmission and clarify any ambiguity. ■

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- What is the difference between personal data and special category personal data under GDPR?
- What are the six lawful bases for processing personal data under GDPR?
- What are the seven participants' rights in research under GDPR?

About the author

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Reporting Snippets

The soleal line

A nasty case of proximal tibial pseudo periosteal reaction?

Nick Bithray

I first became aware of this "pathology" at an Accident and Emergency MDT meeting around 10 years ago. A plain film knee image (Figure 1) was brought up on the projector for us to discuss whether further imaging was needed to help characterise the periosteal reaction reported by one of my radiologist colleagues!

When you are under pressure in a room full of people awaiting your opinion, it is easy to doubt yourself – but I was sure that I had seen it on plenty of previous knee images and never paid it much attention.

More recently I have been asked once again to review a similar case (Figure 2) and therefore felt it was probably worth a Snippet. Figures 3 and 4 are two more examples.

Well, as you may have gathered, it's not a real periosteal reaction at all – it's a normal ridge called the "soleal line" on the posterior surface of the tibia that curls around and pokes its head out laterally on some AP views (Figure 5).

If you have a skeleton in the department, take a look, you will be able to see it on there. Sometimes the whole line is visible while, at other times, just the area curling around the lateral edge of the more superior tibia can be seen. The line, also known as the "popliteal line", is the site of several origin and insertion points, including the popliteus and soleus muscles, among others.

It does not warrant any further imaging at all but giving it a name does help us to comfort a concerned requester.

We should, of course, consider any "real" pathologies that may mimic the soleal line, such as vascular calcification or osteomyelitis (both Figure 6); partial synostosis (Figure 7), where two or more bones fuse together; hypertrophic osteoarthropathy as covered in a previous Snippet[1] (Figure 8); or maybe a stress fracture (Figure 9). ■

About the author

Nick Bithray is a Consultant Radiographer for James Paget University Hospital and Queen Elizabeth Hospital, Norfolk, reporting both plain film and selected MRI. He gained all his reporting qualifications at Canterbury University and is involved in teaching plain film image interpretation at various levels and locations, including Norwich Radiology Academy.

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Suggested reading

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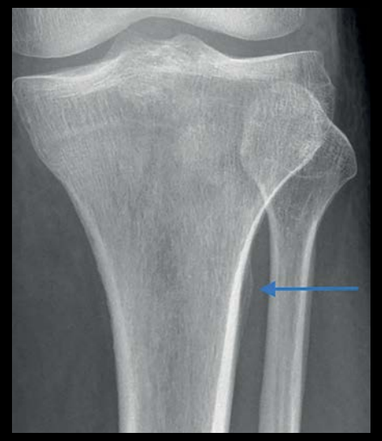

Figure 1. MDT case. Small area of apparent periosteal reaction indicated by the blue arrow.

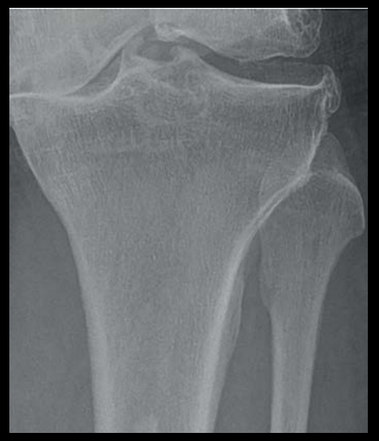

Figure 2. Review case. In this review case, the area is more defined. A touch of OA medially.

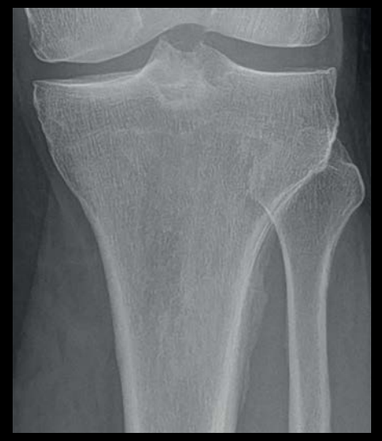

Figure 3. Another soleal line.

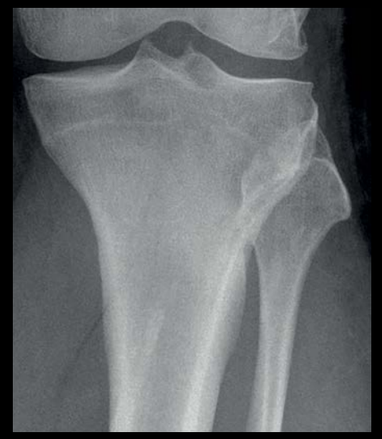

Figure 4. This soleal line is particularly solid

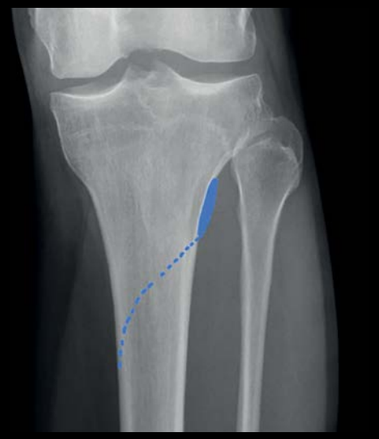

Figure 5. The soleal line. The dotted section is posterior and the solid section is visible on the AP.

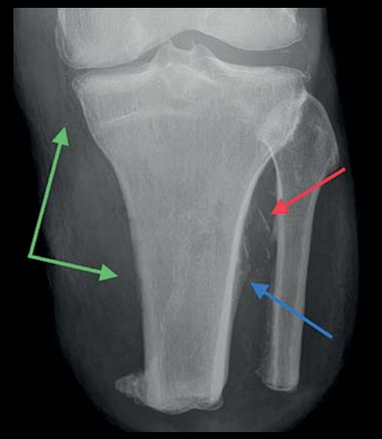

Figure 6. This image shows a diabetic partial amputee with vascular calcification (red arrow), the soleal line (blue arrow) and, interestingly, gas bubbles/cortical irregularity (green arrows) due to osteomyelitis.

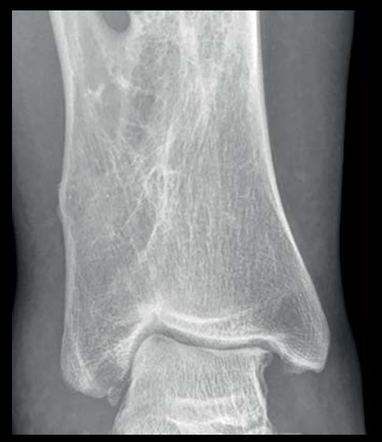

Figure 7. I agree this is not a great example but, if you can image partial synostosis of the proximal tibia/fibula, it could look similar.

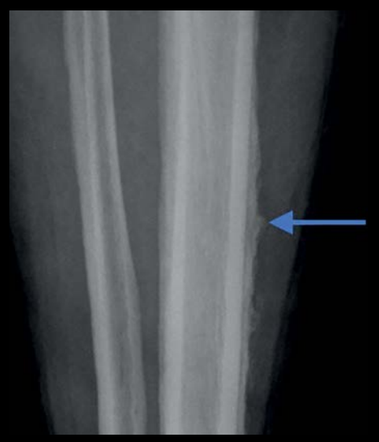

Figure 8. Hypertrophic osteoarthropathy, as reported in a previous Snippet[1].

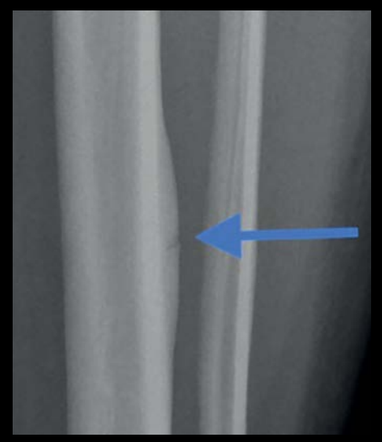

Figure 9. Stress fracture of the mid tibia showing cortical thickening/solid periosteal reaction and a lucent fracture line.

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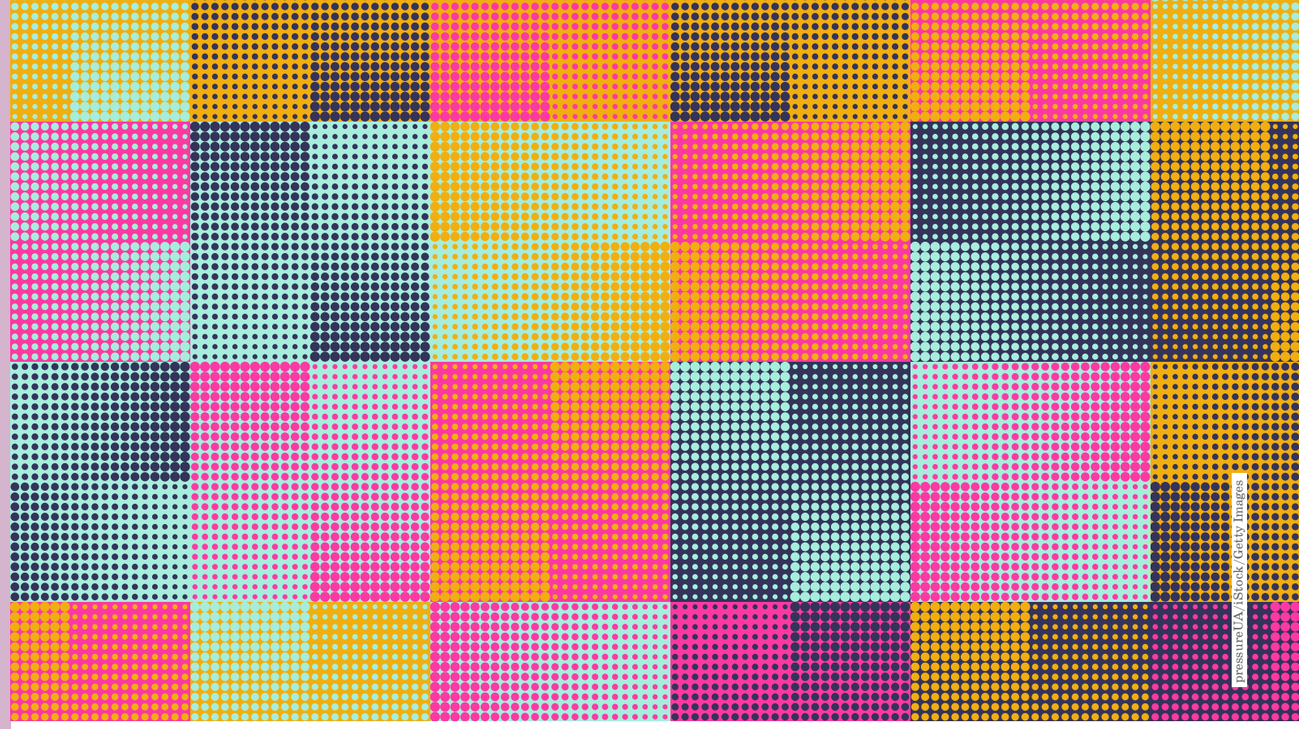

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Abstract/article idea
If you are formulating an idea and would like advice, a structured abstract can be submitted for review and members of the Editorial Board will offer guidance on developing the full article. Structured abstracts should be no longer than 300 words and take the following format:

- **Keywords.** State up to six keywords that reflect the content of the intended piece.
- **Title.** This should be a concise description of the intended work to give the reader a clear idea of what to expect in the article.
- **Aim.** A short statement detailing the purpose of the article.
- **Body.** A brief overview of the entire article describing the areas that will be reported (for example, methods, results, outcomes).
- **Conclusion.** State what conclusions may be drawn from the work, what any results may indicate, what the implications of the findings may have on clinical practice, and give consideration to recommendations for future studies.
- **References.** Include some key references to support the basis of the work.

Personal reflection
A reflection on your own personal experiences in practice, written in a formal academic style, from which others can learn. Please also provide three CPD activity points, questions or activities for readers to reflect upon, answer or look up. The article should:

- Take a clear line of argument.
- Analyse (not just describe) your thoughts

and feelings about the experience.
- Refer to evidence from existing literature on the topic.
- Discuss different perspectives.
- Detail your own points of learning.
- Suggest how your future practice might change.

Case study
A case study is an intensive, systematic study of an episode of care, a person, a group of people or a unit[1,2] and may be written with the team involved. The case must be relevant to readers and support their learning and should, therefore, be engaging. It is not necessary to look for rare or exotic occurrences. In everyday practice, radiographers and students may encounter complications, unusual occurrences, ethical or management challenges, near misses and potential pitfalls. Such experiences result in reflection, learning and perhaps a review of practice from which other practitioners may also benefit.

Writing a case study
Case studies should be around 2,000 words, excluding references, CPD learning points, tables and figure headings.

Tip A summary of up to 150 words to summarise the case and outcome may help you to draw out the important elements.

The following headings should be used:
- **Abstract.** Up to 150 words to summarise the case and outcome.
- **Case presentation.** Brief description of the situation or patient presentation to capture key features about how the incident occurred, or patient presented, what were the main issues and why this is relevant.
- **Management.** (This may include sub-headings). Include actions that were taken to manage this experience with a brief explanation of what influenced your decisions and the resulting outcomes. If you needed to adapt practice guidelines, indicate where in the pathway this was done and how.
- **Outcome.** Include follow-up data where possible to support readers' understanding of the outcome. Indicate the follow-up period. State the impact.
- **Discussion.** Include a brief review of similar published literature including relevant clinical guidelines and/or protocols.
- **Learning points.** What did you learn from this case? Please give three to five points. This is the most important part of your case study.
- **CPD activities.** Please also provide three points, questions or activities for readers to reflect upon, answer or look up.

"Your work will be reviewed by the Editorial Board and constructive feedback will be provided"

Review paper
Review papers address topical clinical, ethical and policy issues that matter to radiographers, patients and health policymakers. The topic should be timely.

Writing a review paper
Review papers should be around 2,500 words, excluding references, CPD activities, tables and figure headings.

The following subsections should be considered in order to develop a structured paper:
- **Introduction.** A succinct introduction is necessary to establish what is already known, identify the gap in the field and outline the motivation for the review. A good motivational statement will steer away from simply stating that 'this has not been done before'. Include clear definitions of key terms, where appropriate. Outline what the structure will be and why this is helpful.
- **Main content of review.** The content should analyse, synthesise and interpret the literature to present a clearly reasoned argument. Use subheadings in the main body of the text so it is logical and easy to follow.
- **Discussion and conclusion.** Include a discussion and conclusion section. A clear message is an important endpoint.
- **CPD activities.** Please provide three points, questions or activities for readers to reflect upon, answer or look up.

Research paper
Original research papers should be around 2,500 words, although up to 4,000 words is acceptable for a qualitative research paper. This excludes references, CPD activities, tables and figure headings.

Original research papers involve research or audit that may improve practice in the clinical environment, influence policy development, education and/or research. All submissions should include an abstract of 300 words
(see opposite). Research involving people should include relevant information about ethical issues. Please also provide three points, questions or activities for readers to reflect upon, answer or look up.

The article should be written in the standard scientific format:

- Abstract
- Introduction
- Method
- Results
- Discussion
- Conclusion
- CPD activities

Poster
Posters are visual communication tools for engaging people in your research or clinical project. They may also be displayed in your department to raise awareness of your work and spread knowledge. Therefore, the design and physical appearance are important features for successful promotion[3].

When published, your poster will appear as a quarter-page image to showcase the design. The main text or a summary will appear alongside, and readers will be able to download the full poster from the SCoR website.

For submission, poster files should be labelled with the author's name, and you will be asked to insert the text separately to the submission form.

Developing a poster
The poster should convey the main points about your work. The following headings, therefore, should be included to organise your content:
- **Title.** Your title should be brief, eye-catching and results oriented. Avoid clever titles.
- **Introduction.** This should be succinct, consisting of a few sentences providing sufficient context using the most relevant references. A lengthy review should be avoided. The aim(s), hypothesis or research question(s) should be presented at the end of this section.
- **Methods and materials.** This outlines your research design, procedures, group/participant characteristics, equipment/material and/or the chosen outcome measures. Include data analysis methods. Keep it brief, use bullet points, tables and figures where appropriate.
- **Results.** Begin with the hypothesis or question(s) to remind your audience. Present an overview of your findings and include charts, graphs and figures where appropriate. Avoid too much text and keep paragraphs brief.
- **Discussion/conclusions.** Address your aim(s)/research question(s), explaining why your findings are important. How do your findings relate to previous work? How do they apply to your field? What should happen next? Be concise and use bullet points where appropriate.
- **Citations and acknowledgments.** Use current references, avoid grey literature. Thank those who have helped you and funded your project. Declare conflicts of interest, if appropriate.

Design tips
- Use a limited colour scheme that complements the rest of your poster.
- Use white space effectively to allow your audience to focus on the content.
- Use high-quality photographs.
- Limit the use of clip art.

Visual elements
Images, figures, charts and tables should be numbered consecutively, in accordance with their appearance in the text, using Arabic numerals (1, 2, 3 etc.) and figures with multiple parts should be labelled alphabetically (for example, 1a, 1b).
- Insert a caption into the text when you first refer to an item. Captions should consist of a brief title and description and should include an explanation of any abbreviations and symbols used.
- Do not include the caption on the image or figure itself.

Charts and tables
- These must be submitted as editable text, not in image formats, for example, screenshots.
- Reference must be made in the text but data presented in charts and tables should not be discussed elsewhere in the article to avoid repetition.
- Avoid shading the table cells.

Photographs and medical images
- These should be original materials. Photocopies of photographs are not acceptable.
- People should not be identifiable in photographs (masking the eye area alone does not guarantee anonymity). If people are recognisable, a consent form from the subject for the use of the photograph must accompany the submission.
- Label all photographs and medical images with the figure number and ensure correct orientation.
- Remove non-essential areas from the photograph or medical image.
- Copyright agreement and acknowledgments should be provided where necessary.

Diagnostic images
- These must be fully anonymised original files and consent gained in line with GDPR (see below).
- Resolution must be 300dpi and files approximately 1mb in size. Images downloaded from the internet are unlikely to be of a high enough resolution for print purposes. Please contact the editor for advice at insight@haymarket.com if such images are used in your work.
- All images usually produced for an examination should be included, that is, two projections where this is normal practice, and be presented in the correct orientation, that is, how they would be viewed in normal practice.
- Images must have the correct anatomical marker and, where technically relevant, the data on the image should identify projection. For example, AP/PA; erect/supine; slice orientation if cross sectional (sagittal/coronal/transverse, etc).
- Information accompanying the image should include, where appropriate, the relevant clinical history and clinical question (especially if the image is to be reported), the source of the image (clinical image title/downloaded from the web, including website address).

References
- References must be listed according to the Vancouver system, a numeric system where the references are numbered sequentially as they occur in the text and correspondingly numbered in the reference list.
- In the text use superscript when citing references, for example[1]. The reference number should appear within the punctuation if it is at the end of a sentence, that is, before a full stop or quotation mark. Do not bracket the numbers.
- If the reference appears more than once, use the original number assigned to it on subsequent appearances.
- Please do not use footnotes – these cannot be accepted.

CPD activities
Please provide three points, questions or activities for readers to reflect upon, answer or look up. This is a way of highlighting the important parts of your article for others to learn through in a broader sense, and to reflect on how your article impacts on their practice. Readers will be able to scan a QR code on the article and record their learning on the CPD Now website.

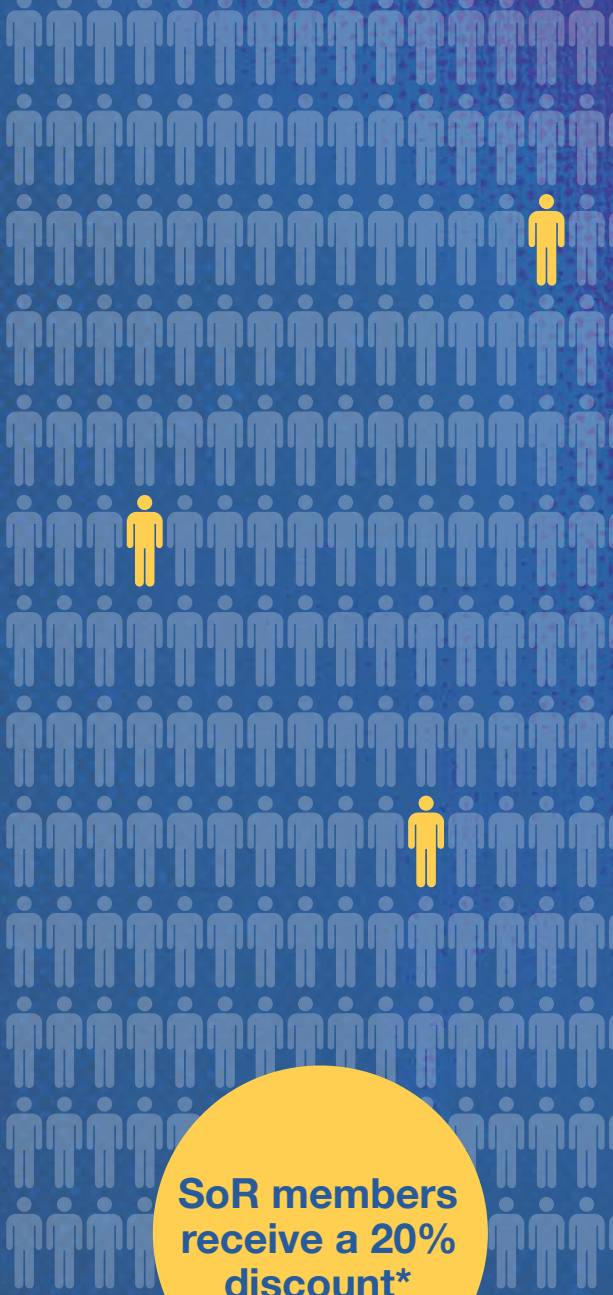
Submitting your article
All articles and abstracts should be submitted to the *Insight* online submissions portal at www.sor.org/insightauthor.

You will be asked to register on the system through which the whole submission and review process will be managed. You will be guided through the process step by step, inserting your text and additional elements in the formats detailed above.

Review process
While reviewing your anonymised submission, the members of the board will be assessing:
- **Relevance of the topic.** Is the content relevant to the current readership and to the objectives of *Insight*?
- **Content.** Is the content applicable to the current situation in clinical practice?
- **Structure.** Does the structure comply with the general format expectations?
- **Standard of writing and coherence.** Is it easy to read and does it flow well? Does it make sense?
- **Referencing.** Is it suitably referenced with current and relevant literature referenced in the correct way?
- **Accuracy.** Are there any technical errors?

The reviewers will decide if the article needs revision prior to publication. Each reviewer will submit comments and you will be alerted to when you can log in to view the comments. The Editorial Board aims to provide feedback within four weeks of submission. You will be expected to submit a revised version within four to six weeks, depending on the changes requested. ■

References
1. Gustaffson J. Single case studies vs. multiple case studies: a comparative study (thesis). Halmstad, Sweden: Halmstad University 2017.
2. Woods NF, Calanzaro M. Nursing research: theory and practice. St. Louis: Mosby 1980.
3. Dragan I, Rowe N. What is the evidence that poster presentations are effective in promoting knowledge transfer? A state of the art review. *Health Info Libr J* 30(1): 4-12. Available at https://doi.org/10.1111/hir.12015 Accessed 23 November 2020.



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