



British Society for SpondyloArthritis



Axial SpA
works silently.
We don't.

The use of MRI in the diagnosis of axial SpA

A UK survey of protocols for Magnetic Resonance Imaging (MRI) in the diagnostic process of Axial Spondyloarthritis (axial SpA)



Campaign fully funded by UCB.

 Inspired by patients.
Driven by science.


Royal United Hospitals Bath
NHS Foundation Trust


Norfolk and Norwich
University Hospitals
NHS Foundation Trust

act on
Axial SpA

About the National Axial Spondyloarthritis Society

Our purpose:

To transform the diagnosis, treatment, and care of people with axial SpA so everyone can live well with it.

Our cause:

Axial SpA is an inflammatory condition of the spine and joints. It works silently, leaving people in increasing pain and exhaustion.

What we do:

We campaign to transform diagnosis and treatment. We provide support to empower people living with the condition.

This report should be cited as follows:

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London: National Axial Spondyloarthritis Society (NASS)

Our *Act on Axial SpA* campaign: A Gold Standard time to diagnosis

The current time to diagnosis of axial SpA in the UK averages approximately 8.5 years from symptom onset. This delay is unacceptable and has serious consequences for the patient. With our *Act on Axial SpA* campaign, we propose a roadmap for reducing the time from symptom onset to diagnosis to just one year.



Find out more by visiting:

www.actonaxialspa.com

Foreword from the British Society for Spondyloarthritis (BRITSpA)

An accurate and timely diagnosis remains the main challenge in the quest to improve the lives of people living with axial Spondyloarthritis all over the world. Indeed, this is a “silent” disease causing significant pain and disability, yet lacking precise diagnostics. Research over time has identified key unmet needs in order to shorten the long journey from first symptom onset to diagnosis endured by many affected individuals.

Chief among these is the need to fully understand the role that MRI plays in aiding the diagnosis of axial SpA, particularly when other imaging methods such as plain radiography appear to show no abnormalities. Rheumatologists are generally aware of the limitations of MRI which lacks sensitivity and hence may not be of help for all patients. Yet, it remains a useful tool for many, and it is important that its use is standardised.

In 2017, the British Society for Spondyloarthritis (BRITSpA) conducted a national survey which showed a lack of awareness and standardised MRI protocols in the UK. This led to the production of a consensus statement document in 2019, a collaborative effort between rheumatologists and radiologists working across the nation, and aimed to improve knowledge, awareness, and standardisation of MRI protocols to aid the diagnosis of axial SpA. The current survey performed by NASS testifies to the success in the dissemination of the BRITSpA guidance, yet more work needs to be done to improve outcomes related to the reporting and interpretation of MRI scans. In this respect, BRITSpA is committed to continue working with NASS and other stakeholders to address the new challenges posed by the outsourcing and lack of specialism in many NHS Trusts across the UK.



Dr. Helena Marzo-Ortega,

*Chair of Executive Committee, BRITSpA and
Consultant Rheumatologist at Leeds Teaching
Hospitals NHS Trust and Honorary Clinical
Associate Professor at the University of Leeds*

Foreword from NASS

In 2021, following a national consultation process, we published a route map to achieve a Gold Standard time to diagnosis in axial SpA of 12 months and identified four broad areas in which improvements could be made. One of these is the access to timely and appropriate imaging and tests for rheumatology clinicians to make a diagnosis.

Our vision is that patients with suspected axial SpA have a quick and accurate diagnosis once they arrive in rheumatology. Imaging, in particular magnetic resonance imaging (MRI), is critical in this complex diagnostic decision for clinicians and can provide vital insight and support to confirming or discounting axial SpA in many patients. To enable this, every hospital in the UK seeing potential axial SpA patients should have an inflammatory spinal MRI protocol in place. In addition, every rheumatologist in the UK should be able to access an axial SpA expert musculoskeletal (MSK) radiologist. Finally, all radiologists and rheumatology clinicians should be aware of and use the BRITSpA MRI guidelines.¹

To understand current practices related to MRI in the diagnosis of axial SpA in the UK and identify if the 2019 BRITSpA guidance has improved utilisation and standardisation, we surveyed, via a Freedom of Information (FOI) request, all UK NHS Trusts, Health Boards and Health and Social Care Boards.

Our study has shown that there has been significant progress in raising awareness amongst radiology teams of axial SpA and the importance of spinal MRI in the diagnostic process. We are pleased to see that there is greater awareness of axial SpA but concerned by the impact that system-wide pressures are having on the ability to achieve diagnosis within a year of symptom onset, specifically capacity issues in imaging. Time to diagnosis can be significantly impacted by long waits for scans, excessive lead in times for image interpretation and poor quality interpretation which may lead to repeat MRIs or a second opinion on the interpretation.

As a patient organisation, we are keen to ensure that our work results in patients getting the best



possible care and hope that the analysis can contribute to an ongoing debate on the most appropriate first line investigations including imaging for patients with suspected axial SpA.

Our biggest concern is the emergence of the reliance on non-musculoskeletal outsourcing for the interpretation of images and the lack of associated quality control. The reliance on non-musculoskeletal radiologists is also worrying as it could be associated with substantially poorer familiarity with the term axial SpA and the 2019 BRITSpA imaging guidance, which may be driving poorer patient outcomes. These are areas that we will be focussing on to drive change collaboratively across the sector.

The study has highlighted that collaboration between rheumatology and radiology makes an important contribution to the quality of care that patients receive. This is something that we have seen from our Aspiring to Excellence partners anecdotally.

We continue to recognise the significant pressures on our health care professional (HCP) colleagues and are heartened by the support and commitment of those HCPs who work with us to create the conditions for change at a local level.

We are pleased to work with BRITSpA and other stakeholders in this research and continue to build the burning platform for change, creating a momentum for significant and lasting impact to ensure that every patient, every time receives early diagnosis and the best care.

Dr. Dale Webb, FRSA, FRSPH
CEO of NASS

¹ Jones A, Bray TJP, Mandl P, Hall-Craggs MA, Marzo-Ortega H, Machado PM. Performance of magnetic resonance imaging in the diagnosis of axial spondyloarthritis: a systematic literature review. *Rheumatology (Oxford)*. 2019 Nov 1;58(11):1955-1965. doi: 10.1093/rheumatology/kez172. PMID: 31046102; PMCID: PMC6812711.

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Acknowledgements

NASS wishes to express our sincere thanks to UCB for funding this programme, without which it would not have been possible to bring our plans to life.



Inspired by **patients**.
Driven by **science**.

We would like to thank Prof. Karl Gaffney, Norfolk & Norwich University Hospitals NHS Foundation Trust and Prof. Raj Sengupta, Royal National Hospital for Rheumatic Diseases Bath, for being such committed and enthusiastic partners to the programme.

We would also like to thank Dr Timothy Bray, University College Hospitals London, for providing clinical expertise as a radiologist in development of the survey, writing up of the findings and assessing what they mean for diagnosis of axial SpA.

We also want to thank the other clinicians and academics who contributed during the project including:

- **Dr Helena Marzo-Ortega, Consultant Rheumatologist at Leeds Teaching Hospitals NHS Trust and Honorary Clinical Associate Professor at the University of Leeds;**
- **Prof. Margaret Hall-Craggs, Consultant Radiologist at University College Hospitals London;**
- **Prof. Pedro Machado, Consultant Rheumatologist at University College London Hospitals; and**
- **Prof. Alex Bennett, Consultant Rheumatologist at the Defence Medical Rehabilitation Centre, MOD.**



British Society for SpondyloArthritis

Finally, we would like to thank BRITSpA, for their collaboration in the development of the survey, supporting the report development and co-authoring this report.

Executive summary

Key findings

Access:

- Timely access to MRI has deteriorated since 2017 with 62% (n.58/93) of scans performed in under 2 months (down from 90%) despite access to suitable scanners increasing.
- A substantial number of providers now utilise outsourced services for interpretation and reporting with 33% (n.31/93) using specialist MSK radiology services and 29% (n.27/93) using non-musculoskeletal radiology services.

Awareness:

- Awareness of axial SpA has improved with 97% (n.90/93) of Trusts and Health Boards now recognising the term axial SpA, up from 75% in 2017.
- 75% (n. 70/93) of respondents were aware of the 2019 BRITSpA consensus guidance.

MRI as a diagnostic tool:

- Use of MRI as a diagnostic tool has improved with 85% (n. 79/93) now routinely using MRI. Whereas previously only 18% of radiologists routinely used MRI instead of radiographs of the Sacroiliac joint (SIJ) and spine.
- MRI including the spine is now more routinely performed, with 69% (n. 63/93) now scanning the whole spine, up from 30% in 2017.

Clinical definitions:

- Awareness of the definitions of positive MRI has increased with 80% (up from 31%) awareness of SIJ definitions and 71% (up from 25%) awareness of definitions in the spine.

Other:

- Having a specialist axial SpA clinic that regularly collaborates with specialist MSK radiologists drives higher awareness of axial SpA and the key diagnostic criteria.
- There are regional variations in key aspects of awareness and reliance on non-musculoskeletal and outsourced interpretation, with awareness of best practice in Scotland significantly lower than the other nations.

Recommendations and further areas of work

Recommendation one:

When utilising MRI in the diagnosis of axial SpA, all Integrated Care Boards (ICB), Health Boards or Health and Social Care Boards should adopt axial SpA spinal MRI protocols in line with the BRITSpA consensus guidance. The protocols should be implemented by all Trusts, hospitals, or secondary care providers.

Recommendation two:

All local axial SpA pathways should ensure that all patients with suspected axial SpA as deemed clinically necessary by a rheumatologist to be in need of an MRI receive one of at least the lumbar and thoracic spine, plus SIJ, as part of their diagnostic assessment.

Recommendation three:

All Trusts, Health Boards and Health and Social Care Boards should have access to specialist MSK radiologists so that all

axial SpA spinal MRIs are interpreted by specialists with appropriate knowledge, even if this is via an outsource arrangement.

Recommendation four:

Education should be in place for MSK radiologists, both during training and as part of ongoing professional development, on best practice spinal MRI protocols and axial SpA diagnostic criteria.

Recommendation five:

All rheumatology teams who see axial SpA patients should have access to MSK radiologists and have joint working practices in place to aid collaboration and ongoing improvement.

Recommendation six:

Outsourced MRI should be monitored closely and local arrangements for accountability and accuracy put in place.

Area for further work or investigation:

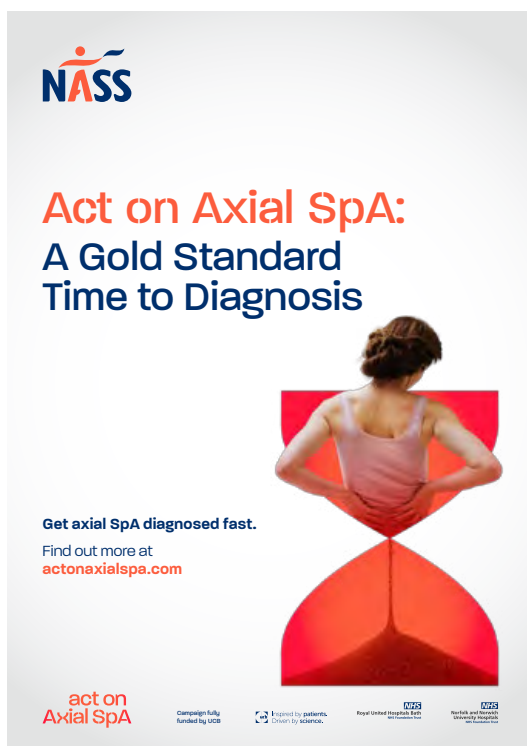
Integrated Care Boards (ICB), Health Boards or Health and Social Care Boards should consider the most optimal way to deliver MSK imaging including service models, workforce models, MSK diagnostic hubs, MSK commissioning and outsourcing contracts. This should remove the need to rely on outsourcing to non-musculoskeletal services for MSK imaging.

Area for further work or investigation:

Submit proactive surveillance activity to the National Institute for Health and Care Excellence (NICE) and engage with them to explore an update to the NICE Guideline (NG65) which needs to be clearer on the role of MRI in the diagnosis of axial SpA.

Introduction

This report is part of our *Act on Axial SpA* campaign to implement a Gold Standard time to diagnosis, which we launched in June 2021. It sits alongside other work in the campaign to shine a light on the impact that waiting on average 8.5 years for a diagnosis has on individuals living with axial SpA.



The findings from this research are key to help us influence the thinking and behaviour of policy makers, system leaders and HCPs that we hope will translate into streamlined, improved, high quality care pathways and ultimately drive down diagnosis time, including identifying any areas where there is the greatest need for improvement.

The diagnosis of axial SpA is complex, where individual symptoms or tests in isolation are insufficient either to diagnose or rule out axial SpA; rather a combination of symptoms, physical examination, appropriate diagnostic tests and imaging should lead to diagnosis. However, not all clinicians or HCPs in rheumatology have specialist knowledge of axial SpA or feel confident implementing or interpreting the appropriate investigations, particularly MRI scans.²

In recent years, MRI has emerged as a valuable, non-invasive, and non-ionising method for the early diagnosis and assessment of axial SpA in roughly two thirds of patients.³ The development of MRI and its ability to visualise inflammation has led to a greater ability to identify patients with 'non-radiographic disease' (i.e., disease which cannot be detected using plain radiography, known as non-radiographic axial SpA [nr-axSpA])^{4,5}, enabling patients with axial SpA to receive appropriate targeted treatments such as biologic disease modifying anti-rheumatic drugs (bDMARDs) earlier in their disease course⁶ and potentially improve long term outcomes.⁷

² Webb D, Swingler L, Barnett R, Sengupta R, Marshall L, Hamilton J, Zhao S & Gaffney K. Act on axial SpA: A Gold Standard time for the diagnosis of axial SpA (2021). London: National Axial Spondyloarthritis Society.

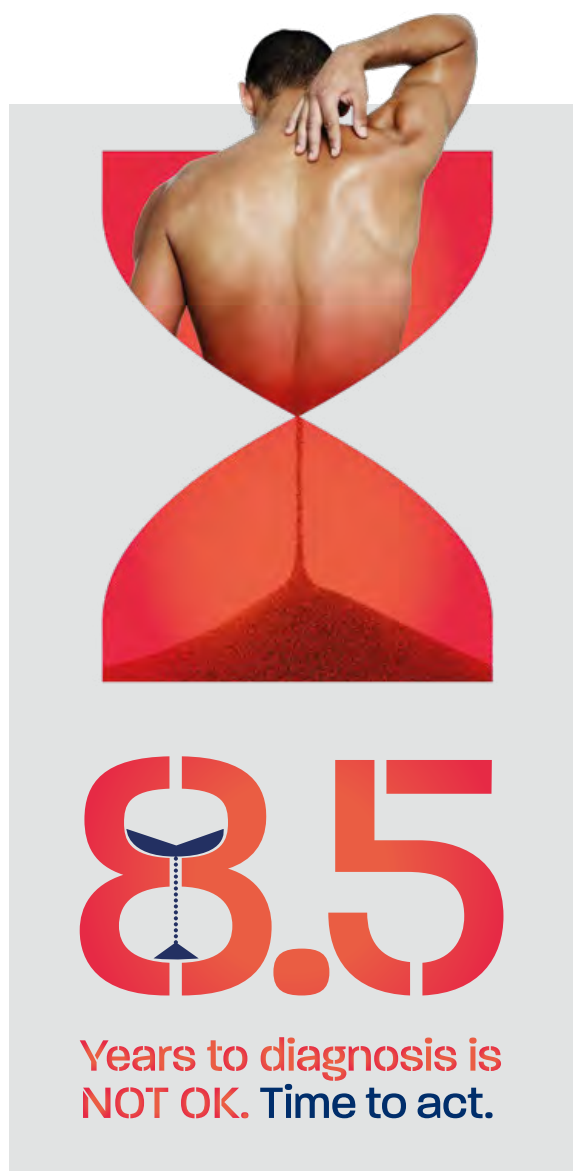
³ Jones A, Bray TJP, Mandl P, Hall-Craggs MA, Marzo-Ortega H, Machado PM. Performance of magnetic resonance imaging in the diagnosis of axial spondyloarthritis: a systematic literature review. *Rheumatology (Oxford)*. 2019 Nov 1;58(11):1955-1965. doi: 10.1093/rheumatology/kez172. PMID: 31046102; PMCID: PMC6812711.

⁴ Rudwaleit M, Landewé R, van der Heijde D, Listing J, Brandt J, Braun J, et al. The development of Assessment of SpondyloArthritis international Society classification criteria for axial spondyloarthritis (part I): Classification of paper patients by expert opinion including uncertainty appraisal. *Ann Rheum Dis*. 2009;68(6):770–6.

⁵ Rudwaleit M, van der Heijde D, Landewé R, Listing J, Akkoc N, Brandt J, et al. The development of Assessment of SpondyloArthritis international Society classification criteria for axial spondyloarthritis (part II): validation and final selection. *Ann Rheum Dis*. 2009;68(6):777–83.

⁶ National Institute for Health and Care Excellence. TNF-alpha inhibitors for ankylosing spondylitis and non-radiographic axial spondyloarthritis [Internet]. 2016. Available from: www.nice.org.uk/guidance/ta383

⁷ Danve A, Deodhar A. Treatment of axial spondyloarthritis: an update. Vol. 18, *Nature Reviews Rheumatology*. Nature Research; 2022. p. 205–16.



However, despite the clear potential value of MRI to improve management for patients, several studies have raised concerns about the quality of its implementation in standard care.^{8,9} A survey of 699 UK radiologists conducted by Bennett et al. in 2017 found wide variations in approaches to the use of MRI, including the particular acquisition protocols used to acquire the scans and the features used to interpret the images.

Despite expert guidance available at the time, in this survey, 18% did not use subchondral bone marrow oedema of the SIJ to help diagnose axial SpA and 18% did not use inflammatory corner lesions of the spine. Awareness of axial SpA as a disease entity was reported by only 75% of radiologists, and awareness of positive definitions for MRI of the SIJ and spine were reported by only 31% and 25% respectively. This lack of consistency and awareness of definitions may be an important contributor to suboptimal management of patients with axial SpA in routine care.

To address the inconsistency in the use of MRI, an exercise was performed in 2019 to systematically review the available literature on the use of MRI in the diagnosis of axial SpA¹⁰ and to develop recommendations based on this literature, with input from both rheumatologists and radiologists, under the auspices of the BRITSpA.¹¹ The 2019 recommendations document provides practical guidance around the use of MRI for standard care, including recommendations on both acquisition (including anatomical coverage, sequences, and acquisition planes) and interpretation (comprising the specific features in the SIJ and spine, and how these should be used in combination with clinical symptoms and laboratory parameters to assist the diagnosis of axial SpA). The overall objective of this work was to standardise practice regarding the use of MRI and ensure a more informed, consistent approach to the diagnosis of axial SpA.

Here, we assess the current practice regarding using MRI in the diagnosis of patients with suspected axial SpA across the UK and evaluate whether previous inconsistencies in MRI use in clinical practice have improved since the development and publication of the 2019 BRITSpA recommendations document.

⁸ Hamilton L, Gilbert A, Skerrett J, Dickinson S, Gaffney K. Services for people with ankylosing spondylitis in the UK—a survey of rheumatologists and patients. *Rheumatology (Oxford)*. 2011;50(11):1991–8.

⁹ Bennett AN, Marzo-Ortega H, Kaur-Papadakis D, Rehman A. The use of magnetic resonance imaging in axial spondyloarthritis: Time to bridge the gap between radiologists and rheumatologists. *Journal of Rheumatology*. 2017;

¹⁰ Jones A, Bray TJP, Mandl P, Hall-Craggs MA, Marzo-Ortega H, MacHado PM. Performance of magnetic resonance imaging in the diagnosis of axial spondyloarthritis: A systematic literature review. *Rheumatology (United Kingdom)*. 2019;58(11):1955–65.

¹¹ Bray TJP, Jones A, Bennett AN, Conaghan PG, Grainger A, Hodgson R, et al. Recommendations for acquisition and interpretation of MRI of the spine and sacroiliac joints in the diagnosis of axial spondyloarthritis in the UK. *Rheumatology (United Kingdom)*. 2019;58(10):1831–8.

What we did - background

NASS developed a survey in conjunction with BRITSpA and key clinical advisors, building on the 2017 BRITSpA survey to allow some comparison. It was sent out via an FOI request in September 2022 to all UK hospital Trusts, Health Boards and secondary care providers. The survey was sent to 150 organisations to assess the current provision of MRI in axial SpA diagnosis across the UK in terms of:

- The levels of access to appropriate scanners including numbers, wait times, and scanner type.
- The working level relationships between rheumatology and radiology.
- The practices in reporting of MRI scans and the balance between in-house vs outsourced and MSK vs generalist radiologists.
- When MRI is used in the diagnostic process, and reasons for not using MRI.
- The specific MRI protocols in place including the coverage, sequences, and acquisitions.
- The knowledge of specific axial SpA and MRI lesions and definitions for diagnosis.

Additionally, we explored the impacts that hospital location, presence of local specialist axial SpA services and joint working of radiologists and rheumatologists have on knowledge and use of best practice.

We received full responses from 93 providers (62%) with the majority responding within the statutory period, but reflective of current NHS pressures we also included responses received outside that period. The split of responses was 71 from England, five from Northern Ireland, 11 from Scotland and six from Wales.

Responses were collated and any substantially incomplete responses disregarded (n=3). Descriptive statistics were derived across all responses and after subdividing by the presence of a specialist axial SpA service, access to MSK radiologists, use of outsourcing and UK location. Results were descriptively compared against those from the 2017 BRITSpA survey to evaluate changes in practice since the 2019 BritSpA guidance.

As part of the analysis, we also utilised other publicly available data sources, such as scientific publications,¹² to understand if our findings are consistent with these. Insights from the NASS Aspiring to Excellence programme and participating rheumatology teams was used to supplement the analysis. We held a round table policy debate to validate the results, debate the implications, and confirm our recommendations with key rheumatologists, radiologists and BRITSpA.

¹²Bray T, Eddison J. A UK review of the use of MRI in the diagnosis of axial SpA, E083. British Society for Rheumatology 2023.

The survey was sent to 150 organisations to assess the current provision of MRI in axial SpA diagnosis across the UK



Access to MRI

What we asked and why

MRI is a valuable, non-invasive, and non-ionising method for the early diagnosis and assessment of axial SpA. Patients with suspected axial SpA having an MRI upon referral to rheumatology are more likely to receive a swift positive diagnosis of axial SpA. MRI is critical in the complex clinical diagnostic decision rheumatologists need to make to confirm axial SpA. Understanding the level of access is important and therefore we asked:

How many MRI scanners suitable for scanning the spine and SIJ do you have access to?;

What type of scanner do you have access to? and

Roughly how long would an outpatient appointment wait for an MRI in your Trust?

Results

Access to MRI: All but one Trust/Health Board reported access to an MRI scanner; seven (8%) had access to one scanner, 21 (23%) had access to two, 24 (26%) had access to three and 40 (43%) had access to four or more (the median number of MRI scanners was 3). Ninety (97%) had access to at least one 1.5T scanner and 35 (38%) had access to at least one 3T scanner.

Waiting times: Average wait times for MRI scanning were as follows: less than two weeks for two Trusts / Health Boards (2%), 2-4 weeks for nine Trusts / Health Boards (10%), 1-2 months for 47 Trusts / Health Boards (51%), 2-3 months for 17 Trusts / Health Boards (18%) and greater than three months for 18 Trusts / Health Boards (19%).

Our analysis

The results suggest that the availability of MRI scans has deteriorated compared to 2017. Although Trusts / Health Boards now have access

to a greater range of MRI scanners (the median number of scanners is now three, compared to two previously¹³), this has not translated into a reduction in waiting times. Whereas previously 90% of respondents reported waiting times of less than two months, now only 73% of scans are performed in less than two months. This suggests that, although more scanners are available, this increase has not matched the greater demand.

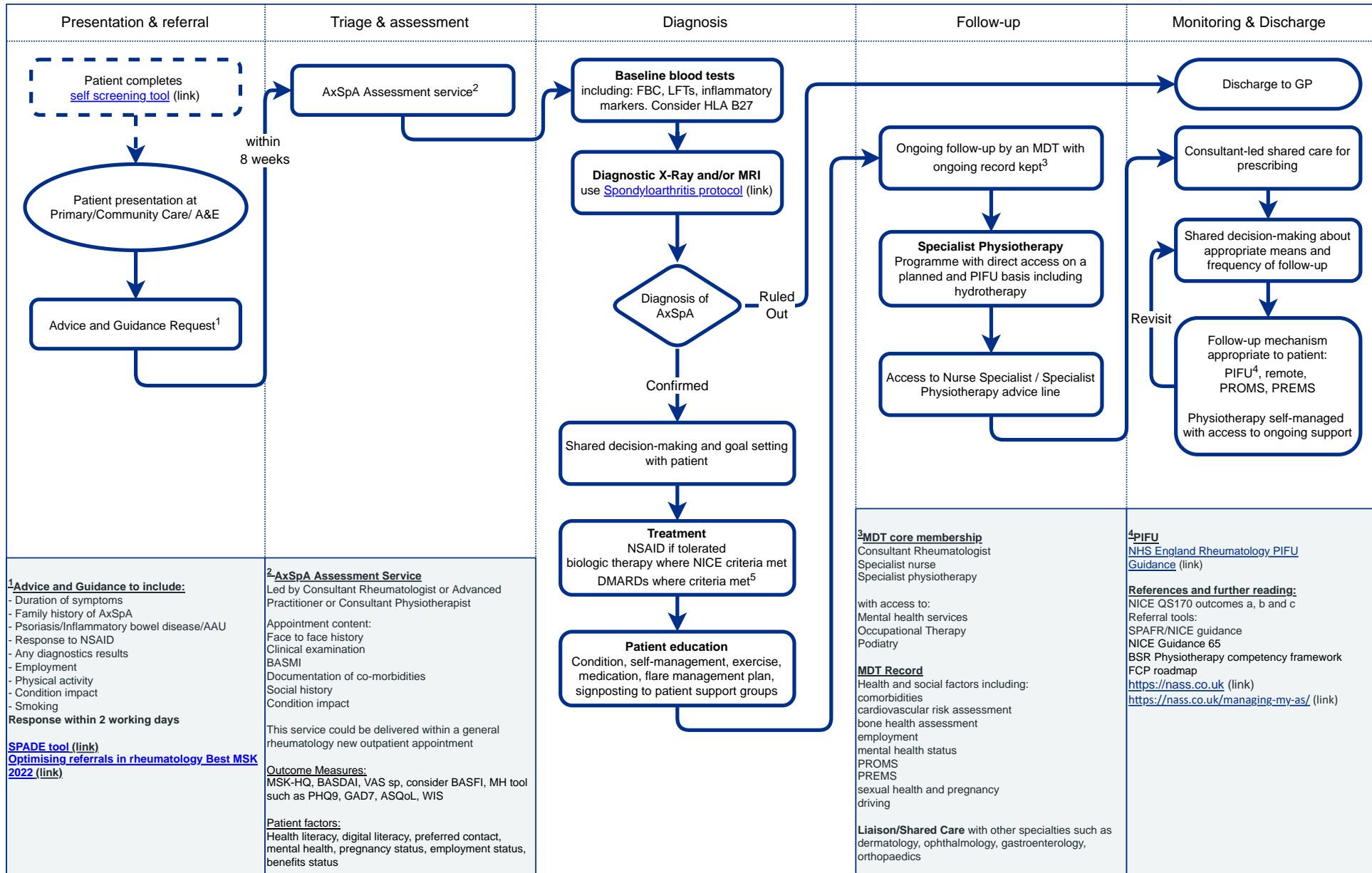
The results on waiting times were expected on the back of the COVID pandemic and the subsequent growth in NHS waiting lists. The NHS is currently under significant pressure to try and recover from the pandemic, including diagnostic services. MSK imaging covers both orthopaedic surgery and rheumatology and with record waiting lists for key orthopaedic procedures - such as hip and knee replacements - rheumatology is competing harder than ever for MSK MRI capacity.

Within the NHS England Best MSK Health Collaborative and GIRFT axial spondyloarthritis pathway, a key diagnostic step is an MRI using a spondyloarthritis protocol.¹⁴ The GIRFT report recommends that routine referral to treatment (RTT) times for all conditions that require specialist rheumatology care should not exceed eight weeks. The NHS constitution is RTT within a 3-month window¹⁵. Given the results we have seen on MRI waiting times and a third of patients waiting over two months, and about half Trusts / Health Boards with waiting times of one to two months, it is incredibly challenging to ensure that patients receive their diagnosis within eight weeks as targeted: MRI is a rate-limiting factor in achieving a swift diagnosis. It potentially extends the length of time patients are living in pain, both physically and mentally, and delays life altering treatments.

¹³ Hamilton L, Gilbert A, Skerrett J, Dickinson S, Gaffney K. Services for people with ankylosing spondylitis in the UK--a survey of rheumatologists and patients. *Rheumatology (Oxford)*. 2011;50(11):1991-8.

¹⁴ Available at: <https://gettingitrightfirsttime.co.uk/wp-content/uploads/2022/11/Rheumatology-Axial-Spondyloarthritis-Pathway.pdf>

¹⁵ Available at: <https://www.gov.uk/government/publications/supplements-to-the-nhs-constitution-for-england/the-handbook-to-the-nhs-constitution-for-england>



Collaboration and reporting arrangements

What we asked and why

We know that collaboration between rheumatologists and radiologists is important in sharing knowledge, reviewing diagnostic scans and joint decision-making in what can be complex scans for interpretation. Assessing SIJ MRI¹⁶ is known to be challenging, with high inter and intra observer variability, made more problematic with the inconsistent use of standard MRI protocols. However, this could potentially be mitigated by close radiology-rheumatology collaboration. To understand to what extent this collaboration was occurring, we asked:

Do you have regular meetings or discussions with your rheumatology colleagues?

Anecdotally from across the rheumatology community and in particular from our Aspiring to Excellence teams we have heard intelligence that there is a reliance on outsourcing of the interpretation of MSK MRI scans. There is no empirical evidence of the scale of the use of outsourcing and the impact that this has on both speed and accuracy of interpretation. Therefore, we wanted to explore if this was widespread in practice and asked:

How is axial SpA MRI imaging reported in your Trust?

Results

Collaboration between radiology and rheumatology: 33 Trusts / Health Boards (35%) reported weekly meetings between radiology and rheumatology, 19 (20%) reported fortnightly meetings, 16 (17%) reported monthly meetings, one (1%) reported quarterly meetings, 21 (22.6%) reported meetings as required, and three (3%) reported never having joint meetings.

We also looked at the data to analyse how a greater level of collaboration between rheumatology and radiology affected the awareness of best practice; this included some cross referencing to a recent inquiry by the All Party Parliamentary Group on Axial Spondyloarthritis (APPG)¹⁷ to identify the impact of the rheumatology team being an axial SpA specialist service / clinic.

The presence of a specialist SpA clinic was associated with greater familiarity with the term axial SpA (100% vs 96% for sites with/without specialist clinics), familiarity with the BRITSpA guidance (84% vs 72%), awareness of recommendations on the features contributing to a positive SIJ (84% vs 78%) and awareness of recommendations on the features contributing a positive spine MRI (76% vs 69%).

Having at least fortnightly meetings between radiologists and rheumatologists was associated with greater familiarity with the term axial SpA (100% vs 93% for sites with/without at least fortnightly meetings), familiarity with the BRITSpA guidance (83% vs 66%), awareness of recommendations on the features contributing to a positive SIJ (85% vs 73%) and awareness of recommendations on the features contributing a positive spine MRI (73% vs 68%). The effect of having regular meetings and a specialist axial SpA clinic on radiologist awareness of definitions is shown in Figure 1.

¹⁶ Webb D, Swinger L, Barnett R, Sengupta R, Marshall L, Hamilton J, Zhao S & Gaffney K. Act on axial SpA: A Gold Standard time for the diagnosis of axial SpA (2021). London: National Axial Spondyloarthritis Society.

¹⁷All Party-Parliamentary Group for Axial Spondyloarthritis, Axial SpA in England: Are services improving? (2022), London, National Axial Spondyloarthritis Society.



We know that collaboration between rheumatologists and radiologists is important in sharing of knowledge

Figure 1 – Familiarity with ‘axial SpA term’, 2019 recommendations document and diagnostic recommendations contained therein, and relationship between having regular meetings / a specialist axial SpA clinic and knowledge of terminology / guidance. (a) Shows the responses from all responding Trusts / Health Boards. (b) shows responses divided by whether Trusts / Health Boards had regular (at least fortnightly)

meetings (sites having/not having at least fortnightly meetings are shown in blue/red). (c) shows responses divided by whether Trusts / Health Boards had a specialist axial SpA clinic (sites with/without specialist axial SpA clinics are shown in blue/red). Note a specialist axial SpA clinic is defined as a dedicated axial SpA clinic, which is on a set day or time when patients with axial SpA are seen by a multi-disciplinary team.

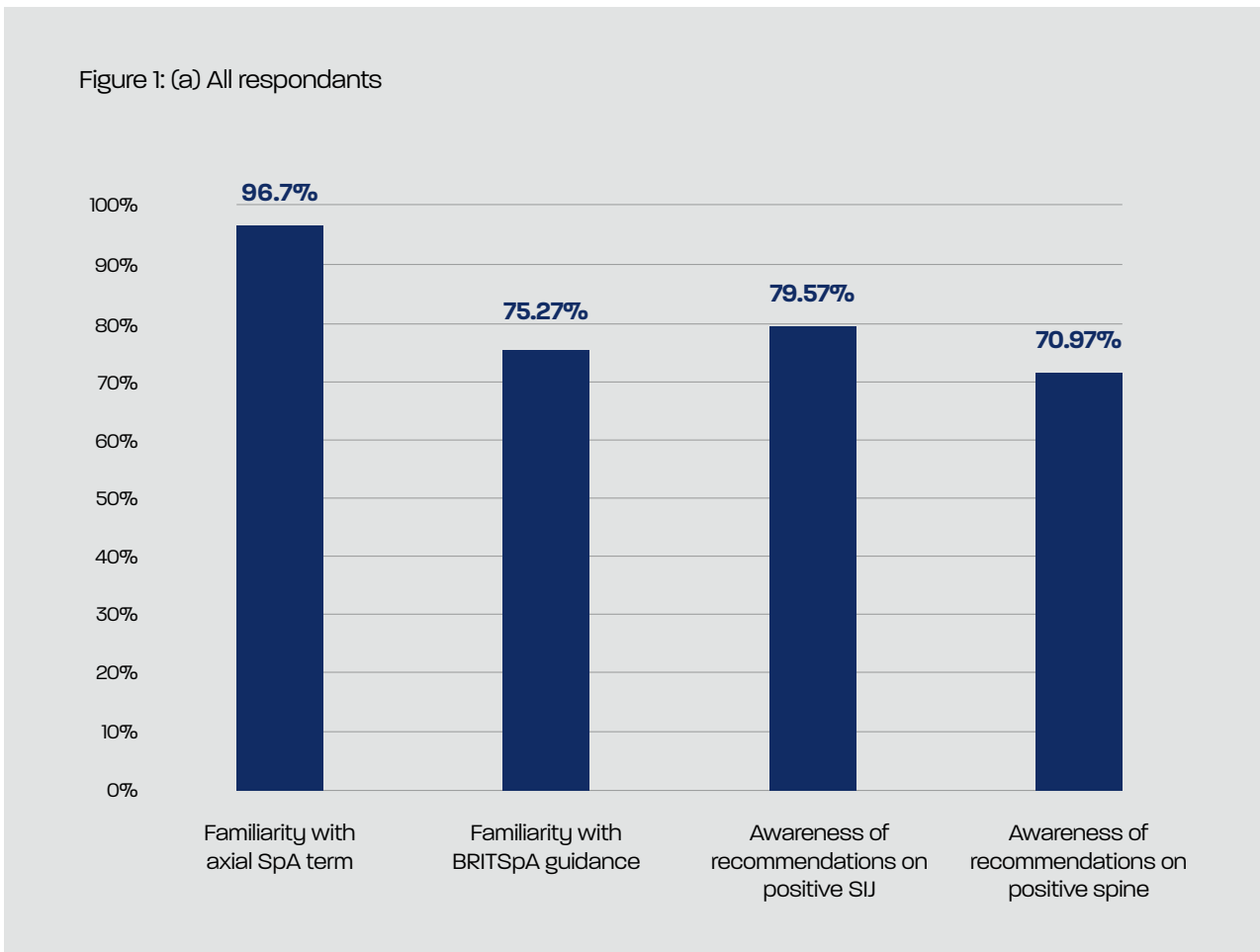


Figure 1: (b) Blue is Trusts with regular meetings in place between rheumatology and radiology vs Orange as Trusts with no regular meetings in place between rheumatology and radiology

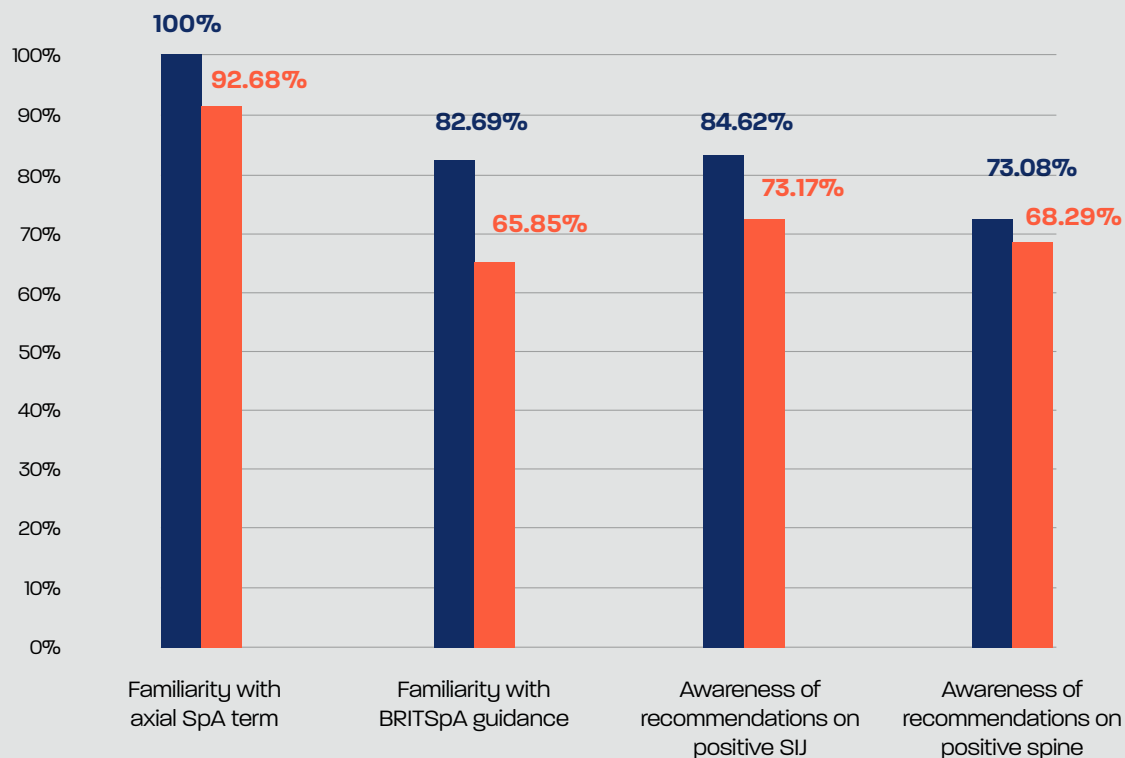
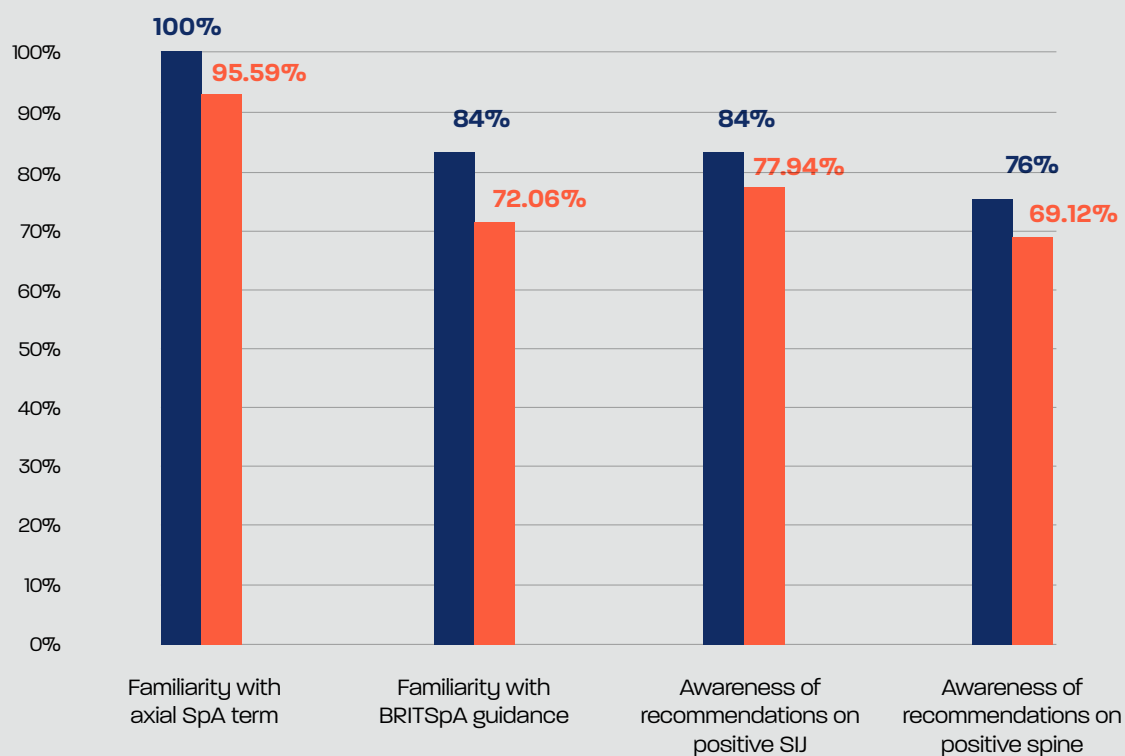


Figure 1: (c) Blue are Trusts that have specialist axial SpA clinics vs Orange as Trusts with only general rheumatology clinics





Sub-specialisation of reporting radiologists and use of outsourcing:

85 Trusts / Health Boards (91%) reported that at least some of their scans were reported internally by a specialist MSK radiologist, 32 (34%) reported some scans being reported internally by a non-musculoskeletal radiologist, 31 (33%) reported some scans being outsourced to a specialist MSK radiologist and 27 (29%) reported some scans being outsourced to a non-musculoskeletal radiologist. Combining both specialist and non-musculoskeletal outsourcing, 52 (56%) reported at least some outsourcing of axial SpA scans. Three Trusts / Health Boards (3%) reported some scans being reported by reporting radiographers, so not by radiologists.

Exploring the impact of in-house vs outsourcing and specialism on awareness and use of best practice showed that the most important factor in awareness and knowledge is in specialism, with specialist MSK radiologists having increased awareness and knowledge.

Having at least some scans reported by an in-house specialist MSK radiologist was not associated with lower familiarity with the term axial SpA (96% vs 100% for sites with/without at least some in-house specialist MSK reporting), but was associated with greater familiarity with the BRITSpA guidance (79% vs 38%), awareness of recommendations on the features contributing to a positive SIJ (82% vs 63%) and awareness of recommendations on the features contributing a positive spine MRI (73% vs 50%).

Having at least some scans reported by internal non-musculoskeletal radiologists was associated with lower familiarity with the term axial SpA (93% vs 98% for sites using/not-using internal non-musculoskeletal), lower familiarity with the BRITSpA guidance (62% vs 82%), awareness of recommendations on the features contributing to a positive SIJ (66% vs 87%) and awareness of recommendations on the features contributing a positive spine MRI (66% vs 74%).

The use of outsourcing to specialist radiologists was associated with similar familiarity with the term axial SpA (97% vs 97% for sites using/not-using outsourcing to specialists), familiarity with the BRITSpA guidance (74% vs 75%), awareness of recommendations on the features contributing to a positive SIJ (81% vs 79%) and awareness of recommendations on the features contributing a positive spine MRI (71% vs 71%).

The use of outsourcing to non-musculoskeletal radiologists was associated with similar familiarity with the term axial SpA (100% vs 95% for sites using/not using outsourcing to non-musculoskeletal), lower familiarity with the BRITSpA guidance (67% vs 79%), awareness of recommendations on the features contributing to a positive SIJ (74% vs 82%) and awareness of recommendations on the features contributing a positive spine MRI (74% vs 70%). The effect of radiologist specialism and the use of outsourcing is shown in Figure 2.

Figure 2 – Effect of specialist reporting and outsourcing. Separate blue/red bars are shown for sites using/not using the relevant radiological reporting method – for example in (a) sites with at least some in-house reporting are shown in blue, and sites not using any in house reporting are shown in orange. The effect of specialist reporting is shown in the top row (note that the awareness rates are generally higher for sites with this), and the effect of non-musculoskeletal reporting is shown in the bottom row (awareness is generally lower for sites with this). The effect of in-house reporting shown on the left column (blue) and the effect of outsourced reporting is shown on the right (orange).

Figure 2: (a) Effect of in-house specialist reporting

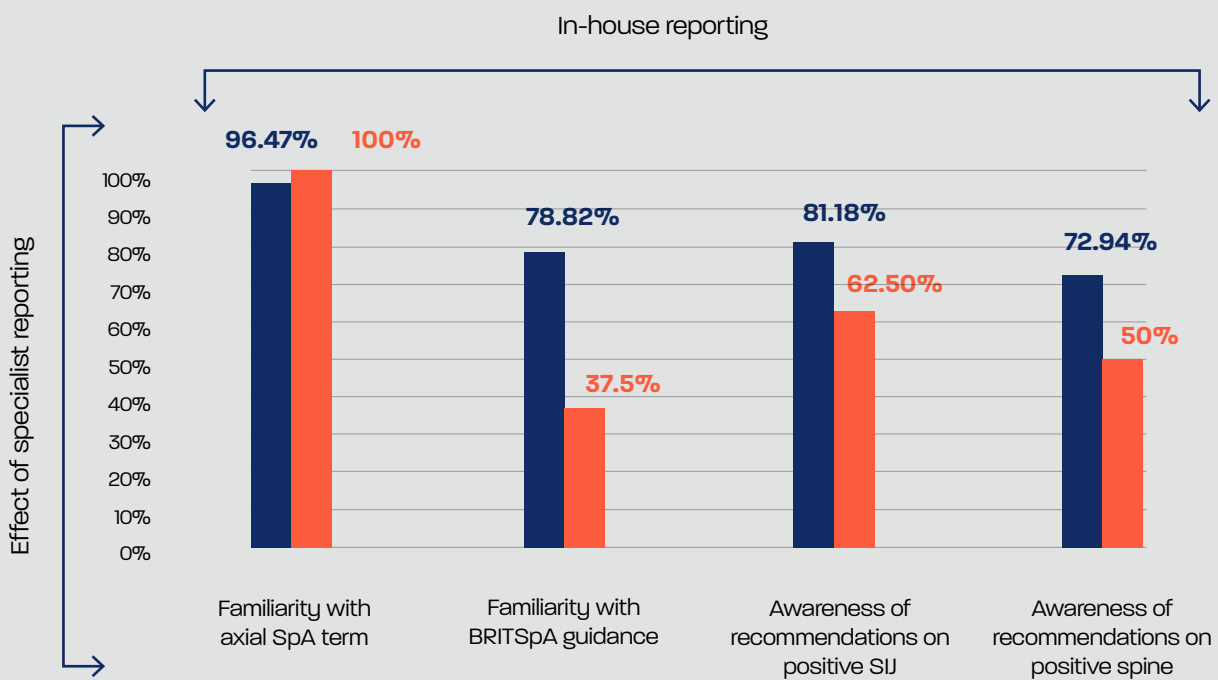


Figure 2: (c) Effect of in-house non-specialist reporting

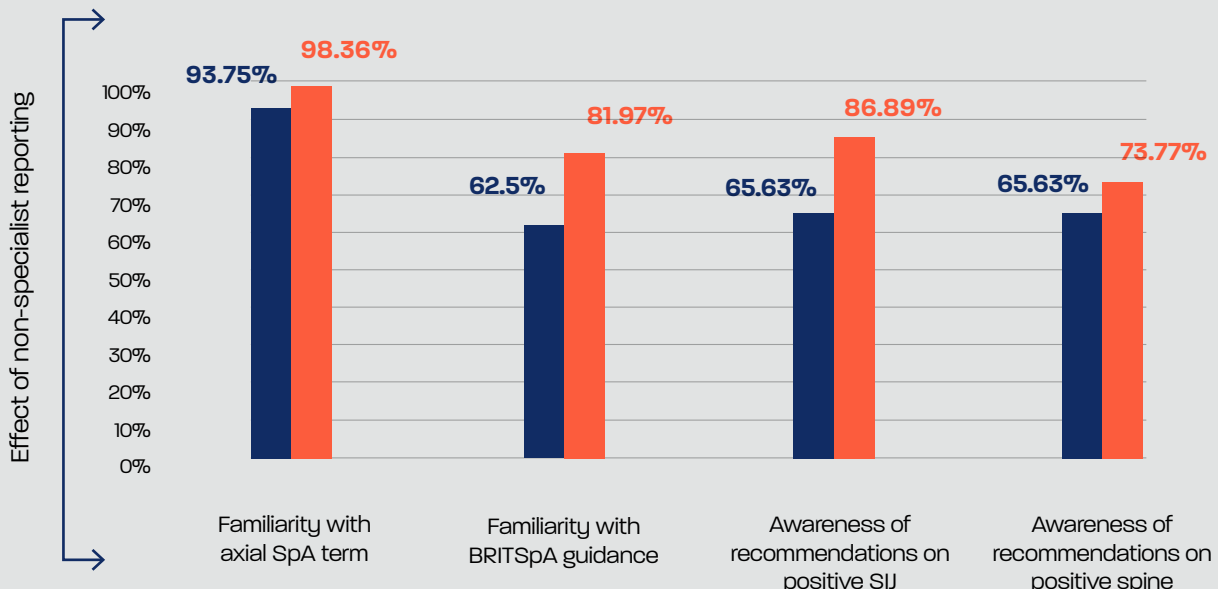


Figure 2: (b) Effect of outsourced specialist reporting

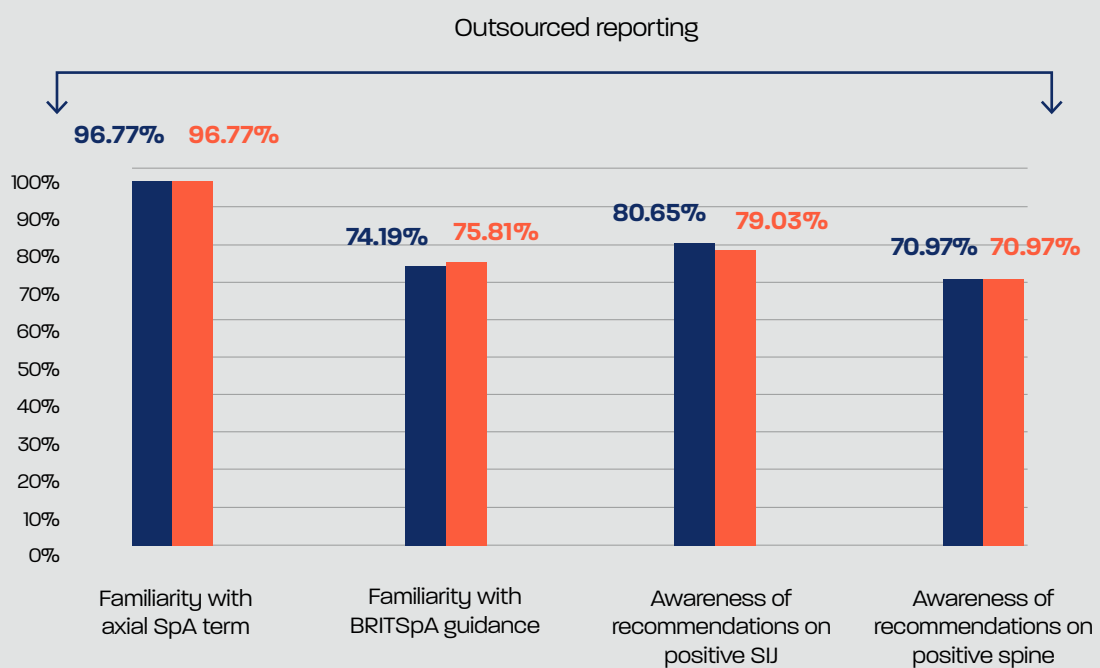
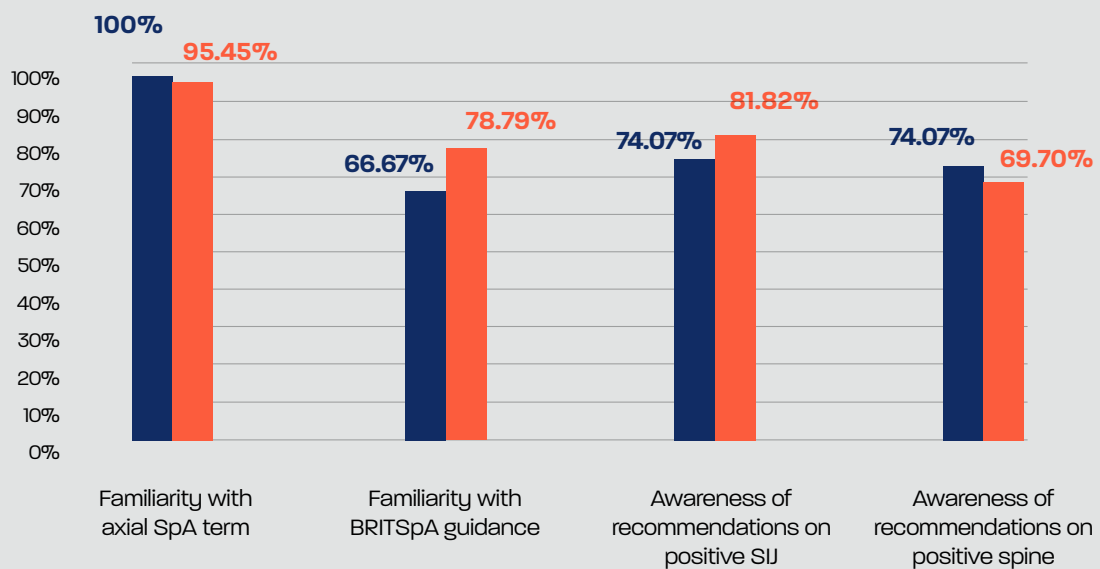


Figure 2: (d) Effect of outsourced non-specialist reporting



The charts below (figure 3) show a further analysis on the use of outsourced interpretation and reporting by UK region (nations and England areas) highlighting some significant differences based on geographical location. This highlights that some areas are more reliant on outsourcing overall (top) and non-MSK outsourcing (bottom).

The proportions are based on the number of Trusts / Health Boards identifying outsourcing as a proportion of total Trusts / Health Boards submissions in each region. It is worth noting that some regions only had small numbers of responses and the results are indicative rather than absolute.

Figure 3: (a) – Geographical reliance on outsourcing.
Green = 25% or less Yellow = 26% to 50% Amber = 51% to 75% Red = 75% or greater

% outsourced

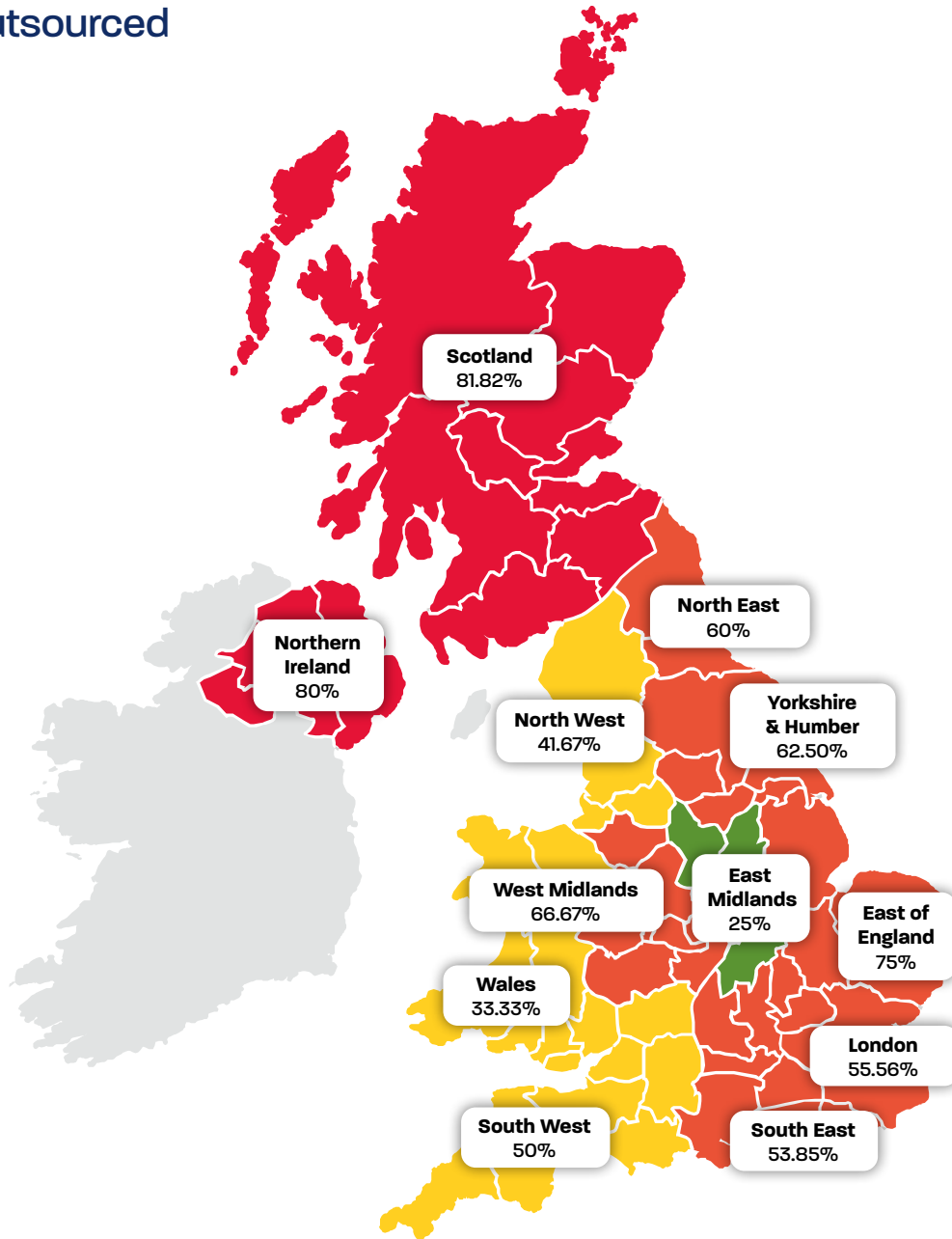
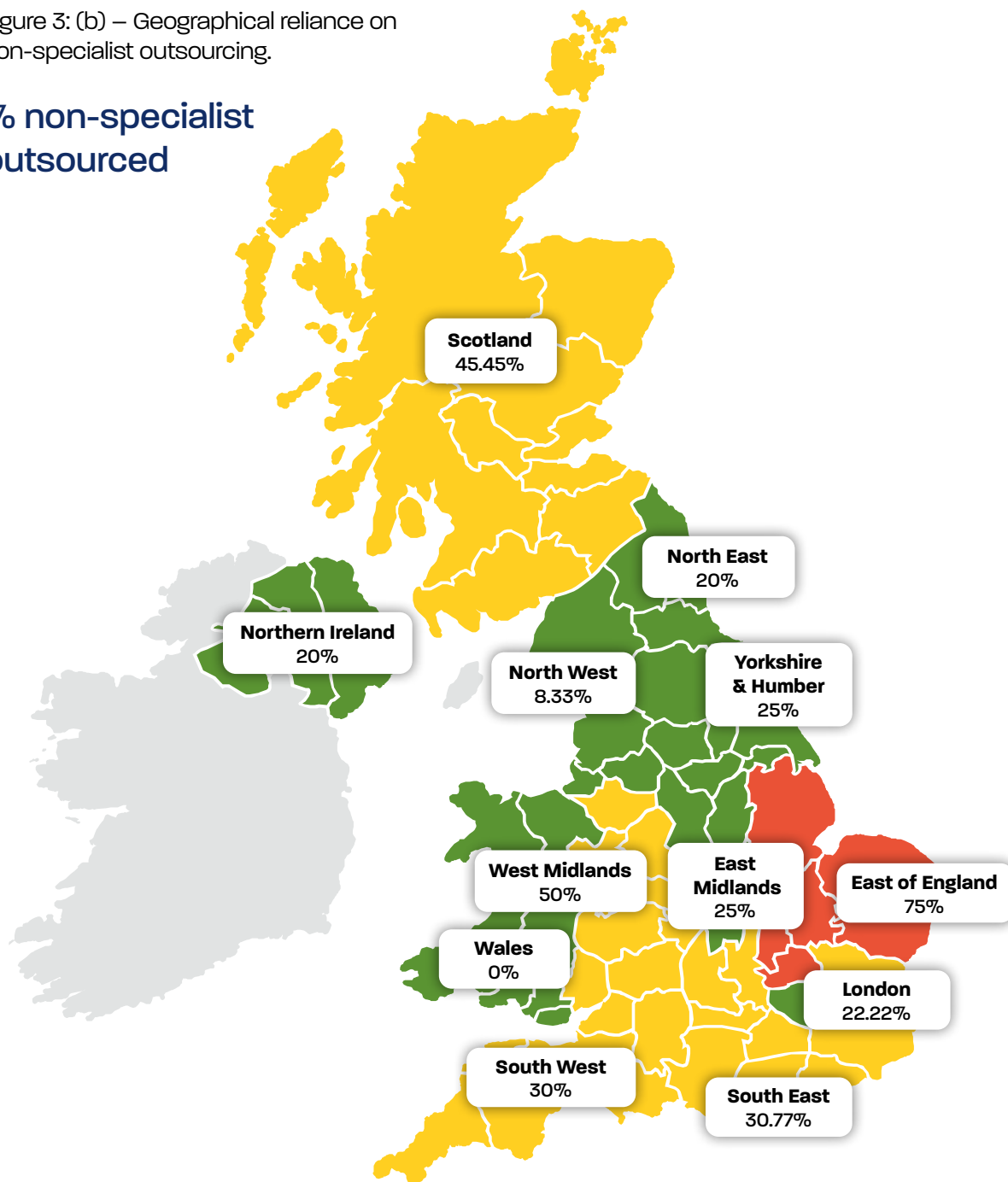


Figure 3: (b) – Geographical reliance on non-specialist outsourcing.

% non-specialist outsourced



There is a greater reliance overall on outsourced services in Scotland and Northern Ireland plus significant reliance in the eastern regions of England. All areas utilise some outsourcing arrangements. The outsourcing to specialist MSK radiology does not appear to have a negative impact on awareness of guidelines and terminology. However, outsourcing to non-musculoskeletal radiologists does appear to be detrimental, and the East of England has the highest proportion of providers utilising these. On a positive note, Wales reports no outsourcing to

non-musculoskeletal MSK services. The South and West of England appear to have higher reliance on non-musculoskeletal outsourcing despite overall having lower outsourcing. As with the high levels of MSK outsourcing in Scotland these providers also use significant non-MSK outsourcing.

Outsourcing is obviously a complex area that will be driven by lots of factors that are related to local service provision and more work to understand these relationships is required.

Our analysis

The results suggest that reporting services may be under greater pressure than before. Whereas the 2017 UK survey did not mention the use of outsourcing (presumably because outsourcing was not, or only rarely, used at that time), in the current survey a substantial proportion of Trusts / Health Boards reported outsourcing at least some scans: 33% reported outsourcing to specialists and, strikingly, 29% reported outsourcing to non-musculoskeletal, with 56% of Trusts / Health Boards using at least some outsourcing. Again, this likely reflects a broader trend towards the use of imaging and a greater reliance on outsourcing services; however, the use of non-musculoskeletal outsourcing by a large number of Trusts / Health Boards is a concerning development. There is currently some strategic development within NHS England to explore the greater use of Community Diagnostic Centres (CDC)¹⁸. These centres would move outpatient elective diagnostics away from acute hospital sites and are seen to be key to reducing waiting times and risk of cancellations. In essence this would mean that over time services such as MSK imaging would be outsourced by Trusts in England to CDCs. This is also being explored within Wales. A new site has been announced near the Royal Glamorgan Hospital which will serve Cwm Taf Morgannwg, Anuerin Bevan and Cardiff and Vale Health Boards¹⁹. These two developments show the direction for diagnostic services in the UK that will evolve over the medium term.

The study provides some insights into the association of radiological specialism and of rheumatology-radiology collaboration on awareness of the relevant terminology. The presence of a specialist axial SpA clinic, having regular meetings between radiologists and rheumatologists and having at least some scans reported in-house by a specialist MSK radiologist were all associated with greater familiarity with the term axial SpA and the 2019 guidance.

Conversely, the use of non-musculoskeletal radiologists (either in-house or by outsourcing) was associated with substantially poorer familiarity with the term axial SpA and the 2019 guidance. However, interestingly, the use of outsourcing to specialist radiologists had no detrimental effect on awareness, suggesting that the degree of specialism may be a more important consideration than whether the scans are reported in-house or through outsourcing.

This set of results shows the importance of interpretation of axial SpA MRIs by specialist MSK radiologists. The analysis suggests that the degree of specialism of radiologists may be more important than the setting in which the scans are reported. While in-house specialist remains the optimal approach, outsourcing to MSK radiologists may be a reasonable alternative. We therefore advocate that all axial SpA protocol MRIs are interpreted by and reported on by specialist MSK radiologists, either in house or via an outsourcing agreement. Due to the obvious capacity issues for MSK radiology, exploring regional MSK diagnostic hubs may help to bridge the gap and maintain the access to the required expertise.

Alongside the benefit of specialist access for interpretation is the positive impact that ongoing engagement between rheumatology teams and radiologists. These elements increase both the likelihood of the most appropriate scans and optimal diagnostic criteria being used. Specialist axial SpA teams are more likely to raise awareness of best practice protocols and diagnostic criteria. Rheumatologists do play a crucial role in requesting the right imaging so it is important to ensure regular communication and working, through multi-disciplinary teams (MDTs) or engagement programmes, between rheumatology (axial SpA teams) and MSK radiology.

¹⁸ Available at: <https://www.hee.nhs.uk/our-work/cancer-diagnostics/community-diagnostic-centres-cdc>

¹⁹ Available at: <https://www.gov.wales/first-step-development-new-regional-treatment-hub-underway>

Diagnostic use of MRI and MRI protocols

What we asked and why

A survey of 699 UK radiologists conducted by Bennett et al. in 2017 found wide variations in approaches to the use of MRI, including the particular protocols used to acquire the scans. The 2019 BRITSpA recommendations document provided practical guidance about the use of MRI for standard care, including recommendations on acquisition (including anatomical coverage, sequences, and acquisition planes). The overall objective of this work was to standardise practice in relation to the use of MRI and ensure a more informed, consistent approach to the diagnosis of axial SpA. We set out to establish if there had been improvement in the use of MRI and in the standardisation of MRI protocols since the 2019 recommendations. To assess this, we asked:

In what circumstances would you use MRI in the assessment / diagnosis of spondyloarthritis?; What is your standard MRI protocol for the assessment of spondyloarthritis?; What is the approximate scan time for this protocol; What anatomical coverage would you routinely use for MRI in the assessment of spondyloarthritis?; If you are MRI scanning the spine / sacroiliac joints, what acquisitions would you perform?; When MRI scanning for the assessment of spondyloarthritis which sequences do you use in your protocol?; and When MRI scanning for the assessment of Spondyloarthritis do you perform gadolinium-enhanced images of the spine / sacroiliac joints?

Results

Use of MRI in the diagnosis of axial SpA: All responding Trusts / Health Boards reported using MRI in some capacity for the diagnosis of axial SpA. 10 (11%) reported only using MRI if radiographs of the SIJ were normal or not diagnostic, 79 (85%) reported using MRI as a

diagnostic test, irrespective of whether there is an abnormality on plain radiographs, and three (33%) reported performing MRI if specifically requested by rheumatology.

MRI protocols

Duration: The mean (SD) duration of MRI protocols was 39 (13) minutes.

Anatomical coverage: One Trust (1%) reported a protocol including the sacroiliac joints only, one Trust (1%) scanned SIJs and lumbar spine, 11 Trusts / Health Boards (12%) scanned SIJs and thoracolumbar spine, and 63 Trusts / Health Boards (69%) scanned SIJs and whole spine. 15 Trusts / Health Boards (16%) reported scanning the SIJs and any other spinal segment, as requested by a rheumatologist. Of those 30 Trusts / Health Boards not scanning the whole spine, 21 gave a rationale for not doing so: 12 (57%) reported that this was because imaging of the lumbar / thoracolumbar spine was sufficient for assessing spinal features of axial SpA, one (5%) reported that it took too long to scan the spine, one (5%) reported that scanning the whole spine was too expensive, and two (10%) reported that scanning the whole spine in cases of specific clinical concern.

Acquisition planes: For scanning the SIJs, 41 Trusts / Health Boards (46%) reported using semi-coronal acquisitions only, and 49 (54%) reported using both semi-coronal and semi-axial acquisitions.

For scanning the spine, 12 Trusts / Health Boards (14%) reported using sagittal, axial, and coronal plane acquisitions, 35 (42%) reported sagittal and axial plane acquisitions only and 37 (44%) reported sagittal plane acquisitions only.

Sequences: 91 Trusts / Health Boards (97%) utilised fat-suppressed water sensitive sequences and 75 (81%) used fat-sensitive sequences. 30 Trusts / Health Boards (33%) also included conventional T2-weighted (T2w) imaging, and four Trusts / Health Boards (4.3%) included gradient echo imaging.

Use of contrast: Only one Trust (1%) reported using contrast in the sacroiliac joints, and two Trusts / Health Boards (2%) reported using contrast in the spine. All others reported using protocols which did not include contrast-enhanced imaging.

Our analysis

These results suggest that there has been an improvement in several aspects of MRI practice compared to the previous survey. There is now a greater willingness to use MRI, with 85% now reporting use of MRI as a diagnostic test irrespective of radiographic abnormalities, whereas previously only 18% of radiologists 'routinely used MRI instead of radiographs of the SIJ and spine', are of no diagnostic utility. Inclusion of the spine in MRI acquisition protocols has also increased, with 99% of Trusts / Health Boards now including at least some coverage of the spine (previously 95%) and a large proportion (69% compared to 30% previously) now scanning the whole spine.

The large majority of Trusts / Health Boards now use acquisition protocol in line with the 2019 recommendations, although some include elements which are arguably unnecessary. In line with the 2019 recommendations, it is not always required to MRI the cervical spine and therefore it is promising that most Trusts / Health Boards now at least use MRI on the lumbar and thoracic spine alongside the SIJs joints.

There is still more we can do to raise awareness, measure ongoing compliance, and ensure patients are receiving the right scans. Some of this links back to the previous section and ongoing collaboration between rheumatology and radiology teams. Ensuring that there is ongoing awareness and education of MSK radiologists around best practice MRI protocols is key, and we continue to push for all secondary care providers in the UK to have a spinal MRI protocol in place based on the BRITSpA consensus guidance.

Diagnostic knowledge of Axial SpA and MRI lesions and definitions

What we asked and why

The 2017 UK survey also found wide variations in the features used to interpret axial SpA MRI images. The 2019 BRITSpA recommendations document provided practical guidance about the interpretation of images (comprising the specific features in the SIJ and spine, and how these should be used in combination to assist the diagnosis of axial SpA). We set out to establish if there had been improvement in the interpretation of MRI and in the standardisation of MRI protocols since the 2019 recommendations. To assess this, we asked:

Are you familiar with the rheumatological term axial spondyloarthritis (axial SpA)?; Are you familiar with the BRITSpA consensus guidance on MRI for the diagnosis of axial spondyloarthritis?; Are you aware of formal recommendations regarding which imaging features should contribute to the identification of a

positive MRI of the sacroiliac joints / spine in spondyloarthritis?; and What MRI SIJ / spinal / spondyloarthritis features do you use to make a diagnosis of Spondyloarthritis?

Results

Familiarity with the term 'axial spondyloarthritis': 90 respondents (97%) reported familiarity with the term axial spondyloarthritis, and three (3%) reported being unfamiliar with the term.

Familiarity with 2019 BritSpA consensus guidelines on MRI for diagnosis of axial SpA: 70 respondents (75%) reported familiarity with the 2019 BRITSpA consensus guidelines, and 23 (35%) reported not being familiar with the guidelines.

Knowledge of formal recommendations regarding imaging features and their contribution to diagnosis: 74 respondents (80%) reported being aware of formal recommendations regarding specific MRI features in the SIJs used in the diagnosis of axial

SpA, and 19 (20%) reported being unaware of such formal recommendations.

66 respondents (71%) reported being aware of formal recommendations regarding specific MRI features in the spine used in the diagnosis of axial SpA, and 27 (29%) reported being unaware.

For both anatomical sites (SIJ and spine), there was a wide variety of descriptions given of the recommendations used to guide diagnosis. Only six sites (both SIJ and spine) specifically reported descriptions consistent with the 2019 BRITSpA guidelines.

Radiological features used to make a diagnosis: Radiologists reported using a variety of radiological features and combinations of features (in both the SIJs and spine) for diagnosis, but the specific features (and combinations) varied widely.

In the SIJ, 33 respondents (36%) reported using all available features, and 48 (51.6%) reported using some combination of the features available. Of those who reported the individual features used, 42 (88%) used bone marrow oedema / osteitis, 40 (83%) used erosions, 35 (73%) used fat infiltration, 31 (65%) used sclerosis, 23 (48%) used joint space widening/effusion, 30 (63%) used enthesitis, 18 (38%) used capsulitis, 19 (40%) used fat deposition in the joint space (backfill), 25 (52%) used synovitis, 32 (67%) used new bone formation (area of ankylosis).

In the spine, 34 respondents (37%) reported using all available features, and 49 (53%) reported using some combination of the features available; the remainder did not respond or used individual features (one site reported using vertebral corner oedema as the only diagnostic feature in the spine, and no other feature was used as a solitary diagnostic criterion). Of those who reported the individual features used, 41 (84%) used vertebral corner bone marrow oedema / osteitis, 20 (41%) used endplate oedema, eight (16%) used diffuse vertebral body oedema, 26 (53%) used posterior element bone marrow oedema, 23 (47%) used spinous process bone marrow oedema, 40 (82%) used vertebral corner fat infiltration and 37 (76%) used syndesmophyte formation.

Trends by nation: We also assessed the differences by the four UK nations on familiarity with axial SpA and the clinical features.

For the four UK nations, familiarity with the term axial SpA was 96/100/100/100% (for England/Scotland/Wales/NI), familiarity with the BRITSpA guidance was 77/45/83/80%, awareness of recommendations on the features contributing to a positive SIJ was 80/63/83/100%, and awareness of recommendations on the features contributing to a positive spine MRI was 71/63/67/80%.

Our analysis

Positively, awareness of axial SpA terminology has improved compared to the previous survey. In particular, knowledge of the term 'axial SpA' has substantially increased, with 97% of respondents now reporting being familiar with the term axial spondyloarthritis (previously 75%). Further, 75% of respondents reported familiarity with the 2019 consensus guidelines. Awareness of definitions of positive MRI in the SIJs has also increased, with 80% reporting being aware of definitions in the sacroiliac joint (previously 31%) and 71% reporting being aware of definitions in the spine (previously 25%). However, it should be noted that the actual descriptions of what definitions were used were variable, and only a small minority reported being specifically aware of the definitions highlighted in the 2019 recommendations document. Overall, the results suggest that there is greater awareness of the MRI features contributing to diagnosis in axial SpA, but there remains variability in the specific use and interpretation of these features.

There are significant national variations, with Scotland showing a particularly lower level of awareness of the guidance and the recommended features for both the SIJ and spine. So, while there is a need for some ongoing educational work and further awareness raising, this is particularly needed within the Scottish health system.

What do these results mean for our Gold Standard time to diagnosis?

The NASS Gold Standard aims to improve the current time to diagnosis of 8.5 years down to just one. A critical component of this ambition is the ability for rheumatologists to make an informed decision based on symptoms, tests, and investigations. MRI now plays a crucial role in this diagnostic process due to the ability to identify changes in the spine and SIJ earlier in a patient's life living with axial SpA.

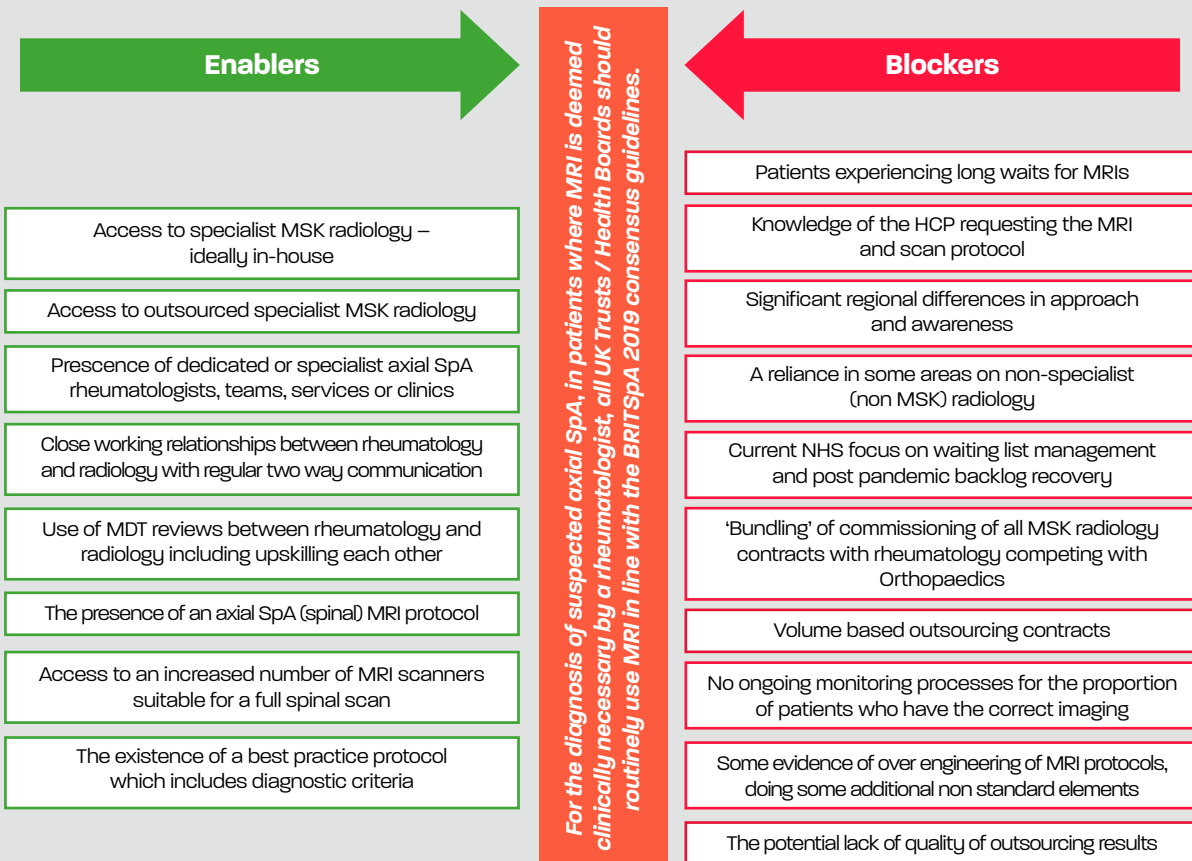
The analysis has shown that there are many key factors that are either enabling or blocking our central aim that:

For the diagnosis of suspected axial SpA, in patients where MRI is deemed clinically necessary by a rheumatologist, all UK Trusts / Health Boards should routinely use MRI in line with the BRITSpA 2019 consensus guidelines.

The diagram below (figure 4) shows a summary of the key factors that are both positively (enablers) or negatively (blockers) impacting the ability for MRI to be a routine and standardised diagnostic tool in axial SpA.

Forcefield Analysis

Figure 4: Forcefield analysis provides a framework for looking at the factors ("forces") that influence a situation, originally social situations. It looks at forces that are either driving movement toward a goal (helping forces) or blocking movement towards a goal (hindering forces)



The forcefield analysis identifies themes that the data generated from the FOI survey highlighted as components of current performance:

Capacity: At both a system level (NHS wide) and at local levels (hospitals) there is only limited capacity for MRI carried out by a specialist MSK radiologist. This capacity is in terms of physical capacity (e.g., scanners) and resource capacity (e.g., specialist MSK radiologists). Having the required capacity to meet the demand across MSK, both rheumatology and orthopaedics is key to optimal scanning.

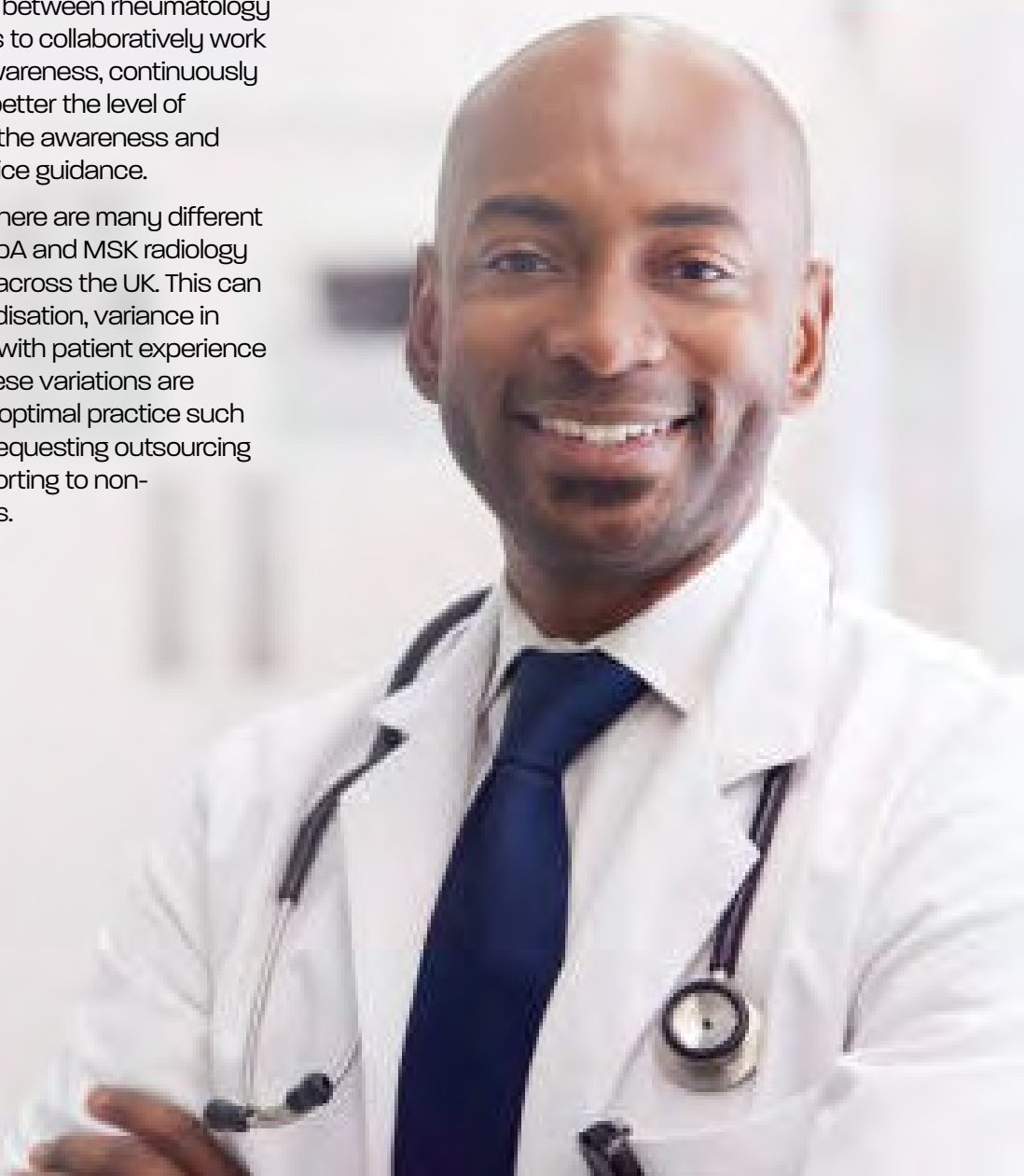
Ways of working: The presence of standardised MRI protocols and operating procedures on how to carry out and interpret spinal imaging for timely and accurate diagnosis have a positive impact on patient outcomes. Underpinning this are the on the ground relationships between rheumatology and radiology colleagues to collaboratively work to best practice, raise awareness, continuously learn, and improve. The better the level of collaboration, the better the awareness and adherence to best practice guidance.

Service configuration: There are many different examples of how axial SpA and MSK radiology services are configured across the UK. This can lead to a lack of standardisation, variance in practice and outcomes, with patient experience impacted as a result. These variations are driving some of the sub-optimal practice such as long wait times, MRI requesting outsourcing of interpretation and reporting to non-musculoskeletal services.

Expertise including awareness: The ability to access the right type of radiological input is critical and evidence shows that MSK radiologists interpreting axial SpA scans is more likely to result in correct reporting as they are more aware of the correct definitions.

Data: This analysis is a snapshot as a follow up to a previous survey and there is a lack of ongoing measurement of the use of MRI protocols in practice. As with all health improvement having the data and ability to measure performance and any impact of changes is imperative in driving lasting tangible change.

The biggest impacts positively are the standardised protocols and ways of working. The biggest negative impacts are related to the way services are configured and the level of capacity in the system.



What is the Gold Standard for imaging in the axial SpA diagnostic journey?

As this analysis is part of our *Act on axial SpA* campaign to embed a Gold Standard time to diagnosis of one year, it has helped us refine what that means in practice.

The 2019 BRITSpA consensus guidance set out what the best practice is for spinal MRI protocols as part of the axial SpA diagnostic journey and more recently the NHS England GIRFT axial

spondyloarthritis pathway sets the guide rails for HCPs to diagnose axial SpA.

We now set out how MRI should be embedded in the patient journey to further help health services and HCPs.

The diagram (figure 5) sets out this view on the Gold Standard based on the themes above and across the levels within the health system they relate to.

Figure 5:

Level 0 – Service configurations

Ideally MSK imaging contracts are differentiated between Orthopaedics (high volume) and Rheumatology (high complexity) to reflect different requirements

Any outsourcing of imaging agreements are on a basis of quality as well as volume

Consideration is given to the most optimal model for MSK imaging provision balancing access, capacity, cost and expertise

Level 1 – Management (pathway)

At triage & assessment: MRI of the sacroiliac joints and spine (lumbar and thoracic region at least) is considered at the point of first assessment by the rheumatologist

At diagnosis: All eligible patients with suspected axial SpA should as part of their diagnostic assessment have a SIJ and spinal MRI protocol scan unless clinically contraindicated.

Target: 90% of patients referred for suspected axial SpA have an MRI requested within 2 weeks of referral

Target: At least 90% of eligible suspected axial SpA patients receive SIJ and spinal (lumbar and thoracic) MRI

Level 2 – Operational

Regular communication and working (through MDTs or engagement programmes) between rheumatology (specialist axial SpA teams), other services which may request an MRI, and MSK radiology is key

Specialist axial SpA teams are more likely to raise awareness of best practice imaging protocols and clinical classification criteria

Level 0 (top) – Oversight – This is the service configuration level that sets how services are arranged, interact, and monitored.

Level 1 (middle) – Management – This is the pathway level on how the hospital services deliver the patient journey, in this case the axial SpA diagnosis. This links to the components in the GIRFT pathway.

Level 2 (bottom) – Operational – The supporting practices that enable the levels above including collaboration, joint working and MRI requesting.

All specialist MSK radiologists have access to educational materials on best practice axial SpA MRI protocols

Best practice axial SpA MRI protocol education, is part of the MSK radiology curriculum

All Trusts (or as an agreement at ICS level) have an axial SpA MRI protocol in place based on BRITSpA consensus guidelines

At diagnosis: All axial SpA protocol MRIs are interpreted and reported on by specialist MSK radiologists either in-house or outsourced

Target: All Trusts have access to specialist MSK radiologists

Rheumatologists play a crucial role in requesting the right imaging

At a service configuration level there needs to be a focus on commissioning / contracting, education and standardisation of protocols.

- **Commissioning / contracting:** Several components of the current commissioning framework in the UK give complexity to the way MSK imaging is provided. Evidence from our work in the rheumatology community raises questions and to achieve the gold standard the most optimal approach needs to be considered. How does MSK imaging best be configured to meet the needs of all MSK services? Do we need to differentiate MSK imaging to better reflect rheumatology needs? How do we ensure that MSK outsourcing is about quality / outcomes not just volumes?
- **Education:** This analysis has shown that ongoing education is key to ensuring awareness of how to scan axial SpA patients and interpret the scans. To enable best practice to be more widespread, all MSK radiologists need access to educational material that keeps them aware of requirements. This needs to be both at trainee and established levels, particularly for MSK radiologists.
- **Standardisation of protocols:** The new NHS landscape in England provides an opportunity to implement the best practice spinal MRI protocols with standardisation for each care system. Each hospital should then work to this standard protocol. Within Wales there are new opportunities for driving improvements across the health system through the recently appointed MSK Clinical Leads.

At the pathway and management level the focus is on what imaging patients get and at which point in their journey that happens. Within England this is set out in the new GIRFT axial Spondyloarthritis pathway. It states that as part of the triage and assessment the rheumatologist should ensure the right MRI has been requested. Then at the diagnosis stage all eligible patients in the opinion of their rheumatologist, receive a spinal MRI (of at least the lumbar and thoracic) including SIJ as standard with these scans interpreted by MSK radiologists.

At the working operational level there are several elements that make the pathway work and should be considered as best practice but adapted to what works best in each local health system.

- **Specialist axial SpA services:** The data show that hospitals with axial SpA services, teams or rheumatologists have a greater awareness of guidance and understanding of diagnostic criteria. So ideally the majority of patients will be referred for diagnosis at a specialist centre, or if referred to a general rheumatology service, that service can seek advice from a main axial SpA centre.
- **Joint working between rheumatology and radiology:** One of the biggest factors on ensuring best practice is embedded is the presence of strong working relationships between rheumatology and radiology. To enable this there should be regular MDT / joint clinics and named contacts in all Trusts / Health Boards between rheumatology and their MSK radiology team. This may need to reflect some outsourcing arrangement or regional access to MSK radiology. This increases the likelihood that the right image will be requested and carried out.

The recommendations set out later look at how the Gold Standard could be embedded across the UK.

Conclusion

In conclusion, there have been several positive developments in the understanding and use of MRI for diagnosis of axial SpA in the UK since the 2017 survey: radiologists are now more willing to use MRI as part of the diagnostic workup for axial SpA and have a greater understanding of the relevant diagnostic features, albeit with scope for further improvement.

However, several new challenges have emerged from this study, including the increase in wait times, reliance on outsourcing and the association of non-specialism on awareness of axial SpA terminology and recommendations.

Early referral to rheumatology is key in ensuring a timely diagnosis, as is swift appropriate MRI scans that will be promptly and accurately interpreted to support rheumatologists in their diagnostic decision.

Some current capacity pressures are making this a challenge with lots of patients waiting significant time for their MRI. There then remains some gaps in awareness of the most appropriate spinal MRI protocols, whilst recognising there have been significant improvements across the UK, there is still more to do.

The NHS workforce pressures appear to be leading to more reliance on non-musculoskeletal radiologists for the reporting of complex scans without the level of oversight, monitoring and expertise for this to be a sustainable model. As a result, some additional work needs to be done to ensure that there is access for all Trusts / Health Boards to MSK radiologists and consideration should be given to the most optimal model for MSK imaging provision balancing access,

capacity, cost, and expertise. Outsourcing is obviously a complex area that will be driven by lots of factors that are related to local service provision and more work to understand these relationships is required. There may be areas where outsourcing offers the best service but for a complex condition such as axial SpA there should remain consideration of the need for expertise.

There are several day to day working practices that clearly enhance the axial SpA diagnostic processes such as ongoing collaboration, communication and joint working between rheumatology and radiology, ideally led by specialist axial SpA rheumatology teams.



Recommendations

Recommendation one: When utilising MRI in the diagnosis of axial SpA, all Integrated Care Boards (ICB), Health Boards or Health and Social Care Boards should adopt axial SpA spinal MRI protocols in line with the BRITSpA consensus guidance. The protocols should be implemented by all Trusts, hospitals, or secondary care providers.

The BRITSpA axial spondyloarthritis protocol from the 2019 recommendations should be utilised as a key part of the diagnosis decision, and supports the decision-making of rheumatologists. These best practice guides are in line with international standards. It is clear that carrying out MRI in line with the protocol supports better decision-making and should therefore be adopted locally. Taking a local approach enables for any internal requirements to be embedded but within a structured framework. In England, the BRITSpA protocol is part of the GIRFT pathway for axial SpA. Any future national pathway development in Northern Ireland, Scotland and Wales should include the BRITSpA protocol.

Recommendation two: All local axial SpA pathways should ensure that all patients with suspected axial SpA as deemed clinically necessary by a rheumatologist to be in need of an MRI receive one of at least the lumbar and thoracic spine, plus SIJ, as part of their diagnostic assessment.

The MRI protocol forms a part of the overall pathway for management of axial spondyloarthritis from presenting at health services to diagnosis and ongoing treatment. Ensuring local adoption of the best practice will show how the MRI and other imaging are utilised in the context of the end-to-end pathway. Within that the BRITSpA consensus recommendations (known as spondyloarthritis protocol in the GIRFT pathway in England) clearly show that the ideal imaging is for MRI encompassing the SIJ, and the lumbar and thoracic spine. This is the protocol most likely to pick up signs of spondyloarthritis, including non-radiographic.

Recommendation three: All Trusts, Health Boards and Health and Social Care Boards have access to specialist MSK radiologists so that all axial SpA spinal MRIs are interpreted by specialists with appropriate knowledge, even if this is via an outsource arrangement.

Our analysis has shown that the patient is likely to get the best outcome if the MRI interpretation is done by a specialist MSK radiologist. This is due to the increased awareness of axial SpA and the indicators that support a definitive diagnosis. There is evidence that this is not impacted by being outsourced, although the fact that close working with rheumatologists further increases effectiveness, in-house would be optimal.

Recommendation four: Education is in place for MSK radiologists, both during training and as part of ongoing professional development on best practice spinal MRI protocols and axial SpA diagnostic criteria.

Education remains a key factor in the patients getting the right investigations and that the images are appropriately interpreted. The Assessment of SpondyloArthritis International Society (ASAS)²⁰, an internationally recognised group of experts in the field of spondyloarthritis, have developed educational materials on the use of spinal MRI in axial SpA. These educational packages can be utilised to bring best practice together into a succinct educational package that ensures we continue to spread awareness of the key factors in spinal MRI and axial SpA diagnosis.

Recommendation five: All rheumatology teams who see axial SpA patients have access to MSK radiologists and have joint working practices in place to aid collaboration and ongoing improvement.

There is a correlation between close working of rheumatologists with MSK radiologists and the awareness of axial SpA and best practice in spinal MRI imaging in the UK. This, combined with the increased knowledge of specialist radiologists vs generalists in axial SpA, shows that patients are likely to experience the optimal diagnostic journey if they attend hospitals where rheumatology and MSK radiology work closely.

Recommendation six: Outsourced MRI should be monitored closely and local arrangements for accountability and accuracy put in place.

There is significant reliance on outsourcing of imaging and worryingly non-specialist services. Currently most reports are paid by item rather than accuracy. This drives a culture where there is no incentive to report more accurately and, in some areas, leads to mistakes being repeated. Mechanisms do exist in some areas for discrepancy reporting and rheumatology teams to request or reject specific radiologists with providers. We do not yet know how often these mechanisms are utilised by rheumatology teams and how this translates into improvement in imaging interpretation quality. More work is needed to understand how much this volume over quality approach is impacting reporting accuracy and we will continue to advocate for this, potentially using the APPG on Axial SpA to raise the issues through parliamentary questions.

²⁰ Available at: <https://www.asas-group.org/education/asas-slide-library>

Areas for further work or investigation

Area for further work or investigation: Integrated Care Boards (ICB), Health Boards or Health and Social Care Boards consider the most optimal way to deliver MSK imaging including service models, workforce models, MSK diagnostic hubs, MSK commissioning and outsourcing contracts. This should remove the need to rely on outsourcing to non-musculoskeletal services for MSK imaging.

Given the current pressures on the NHS in terms of capacity, funding, workforce, pandemic recovery and ongoing emergency pressures debate is needed on what the most optimal way to deliver MSK imaging, specifically MRI. As noted, there is exploration of diagnostic imaging hubs already. NASS is supportive of consideration of alternative delivery models and will proactively work with key stakeholders on this agenda and ensuring that the intelligence we have helps to find the right answer.

Area for further work or investigation: Submit proactive surveillance activity to the National Institute for Health and Care Excellence (NICE) and engage with them to explore an update to the NICE Guideline (NG65) which needs to be clearer on the role of MRI in the diagnosis of axial Spondyloarthritis.

The NICE guideline (NG65) sets out the key practice for the management of spondyloarthritis; however, some of the elements related to imaging have not been reviewed since the guideline came into force. Some areas of practice have changed in the intervening period. We will therefore submit evidence to the Surveillance Team at NICE and request that guidance is updated to reflect the best practice including the BRITSpA consensus recommendations from 2019.

What is NASS doing to support and drive change in this area

As an organisation we have a key role in advocating for change and influencing those in the healthcare system to make these changes in the interest of improving patient care. We are already playing a pivotal role in this with specific focus on those recommendations above.

In collaboration with BRITSpA we will develop an e-learning package on the best practice in axial SpA spinal MRI. We will engage with Health Education England, NHS Education for Scotland, Wales Deanery and Northern Ireland Medical and Dental Training agency on translating this into a sustainable package that can be hosted

on one of their learning platforms to make it available to all NHS staff and potentially target MSK radiology trainees.

Several Aspiring to Excellence rheumatology teams have adopted local MRI protocols based on the 2019 consensus guidance and have regular MDT working practices with radiology. We will work with them to measure the impact this has on patient outcomes and encourage the other teams to implement similar changes locally.

NASS continues to raise the profile of the wider campaign and bring particular issues to policy makers. We will use some of our levers to raise the issues highlighted in this report with parliamentarians by tabling parliamentary questions .





Annex one – What is axial SpA?

Axial spondyloarthritis (axial SpA) is a form of inflammatory arthritis that most commonly affects the spine and sacroiliac joints. It is a painful and progressive long-term condition for which there is no cure. There is currently an 8.5-year average time to diagnosis²¹.

Axial SpA is not rare and affects an estimated 1 in 200 of the adult population²¹ in the UK (approximately 220,000), which is twice the prevalence of multiple sclerosis (MS) (1 in 600 of whole UK population or 107,000)²². The disease is characterised by painful flares and fatigue.

People with the condition can also have a range of complications and co-morbidities:

- 26% of people will have uveitis²⁴
- 9% will have psoriasis²⁵
- 7% will have inflammatory bowel disease²⁶
- 25% of people will have irreversible spinal fusion²⁷
- There is a close association with osteoporosis²⁸
- 59% report suffering a mental health issue at some point.

²¹ Mark P. Sykes, Helen Doll, Raj Sengupta and Karl Gaffney, Delay to diagnosis in axial spondyloarthritis: are we improving in the UK? *Rheumatology*, July 2015

²² Louise Hamilton, Alexander MacGregor, Andoni Toms, Victoria Warmington, Edward Pinch, Karl Gaffney, The prevalence of axial spondyloarthritis in the UK: a cross-sectional cohort study, *Biomed Central Musculoskeletal Disorders*, December 2015

²³ MS in the UK, www.mssociety.org.uk, January 2016

²⁴ Carmen Stolwijk, Astrid van Tubergen, José Dionisio Castillo-Ortiz, Annelies Boonen, Prevalence of extra-articular manifestations in patients with ankylosing spondylitis: a systematic review and meta-analysis, *Annals of the Rheumatic Diseases* 2015, 74:65–73

²⁵ Ibid

²⁶ Ibid

²⁷ S Carette, D Graham, H Little, J Rubenstein, P Rosen, The natural disease course of ankylosing spondylitis, *Arthritis Rehum*, 1983

²⁸ DM Wang, QY Zeng, SB Chen, Y Gong, ZD Hou, ZY Xiao, Prevalence and risk factors of osteoporosis in patients with ankylosing spondylitis: a 5-year follow up study of 504 cases, *Clinical and Experimental Rheumatology*, July 2015

Annex two – Glossary of terms

Act on Axial SpA – campaign to reduce the current 8.5 year time to diagnosis to a Gold Standard time of one.

All Party Parliamentary Group – informal, cross-party groups formed by MPs and Members of the House of Lords who share a common interest in a particular policy area, region, or country.

Aspiring to Excellence – Aspiring to Excellence is a strategic partnership between NASS, BRITSpA and sponsoring companies AbbVie, Biogen, Lilly, Novartis and UCB. It is an award programme designed to encourage and recognise service improvement in axial SpA (AS) care.

Axial Spondyloarthritis – Axial SpA (AS) is a spectrum of disease whereby a person can have changes on an MRI but not x-ray (non-radiographic axial spondyloarthritis (nr axial SpA) to spinal fusion (ankylosing spondylitis)).

Biologic disease modifying anti rheumatic drugs (bDMARDs) – Biologic disease modifying anti rheumatic drugs (bDMARDs) - Biologic DMARDs came to market in the early 1990s, they are usually prescribed when there is evidence of ongoing disease activity despite treatment with conventional therapy such as non-steroidal anti-inflammatories. bDMARDs are drugs that delay the progression of inflammatory arthritis by affecting the body's biological response to various cytokines, particularly TNF- α but are not curative.

Best MSK Health Collaborative – The Best MSK Health Collaborative was set up with the aim of recovering and rebuilding high-quality, high-value personalised MSK provision, integrated across primary, community and secondary care and with mental health, social services and the third sector organisations.

FOI – The Freedom of Information Act 2000 provides public access to information held by public authorities.

Getting it Right First Time (GIRFT) – Getting It Right First Time (GIRFT) is a national programme designed to improve the treatment and care of patients through in-depth review of services, benchmarking, and presenting a data-driven evidence base to support change.

IBP – inflammatory back pain

MDT – multidisciplinary team

MRI – MRI (magnetic resonance imaging) is a type of scan that uses magnetism and radio waves to take pictures of inside the body. It is a key diagnostic tool in the diagnosis of axial SpA.

National Axial Spondyloarthritis Society (NASS) – the only charity in the UK solely focussed on supporting people with axial Spondyloarthritis including ankylosing spondylitis. Formerly known as the National Ankylosing Spondylitis Society.

National Institute for Health and Care Excellence (NICE) – NICE provide national guidance and advice to improve health and social care.

NHS Constitution – The constitution sets out rights for patients, public and staff. It outlines NHS commitments to patients and staff, and the responsibilities that the public, patients, and staff owe to one another to ensure that the NHS operates fairly and effectively. All NHS bodies and private and third sector providers supplying NHS Services are required by law to take account of the constitution in their decisions and actions.

NHS Trust – provides goods and services for the purposes of the health service.

Primary Care – the day-to-day healthcare given by a health care provider. Typically, this provider acts as the first contact and principal point of continuing care for patients within a healthcare system and coordinates other specialist care that the patient may need.

Referral to treatment (RTT) – In England, under the NHS Constitution, patients 'have the right to access certain services commissioned by NHS bodies within maximum waiting times, or for the NHS to take all reasonable steps to offer a range of suitable alternative providers if this is not possible'. The NHS Constitution sets out that patients should wait no longer than 18 weeks from GP referral to treatment. RTT is the time between referral and treatment.

Rheumatology – discipline specialising in immune-mediated disorders of the musculoskeletal system, soft tissues, autoimmune diseases, vasculitides, and inherited connective tissue disorders.

Secondary Care – medical care that is provided by a specialist or facility upon referral by a primary care physician and that requires more specialised knowledge, skill, or equipment than the primary care clinician can provide.



**Axial SpA
works silently.
We don't.**

**National Axial
Spondyloarthritis
Society**

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