Evidence Brief: Diagnostics & Imaging

Contents

Produced by the Knowledge Management team Evidence Briefs offer an overview of the published reports, research, and evidence on a workforce-related topic.

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Key publications – the big picture

What are diagnostics, and how are diagnostics services performing?
The King's Fund, June 2024
Demand for diagnostics has been increasing steadily in over the past decade as hospital referrals and attendances have risen, and since the Covid-19 pandemic there has been a significant increase. This means more people are now waiting for diagnostic tests – 1.58 million in January 20231, a 9 per cent increase over the past year, and a 150 per cent increase over the past decade.

How is provider collaboration delivering diagnostic capacity?
NHS Providers, February 2024
The establishment of CDCs has already led to real success in increasing activity. However, alongside funding constraints, workforce shortages are also a key limiting factor that will continue to make it difficult to expand capacity. Sir Mike Richards' review (Independent review of diagnostic services for NHS England 2020) estimated the need for an additional 3,500 radiographers, 2,000 radiologists and 500 advanced practitioners nationally. These shortages are therefore limiting the progress that can be made through the centres and require innovative and collaborative approaches. Trusts working together have been able to consider shared rotas between providers, supporting trainees from neighbouring trusts to undertake placements at the CDCs, as well as making best use of the expertise of senior clinicians to review scans and provide second opinions across trust boundaries.

NHS Long Term Workforce Plan
NHS England, June 2023 (updated January 2024)
Developments in science, research, technology, digital and data will continue. Genomics and artificial intelligence (AI) in particular will transform our ability to prevent, diagnose, treat and manage disease, supporting a shift towards better prevention of disease and more personalised care outside hospital. […] Among the allied health professions (AHP), shortfalls will increase the most for paramedics, occupational therapists, diagnostic radiographers, podiatrists, and speech and language therapists. […] Complete the planned increase in medical specialty training places by September 2024 to more than 2,000 over three years, as well as 1,000 additional specialty training places focusing on areas with the greatest shortages. This expansion is both supporting existing planned growth for mental health, cancer and diagnostic services, as well as elective recovery, urgent and acute care, maternity services and public health medicine. […] Government has invested in the New Hospital Programme, community diagnostic centres and surgical hubs. […] Future expansion would support existing planned growth for mental health, cancer and diagnostic services […] The Plan sets out the following assessment for proportion of entrants joining the AHP workforce via an apprenticeship route by 2031/32: 25–50% for paramedics, diagnostic radiographers, occupational therapists, dietetics, prosthetists and orthotists. […] Alongside this, education and training expansion and reform will be important to address shortages in particular allied health professions, such as diagnostic radiography, therapeutic radiography, occupational therapy, and speech and language therapy. […] Diagnostic support: AI has the potential to free up clinical time and improve accuracy and efficiency of diagnostics in services such as ophthalmology, imaging, pathology and dermatology by acting as a first reader on images and eventually automating some clinical decisions where safe to do so. […] National funding is available to train 150 enhanced practice radiographers a year to support the diagnosis of cancer and other conditions.

Diagnostics Workforce Plan (Wales)
Health Education and Improvement Wales, 2024
Working in collaboration with the NHS Executive and alongside the National Imaging, Pathology, Endoscopy and Healthcare Science programmes, we have developed a set of short to medium term workforce actions for Diagnostics services in Wales.

The Radiography Support and Assistant Workforce: regulatory compliance, governance arrangements, supervision and delegation
The Society of Radiographers, September 2023
This guidance document is intended for managers, supervising staff and support workers who are employed in all aspects of diagnostic and therapeutic radiography. It contains valuable advice and real-life instances that can aid in the implementation of effective governance strategies to ensure a safe and high-quality service.

Diagnostic Imaging Workforce Plan for NHS Scotland
NHS Scotland, 2023
The Plan provides an overview of the workforce required to ensure delivery of a high-quality, sustainable diagnostic imaging service for the population of Scotland; evidences the gap between current and projected demand and capacity; and sets out a range of recommendations needed to address this gap.

Developing career pathways for diagnostic imaging support worker roles guidance on roles and responsibilities
The Society of Radiographers, 2023
This guidance sets out the roles and responsibilities that diagnostic imaging support workers, including assistant practitioners, can perform at four career levels. It provides additional, profession-specific competencies that complement the AHP Support Worker Competency, Education and Career Development Framework.

Standards for the education, training and preceptorship of reporting practitioners in adult chest X-ray
The Royal College of Radiologists, 2023
The current document defines the education and training required for all members of the multi-professional team who report CXRs within a clinical imaging service. It is expected that other CXR reporters operating outside of a clinical imaging service should follow the same standards for education and training to ensure that they are trained to the same level of overall competence. Any practitioner who is reporting an adult CXR formally should fulfil the criteria in this document.

Imaging equipment from procurement to installation and commissioning: The role of the medical physicist
The Royal College of Radiologists, 2023
The guidance covers seven main steps in the process: Appointment of essential medical physics personnel, Pre-procurement, Procurement, Project initiation, Project design, Construction and installation, Commissioning and acceptance.

Preceptorship and Capability Development Framework for Sonographers
British Medical Ultrasound Society, 2022, updated 2023
While some ultrasound departments have already well-defined pathways in place, many do not, and we hope that this national guidance may be adapted for use at a local level and also provide direction and ideas for individual sonographers aspiring to advance their own careers. Please contact us if you have any questions.

Your Radiography Education and Career Framework
The Society of Radiographers, November 2022
The goal of the ECF is to improve outcomes for patients through the education and training of the workforce. The fourth edition has been designed to help education providers design effective programmes while supporting the College's own programme approval process. While for those within the radiographic profession, you are encouraged to use the ECF to explore your various career pathways.

Why do diagnostics matter? Maximising the potential of diagnostics services
The King's Fund, October 2022
This briefing explores the role that diagnostics play in underpinning much of the activity that takes place in the health and care system, the policy focus to date and where attention is needed to ensure diagnostic capacity and capability are fit for the future.

Diagnostic imaging network workforce guidance
NHS England, April 2022
This document provides support to imaging networks on how to optimise the utilisation of their current workforce.

NHS Sonographers Scope of Practice
British Medical Ultrasound Society, November 2021
A significant portion of the workforce may retire or leave the NHS in the near future, which could limit service delivery in an already overstretched cohort. Prompt strategies are needed to offset this potential exodus. Efforts to standardise job titles and roles may reduce inequity reported by respondents and may enable smoother implementation of the Career and Progression Framework, thus facilitating a fairer, more attractive and more structured ultrasound career for the current and future workforce.

Diagnostic imaging network implementation guide
NHS England, The Royal College of Radiologists, Society of Radiographers, and Institute of Physics & Engineering in Medicine, April 2021

Artificial intelligence: Guidance for clinical imaging and therapeutic radiography workforce professionals
The Society of Radiographers, 2021
It is hoped that these guidelines will be of value to: people who are developing, testing, validating and implementing AI for radiography in clinical practice; patients and carers; individual practitioners; service managers; and academic institutions.

Diagnostics: Recovery and Renewal – Report of the Independent Review of Diagnostic Services for NHS England
NHS England, 2020
Professor Sir Mike Richards was commissioned to undertake a review of NHS diagnostics capacity (NHS Long Term Plan). The independent report, Diagnostics: Recovery and Renewal, recommends the need for a new diagnostics model, where more facilities are created in free standing locations away from main hospital sites, including on the high street and in retail locations, providing quicker and easier access to tests to a range of tests on the same day, supporting earlier diagnosis, greater convenience to patients and the drive to reduce health inequalities.

Advanced Practitioner Radiographers
The Society of Radiographers, no date
The advanced practitioner category encompasses the considerable depth and breadth of radiographic practice.
In 2017 the term 'advanced clinical practice' was defined by Health Education England (HEE) and a framework developed to standardise this level and that of consultant level practice across

all non-medical professions. See also: What is advanced practice in radiography?

Diagnostic radiography support workers
NHS England Workforce, Training & Education, no date
The Supporting Success project has developed guidance on occupation-specific roles and responsibilities for diagnostic radiography support workers employed in the NHS. This builds on the AHP Support Worker Competency, Education and Career Development Framework and includes profession-specific competencies and progression routes linked to formal education and pre-registration degrees. See also Developing career pathways for diagnostic imaging support worker roles: literature review and expert group survey.

Case Studies

Case Study – A Strategic Approach to Workforce Planning for the Diagnostic Imaging Workforce
NHS England Workforce, Training & Education, no date
Surrey and Sussex Cancer Alliance recognised that there was a recruitment and retention issue in some staff groups in cancer and diagnostics services and that workforce supply and demand is challenging across their footprint.

Cheshire and Merseyside Radiology Imaging Network Case Studies
Cheshire and Merseyside NHS, multiple dates
A selection of case studies showcasing best practice across Cheshire and Merseyside.

ChatGPT makes medicine easy to swallow: an exploratory case study on simplified radiology reports
Imaging Informatics and Artificial Intelligence, 2023
Patients have started to use ChatGPT to simplify and explain their medical reports, which is expected to affect patient-doctor interaction. This phenomenon raises several opportunities and challenges for clinical routine.

Role extension in advanced ultrasound practice: A framework approach and case study
BMUS, June 2022
By defining and aligning the components of scope of practice, education/competency and governance, role development in ultrasound can be initiated and sustained. Role extension utilising this approach brings benefits for patients, clinicians and departments.

The Star for workforce redesign

More resources and tools are available in the Star

Statistics

NHS diagnostics data analysis
British Medical Association, January 2025
We look at waiting lists for tests, demand for diagnoses versus capacity, and diagnostic workforce numbers in England.

Establishing the size and configuration of the imaging support workforce: a census of national workforce data in England
BJR Open, 2024
Using a census methodology, an anonymized electronic staff record (ESR) data set extracted in December 2022 was

analysed to identify support workers and their employment bandings at NHS Trust, regional and national (England) level.

Diagnostic Radiography Workforce UK Census 2023
The Society of Radiographers, 2024
The 2023 workforce census captures data about the diagnostic radiography workforce in the UK at a census date of 1 November 2023. Radiology services managers (or equivalents) were asked to answer the census on behalf of all diagnostic radiography (medical imaging) services in their hospital/workplace or organisation. They were asked to include details of all practitioners in the career framework, from clinical support workers and assistant practitioners through to advanced and consultant practitioners, including apprenticeship posts (England only) and trainee assistant practitioners.

Ultrasound Workforce UK Census 2019
The Society of Radiographers, 2020
In May and June 2019, the Society and College of Radiographers (SCoR) surveyed ultrasound providers in the United Kingdom.

[Data collection for the SoR 2024 Ultrasound Census ended in January 2025; the census has not yet been published.]

You can also find relevant statistics on the Health and Care Statistics Landscape.

National Data Programme

Workforce, Training and Education staff can look at the National Data Warehouse (NDL) SharePoint site to find out more about datasets and Tableau products.

Published Peer Reviewed Research

Workforce planning, role expansions, and future considerations

Evaluation of radiographer staffing framework and medical imaging procedures time duration in public healthcare system
Radiography, 2025
This study highlights the need to assess radiographers staffing requirements to optimize the workforce and enhance operational efficiency and patient experience within public radiology departments.

'What is Your Job?': A Qualitative Analysis of the Deployment, Utilisation, and Contribution of Support Workers in Diagnostic Imaging Services in England
The International Journal of Health Planning and Management, 2025
There are three models of deployment for Support Workers in imaging departments. Support Workers are a highly valued but underutilised workforce. Variation and lack of progression opportunities are hindering their potential. More research is needed on Support Worker deployment across other professions.

Reporting radiographers in CT and MRI: A literature review with a systematic approach
Radiography, 2025
Healthcare organisations should implement standardised training pathways to prepare radiographers for reporting roles. Collaborative models, where radiographers support rather than replace radiologists, can improve efficiency while maintaining quality. Policymakers must provide clear guidelines and funding to expand these roles, particularly in radiologist-shortage areas.

The role, scope and utilisation of the imaging support workforce in England: A qualitative framework analysis
Radiography, 2025
National alignment of roles and competencies is urgently required. At regional and place levels, deployment models should be interrogated as a first step towards longer term workforce planning for this essential, yet under-utilised, workforce.

Nonphysician Interpretation of Medical Imaging: Not a Solution for Radiology
American Journal of Roentgenology, 2025
At this time of workload and workforce challenges for radiology practices, an emphasis on appropriate patient care, the profession's high standards, and continued strength in advocacy are needed to create enduring solutions. The temptation for radiology to incorporate nonphysician providers into independent interpretive roles does not align with the best interests of the profession and its patients.

A survey of the NHS reporting radiographer workforce in England
Radiography Open, 2024
The findings for England (n=704 reporters; n=142 trainees) provide an estimate based on the response rate of the current reporting radiographer workforce across the NHSE regions, and their contribution to the skills mix radiology reporting service delivery. It is hoped future surveys will provide ongoing workforce estimates for the diagnostic radiographer reporting workforce in NHSE to support workforce transformation and sustainability plans for the radiography profession and to meet government healthcare targets and priorities.

Has the skills mix promise been broken? A scoping review of the deployment of the support and assistant workforce within diagnostic imaging in the UK
Radiography, 2024
The support and assistive workforce are a key part of the diagnostic imaging workforce but limited research evidence examining these roles has been published. There is limited research evidence of capacity generation with most presenting individual perspectives. Job satisfaction and career aspirations within the support and assistive workforce are evident but there is still confusion over scope of practice and supervision.

What do the revised UK standards of proficiency mean for diagnostic radiography training? A regional radiographer focus group study
Radiography, 2024
The findings showed consistency in expectations of student performance in projectional radiography, patient care and communication. Participants felt some standards of proficiency were beyond threshold competency, or current practices were a barrier in supporting learning. Participants felt assessment over a period and range of examinations in the clinical environment gave a fairer picture of student performance.

Reporting radiographers in Europe survey: An overview of the role within the European Federation of Radiographer Society (EFRS) member countries
Radiography, 2023
Reporting radiographers fulfil an important role within the current demands of healthcare. This demand is likely to increase in the future, and therefore it is vital that there is some form of standardisation in the level of education that this group of healthcare professionals receive.

Radiographers filling the mammography screening gap, but where's the evidence?
Radiography, 2023
What is needed now is evidence to identify factors associated with image interpretation performance of RAPs. This underrepresented group of professionals contributing to the image interpretation sector deserve equitable review and until this research is carried out and a tailored method of performance analysed, radiography-led reporting cannot be achieved.

Diagnostic radiology and its future: what do clinicians need and think?
European Radiology, 2023
Clinicians generally regard medical imaging as high-value care and expect to use more medical imaging in the future. Clinicians mainly need radiologists for cross-sectional imaging interpretation while they interpret a substantial proportion of radiographs completely by themselves. The majority of clinicians expects that the need for diagnostic radiologists will not decrease (half of them even expect that we need more) and does not believe that AI will replace radiologists.

How to prepare for a bright future of radiology in Europe
Insights into imaging, 2023
To ensure radiologists' personal professional recognition and fulfilment in multidisciplinary environments, the focus of training should go beyond diagnostic reporting, concentrating on clinical backgrounds, specific communication skills with referrers and patients, and integration of imaging findings with those of other disciplines.

Extending the scope of practice for experienced assistant practitioners in breast screening and the impact on service resilience
Radiography, 2022
Increasing the autonomy and voice of the APs has a positive effect on the resilience of the wider radiographic workforce and the service as a whole. It also can provide a mechanism for raising their profile with a possible raise in job satisfaction, staff engagement and retention.

Embedding new technology into clinical ultrasound practice: Is role extension for sonographers the key to improving patient pathways?
BMUS, 2022
UK sonographers have repeatedly demonstrated reliability in many areas of role extension in various clinical settings. Early data indicate that the adoption of MicroUS for use in prostate disease surveillance may be another role suited to sonographers.

Diagnostics: a major priority for the NHS
Future Healthcare Journal, 2022
Diagnostic capacity in the NHS in England was much lower than that in many other developed countries before the COVID-19 pandemic. The relative lack of diagnostic equipment and workforce is now hampering recovery from the pandemic. In response to this, a major programme of work is now underway to improve access to a wide range of diagnostic tests. Establishment of community diagnostic centres is a key component of this programme.

Determining diagnostic radiographer staffing requirements: A workload-based approach
Radiography, 2022
The diagnostic radiographer staffing framework consists of seven steps that comprise a workload-based approach to determining the number of full time equivalent diagnostic radiographers that are required for each modality, or group of modalities. Both clinical and non-clinical activities are considered, and guidance is provided on calculating staffing requirements to cover leave allowances. A number of potential approaches to determining activity times are also discussed.

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Current pressure on the UK imaging workforce deters imaging research in the NHS and requires urgent attention
Clinical Radiology, 2022
Common barriers to delivering research were found across the multidisciplinary workforce. The key issues were lack of staff, lack of time, and lack of funding to backfill clinical services. Given the ongoing workforce shortages and increasing clinical demands on radiologists, diagnostic radiographers, and medical physicists, these issues must be tackled with a high priority to ensure the future of clinical research within the NHS.

[Australia] Substitution, delegation or addition? Implications of workforce skill mix on efficiency and interruptions in computed tomography
Australian Health Review, 2020
Building on existing research, this study provides clinical workforce alternatives that maintain patient throughput while offering cost efficiencies. This study also quantified the many daily interruptions that occur within the CT setting, highlighting a potential clinical risk. To the best of our knowledge, this study is the first to empirically test the use of allied health assistants within CT.

Workforce training, supervision, coaching, and mentoring

Clinical insights into cross-sectional imaging integration in radiography education
Radiography, 2025
Variations in training curricula can present significant challenges for graduates. To align with the most recent Standards of Proficiency, curricula must be regularly reviewed and updated. Such Standards now typically require radiographers to perform a range of CT scans, including those of the head, C-spine, chest, and abdomen. Therefore, integrating comprehensive training in cross-sectional imaging into pre-registration education is crucial to ensure that future professionals meet these essential competencies and are fully prepared for their roles.

A maturity matrix and actionable tool for implementing best practices within the radiography support workforce: a mixed methods synthesis
BMC Health Services Research, 2025
The Imaging Support Workforce Maturity Matrix is constructed as a means of tackling workforce improvements and tracking progress over time at service level. Fifteen critical determinants

within three themed categories (evidence-based workforce planning; deployment; development and progression) were embedded within the matrix. Each determinant is presented for self-assessment against four levels of service maturity (Emerging, Developing, Maturing, and Thriving). These support assessment and action-planning towards the goal of fully developing the role and progression route for the support workforce.

Diagnostic radiography workforce expectations of learners against the 2023 HCPC standards of proficiency: Results of a UK Delphi study
Radiography, 2024
A Delphi survey was distributed to UK diagnostic radiographers to ascertain the stage of training in which they expect each standard of proficiency to be demonstrated by the learner. Agreement of when three quarters of the new Standards would be expected to be met during pre-registration training could support practice placement learning and assessment. However, there is some uncertainty around the Standards and the ability to provide appropriate resources, support, and expertise to enable learners to meet them.

Ultrasound education across European Federation of Radiographers Societies (EFRS) countries: Similarities and differences
Radiography, 2024
Sonography training and education varies among EFRS member countries ranging from short focused courses to postgraduate awards. Few countries offer sonography education leading to an award. The majority of clinical teaching and learning takes place in the learner's workplace.

[Australia] Sonographic imaging education for sonographers versus health professionals: A literature review
Sonography, 2024
Different sonographic imaging skills and educational methods are used for sonographers and health professionals. Sonographers utilise a wide range of imaging skills: teaching methods should be tailored accordingly. Health professionals rely on condensed imaging skills and standardised protocols: this requires a customised approach and may be enhanced by sonographer involvement.

Assessing the barriers and enablers to the implementation of the diagnostic radiographer musculoskeletal X-ray reporting service within the NHS in England: a systematic literature review
BMC Health Services Research, 2023
There is evidence of a shift in culturally intrenched legacy perspectives within and between different meso-level professional bodies around skills mix acceptance and role boundaries. This has helped shape capacity building of the reporting workforce. All of which have contributed to conceptual understandings of the skills mix workforce within modern radiology services.

[United States] Getting by with a little help from my friends? Expanding mentorship for career development and satisfaction
Clinical Imaging, 2023
We endorse the theory or intentions of mentorship and believe that its effectiveness can take several forms. Having a formal program in place, with built-in flexibility to address our rapidly changing times, remains highly desirable. Our proposal is to expand this notion to a “whatever works,” “anything goes,” or, in the spirit of the COVID era, a hybrid model.

Our journey from the Peripatetic Ultrasound Trainers to the Ultrasound Training Academy - HEE (South East)
Ultrasound, 2023
The Ultrasound Training Academy - HEE (South-East) is based in the Princess Anne Hospital (University Hospital Southampton NHS FT). The advantages based within a hospital setting allowed the academy to follow the Trust's governance as well as absorbing some of the capacity from the ultrasound department. We have two ultrasound rooms and a dedicated space for simulation training. We have plans to create a third ultrasound room.

[Spain] Gamification: Basic concepts and applications in radiology
Radiología, 2023
Gamification is the use of elements from games in non-game environments, such as education. It is an alternative educational focus that promotes students' motivation and participation in the learning process. Gamification had proven effective in training health professionals and can play an important role in diagnostic radiology training, both at the undergraduate and postgraduate levels.

Adapting a communication coaching intervention for obstetric sonographers delivering unexpected news: A qualitative study
Ultrasound, 2023
The two main themes were (1) the practicalities of coaching, and (2) content. The first theme had four subthemes: (a) brief and flexible structure, (b) online modality, (c) sensitive and positive coach and (d) organisational awareness. The second theme had three subthemes: (a) specific language and behaviour recommendations, (b) adaptable to different service-users and situations and (c) confer relevant emotional skills and techniques.

[Australia and United Kingdom] Identification of factors associated with diagnostic performance variation in reporting of mammograms: A review
Radiography, 2023
Influencing factors included, new technology, volume of reads, experience and training, availability of prior images, social networking, fatigue and time-of-day of interpretation. Advancements in breast imaging such as digital breast tomosynthesis and volume of mammograms are primary factors that affect performance as well as tiredness, time-of-day when images are interpreted, stages of training and years of experience. Recent studies emphasised the importance of social networking and knowledge sharing if breast cancer diagnosis is to be optimised.

Mentoring in radiology: An asset worth exploring!
European Journal of Radiology, 2022
In general, universal rules of mentoring are also useful and applicable in the field of radiology. These universal rules for establishing a successful mentoring relationship include creating a relationship of trust and confidentiality, clearly defining roles and responsibilities, establishing short- and long-term goals, using open and supportive communication, and collaboratively solving problems.

Exploring sonographer emotional well-being: NHS sonographers' experience of the restorative function of professional supervision
Ultrasound, 2022
This study found that participants identify professional supervision in its formative and normative functions more commonly than its restorative functions. It also found that sonographers are found wanting of emotional support, with 50% of sonographers feeling unsupported and identifying a restorative supervision need to their working practice.

[France] Recognition of radiographers in the workplace: Why it matters
Radiography, 2022
Recognition is one of the basic needs of an individual, and satisfying this need is a crucial issue for organizations. This paper focuses on the importance of recognition for radiographers, notably to protect their psychological health and increase their well-being at work and in their professional career.

Performance of Radiologists and Radiographers in Double Reading Mammograms: The UK National Health Service Breast Screening Program
Radiology, 2022
No difference in performance was observed between radiographers and radiologists reading screening mammograms in a program that used double reading.

[Australia] Delivering unexpected news to pregnant women and their attending family: Is sonographer training adequate? A narrative review
Sonography, 2022
Four main themes were identified during thematic analysis: (1) sonographers felt underprepared to deliver unexpected news, (2) sonographers felt training was or would be beneficial in delivering unexpected news, (3) a standard training protocol and guidelines should be implemented and (4) training and preparation to deliver unexpected news can improve patient care and satisfaction.

Reporting radiographer academy training model; an evaluation of the impact for trainees and clinical service
Radiography, 2022
There were overwhelmingly positive opinions of the academy training model from both cohorts in this study, with the two main benefits emerging being the protected study time away from clinical departments and minimal disruption to clinical services due to reduced onus on the local mentors. Peer support was also highlighted as a positive aspect of the model which would facilitate future integrated imaging network working.

Is there a role for professional supervision in supporting the professional and personal wellbeing of the sonographic workforce? A literature review
Radiography, 2022
Professional supervision has an important role in supporting the sonography workforce and enable increased wellbeing and emotional support. There are clear benefits to undertaking professional supervision to support the workforce however there are competing demands which may affect the effectiveness of professional supervision.

[United States] Training for the future: Introducing foundational skills necessary to promote patient-centered care practice in medical physics graduate programs
Technical Innovations & Patient Support in Radiation Oncology, 2022
In this article, we present examples of curricula used to purposefully introduce these skills into graduate training to fill this gap. Presented didactic activities include an introduction to patient communication, ethics in medical physics, and a primer in health disparities for medical physicists. Although development of new curricula is resource-intensive when left to individual programs, we here propose resource-sharing and interprofessional collaboration to overcome these barriers.

The role of the advanced clinical practitioner in breast diagnosis: A systematic review of the literature
Radiography, 2021
Findings suggest that introducing a more formalised pathway to advanced practice into breast imaging through the

implementation of a specific Advanced Clinical Practitioner apprenticeship training programme may overcome many of the challenges evidenced in this review.

[Switzerland] Effect of image quality and motivation of radiographer teams in mammography after dedicated training and the use of an evaluation tool like PGMI
Radiography, 2021
Due to the urgent need for high quality in breast diagnostics and the worldwide frequency of mammographic examinations, investments should be made to establish thoughtful training programs for radiographers and further develop possibilities for assessment like PGMI.

Education of Radiologists in Healthcare Disparities
Clinical Imaging, 2021
At the individual level, educating radiologists, understanding individual contribution to disparities, developing radiology-specific cultural competency training, and increasing awareness of political action committees is needed. At the institutional level, embracing the concept of systemic change through reevaluation of goals and incentives and creating new mandated requirements addressing disparities with outcomes measures would be an initial start. At the national level, leveraging radiology organizations to co-sponsor an annual national meeting on radiological disparities based on diversity would enable an open forum of discussion among a diverse group of radiologists.

An evaluation of the current mentorship/preceptorship practices for newly qualified radiographers in Northern Ireland
Radiography, 2021
In the absence of standardised tools to accurately and universally measure the competency of newly qualified Radiographers (NQR) as they evolve, establishing the benchmark for effective practice within Radiology departments in NI is difficult and highly subjective at best. This study aimed to evaluate the current M/P strategies within NI as perceived by NQR and Radiology Managers (RM).

Mosaic mentoring: finding the right mentor for the issue at hand
Abdominal Radiology, 2021
Mosaic mentoring is a new approach that emphasizes utilizing a collection of mentorship approaches to maximize outcomes based on individual and/or domain-specific needs. The purpose of our paper is to provide a brief overview of a variety of mentorship models while introducing the concept of mosaic mentoring and exploring how it can benefit radiologists throughout their career.

Musculoskeletal radiology training in the UK: a national survey by the British Society of Skeletal Radiologists
Clinical Radiology, 2021
Core MSK radiology training remains widely variable across the UK. 50% of core and 86% subspecialty trainees are satisfied with current exposure. 20% of core trainees report lack of US sessions or < 4 hours of weekly US in 56%. 95.5% core and all subspecialist trainees believe MSK training could be improved. Other healthcare professionals competing for US experience may impact training.

Providing a sustainable sonographer workforce in Australia: Clinical training solutions
Sonography, 2020
A three-round ranking-type Delphi analysis in conjunction with thematic analysis was used to develop and rank a list of potential solutions to the shortage of clinical placements. Participants were recruited purposively based on their roles in the field of sonography that involved management of students in clinical placements.

[Australia and New Zealand] Medical Physics Training, Education and Professional Recognition in Australia and New Zealand
Over the last forty years the Australasian College of Physical Scientists and Engineers in Medicine (ACPSEM) has developed a Training, Education and Assessment Program (TEAP) that provides medical physicists with a pathway to a career in radiation oncology, diagnostic imaging or nuclear medicine. The program is ambitious in its scope and aligned with international guidelines by IOMP and IAEA. More than 400 colleagues have so far been assessed by ACPSEM forming the foundation of better technical and scientific services to patients in Australia and New Zealand.

[South Africa] Structuring improved work environments for newly-qualified radiographers
Radiography, 2020
Four main themes emerged: interpersonal relations, support from fellow newly-qualified peers, departmental policies, and learning. Positive interpersonal relations were an essential component of the work environment; fellow newly-qualified radiographers at the same institution resulted in increased support; departmental policies needed to cater to the needs of new employees, and the environment must facilitate learning.

Supporting Newly Qualified Diagnostic Radiographers: Are We Getting It Right?
International Journal of Practice-Based Learning in Health and Social Care, 2020
The NHS is facing a rising demand in services and consequently, newly qualified practitioners are required to possess a much wider set of skills than ever before. In diagnostic radiography, this pressure is underpinned by the expanding role that diagnostic imaging now plays in many patient pathways.

[Sweden] Radiographers' academic development in Sweden: Towards and after a doctoral degree
Radiography, 2020
Compared to other Nordic countries, Sweden is at the forefront with a positive development in obtained high academic degrees. Nevertheless, there is an urgent need for post-doctorate radiographers in order to maintain the workforce to meet current and future demands. Radiographers with doctorates need to be consulted when planning research projects to establish a clear radiographic perspective. Swedish radiographers with a doctorate or licentiate have limited research time, indicating that Sweden may not invest enough in radiographic research.

Competencies and training of radiographers and technologists for PET/MR imaging - a study from the UK MR-PET network
European Journal of Hybrid Imaging, 2020
The report identified the need for establishing competencies for the PET/MRI workforce, particularly for technologists and radiographers. It also helped defining these competencies as well as identifying the demand for bespoke training and the development of local and national courses to be implemented to fulfil this new training need.

Advanced practice

Exploring enhanced level practice in radiography: A survey of awareness and implementation across the UK
Radiography, 2025
To encourage the adoption of enhanced-level practice in radiography, it is vital to provide the community with resources and support systems that enable them to comprehend and apply this level of practice, thereby delivering high-quality patient care and further advancing both the profession and its practitioners.

Advanced practice among diagnostic radiographers - An international survey
Radiography, 2024
Clear definitions of ARP tasks are necessary for seamless integration of ARP into current practices. Additionally, advocating for official recognition, and global acknowledgement by the profession and key stakeholders are imperative for DRs to fully develop in these areas.

Advanced practice in radiotherapy across Europe: stakeholders' perceptions of implementation and evolution
Radiography, 2024
Four overarching themes emerged: "AP drivers and outcomes", "AP challenges vs enablers", "Current vs future AP", "Becoming and being advanced practitioner".
Participants identified research as the neglected AP pillar due to a lack of protected time, limited staff skills, no research culture, no funding, workload, and clinical priorities. Interviewees highlighted the importance of consistency in job titles, harmonisation of education models and curricula, definition of AP requirements, and support for all AP pillars through job plans and workforce planning.

Role extension in advanced ultrasound practice: A framework approach and case study
BMUS, 2022
By defining and aligning the components of scope of practice, education/competency and governance, role development in ultrasound can be initiated and sustained. Role extension utilising this approach brings benefits for patients, clinicians and departments.

A personal journey to build leadership skills through collaboration to support radiography research and evidence-based practice
Journal of Medical Imaging and Radiation Sciences, 2022
The higher level of knowledge and competences and the medical imaging staff shortage, in some countries, opened the doors for advanced practice in radiography namely on leadership and management, education and training, research, audit, and service evaluation as well as clinical reporting of medical imaging examinations. Advanced practice promotes a shift from "task-oriented" towards "provision of high-quality care considering patient individual pathway", requiring more advanced studies and research to reach evidence-based practice, leadership, knowledge transfer, and clinical expertise.

Advanced practice roles of therapeutic radiographers/radiation therapists: A systematic literature review
Radiography, 2022
Three most-reported outcomes were: enhanced service capacity, higher patient satisfaction, and safety maintenance.

Diagnostic radiographer advanced clinical practice in the United Kingdom – A national cross-sectional survey
BJROpen, 2021
Diagnostic radiographer reporting and procedure-based roles in the NHS are varied and widespread. However, inconsistencies in fulfilment against the expected standards for advanced practice exist. Realignment of advanced-level roles to delineate enhanced and advanced clinical practice may ensure consistency between roles and professions. A requirement for accreditation as an advanced (clinical) practitioner with adherence to advanced practice requirements could therefore provide value to accreditation for both individual practitioners and Trusts.

Enhanced practice: A strategy to resolve the inconsistencies in advanced practice implementation
Radiography, 2021
Alongside the push to strengthen the impact of practitioners at the advanced level there is acknowledgement that many practitioners have higher clinical skills and are making a significant contribution to patient care and services. As such, a new level is emerging – enhanced practice.

An analysis of advanced and specialist posts in diagnostic radiography: Do job descriptions describe advanced practice?
Radiography, 2021
Utilisation of diagnostic radiographers as 'true' advanced clinical practitioners remains intermittent. Greater consistency in job descriptions is required to strengthen radiography advanced practice and support radiographer development.

Diversity in radiation therapist/therapeutic radiographer (RTT) advanced practice (AP) roles delivering on the four domains
Technical Innovations & Patient Support in Radiation Oncology, 2021
All three consultant RTTs have demonstrated expert practice with clear and transparent examples of their professional practice which evidence the four domains of consultant practice. Following two decades of AP practice for RTTs there is a need to be strategic in the development of future posts with a prospective view on succession planning that safeguards their longevity.

Radiographer advanced and consultant practice and community diagnostic hubs – a vision for the future
Radiography, 2021
It is acknowledged that some of these concepts are a combination of visionary and aspirational in outlook rather than being entirely based on current practice. The intention of this article, and the implications for practice, are to support on-going discussions to enable radiography, as a profession, to seek ways and opportunities to do things differently whilst ensuring that the patient remains at the centre of the services delivered.

Characterising the outcomes, impacts and implementation challenges of advanced clinical practice roles in the UK: a scoping review
BMJ Open, 2021
Most papers related to nursing, pharmacy, physiotherapy and radiography roles and these were referred to by a plethora of different titles. ACP roles were reported to be achieving beneficial impacts across a range of clinical and health system outcomes. They were highly acceptable to patients and staff. No significant adverse events were reported. There was a lack of cost-effectiveness evidence.

A literature review exploring the perceived impact, challenges and barriers of advanced and consultant practice in therapeutic radiography
Radiography, 2021
The literature found eleven studies that met the inclusion criteria and after critical appraisal, all were included in the analysis. Five key themes emerged from the analysis which is in keeping with the literature: education, quality of working life, patient care, benefit to healthcare and implementation obstacles.

An examination of Advanced Clinical Practice: Qualitative insights from therapeutic radiography advanced and consultant practitioners based in England
Technical Innovations & Patient Support in Radiation Oncology, 2021
Key findings from the focus groups indicated the need for standardisation in job descriptions, roles and responsibilities and a key understanding of career progression. The professional identity of the AP is acknowledged by independent, autonomous

working; however, this can only be facilitated if the correct training is undertaken and the necessary support structures are in place to enable career progression. Challenges associated with role development are 1) lack of career and pathway guidance, 2) lack of clear educational routes, 3) lack of standardised roles.

Reflections on leadership in advanced and consultant radiographic practice within the UK
Journal of Medical Imaging and Radiation Sciences, 2021
A clearer understanding of leadership is needed to help conceptualise and measure its impact at advanced and consultant levels of practice. The content is intended to provide an opportunity for reflection and discussion around the topic, serving as a development tool in practice.

The Role and Development of Advanced Clinical Practice Within Allied Health Professions: A Mixed Method Study
Journal of Multidisciplinary Healthcare, 2020
This is the first comprehensive profile of ACP roles across AHPs and indicates that these roles are already having a positive impact on healthcare services and supporting new models of care. However, establishing the necessary infrastructure, standardization and governance for ACP roles across sectors, along with the career pathways, funding, sustainability and education, could increase impact in the future.

Workforce diversity, equality and inclusion

The role of women in imaging: the evidence
British Journal of Radiology, 2025
This article examines the evidence for women in various roles, explores why having women in positions of influence is important, and looks at trends in the data. The recent move away from Equality, Diversity and Inclusion (EDI) is disappointing as this affirmative action did help greater numbers of women into senior roles. It is clear there are many opportunities for professional women to step up and we should encourage and support them to do so.

Towards a More Inclusive Future: A Comprehensive Assessment of Gender Diversity in Nuclear Medicine Education, Training and Workforce
Seminars in Nuclear Medicine, 2024
Ways of addressing inequalities includes ensuring female participation at all levels of education and training and promoting the field at undergraduate level in medical school. Mentorship programs have demonstrated great success in guiding and supporting women at various stages of their careers. Therefore, there is a need for their expansion and enhancement. Furthermore, female role models play a pivotal role in shattering gender stereotypes and inspiring other women to pursue careers in nuclear medicine and its related fields.

[United States] Women in the Medical Physics Workforce: Insights from Membership Trends of the American Association of Physicists in Medicine, 1993 to 2023
International Journal of Radiation Oncology*Biology*Physics, 2024
Women remain underrepresented in medical physics in the United States, and determinants of persisting disparities remain unclear. Here, we performed a detailed investigation of American Association of Physicists in Medicine (AAPM) membership trajectories to evaluate trends in Full membership with respect to gender, age, and highest degree.

[United States] Equity, Diversity, and Inclusion Are Essential in Medical Physics
International Journal of Radiation Oncology*Biology*Physics, 2023

A series of highly publicized and racially charged deaths, against the backdrop of a novel viral pandemic unprecedented in modern times, prompted a social reckoning in the United States that put a spotlight on the true costs of racial and social inequity in this country. Since the summer of 2020, several fields in the United States have begun to review their practices regarding equity, diversity, and inclusion (EDI).

How We Got Here: The Legacy of Anti-Black Discrimination in Radiology
Radiographics, 2023
Institutional interventions include implementing community-based outreach and applying antibias methodology in artificial intelligence algorithms, while systemic interventions include identifying national race-based quality measures and ensuring imaging guidelines properly address the unique cancer risks in the Black patient population. These approaches reflect some of the strategies that may mutually serve to address health care disparities in radiology.

Is it still a genuine occupational requirement to have a female only mammographic workforce in breast screening?
Radiography, 2023
In conclusion, this discussion raises important questions.
1. How representative is our mammography workforce in the face of evolving demographics and gender diversity?
2. Is maintaining a female-only mammographic workforce still a genuine occupational requirement in light of evolving societal norms and the call for equitable healthcare practices?

Diversity and Professional Advancement in Medical Physics
Advances in Radiation Oncology, 2023
Diversity within medical physics is limited. Proactive policy should be implemented to ensure diverse, equitable, and inclusive representation within research activities, roles representative of PA, and the profession at large.

Why and How to Increase Diversity in the Radiology Trainee Workforce
Radiographics, 2022
In this editorial, we describe the current state of diversity in radiology, potential challenges, and solutions to increase diversity in the field and suggest ways for radiology departments to showcase their commitment to diversity, equity, and inclusion (DEI) to prospective trainee and faculty applicants.

Women in Medical Physics and Biomedical Engineering: past, present and future
Health and Technology, 2022
Women in Medical Physics and Biomedical Engineering (WiMPBME) is a Task Group established in 2014 under the International Union of Physical and Engineering Scientists in Medicine (IUPESM). The group's main role is to identify, develop, implement, and coordinate various tasks and projects related to women's needs and roles in medical physics and biomedical engineering around the world.

[Australia] Analysis of gender in radiology in Australia and its importance to the profession and workforce planning
Journal of Medical Imaging and Radiation Oncology, 2022
Women are underrepresented in interventional and neurointerventional radiology. There is more self-reported subspecialty interest in breast and women's imaging. A review of the literature demonstrated a similar situation in comparable countries. We also considered the reasons, potential solutions for this, and knowledge gaps where research is needed.

[United States] Strategies to Improve Racial and Ethnic Diversity in Breast Imaging Training and Beyond
Journal of Breast Imaging, 2022
This lack of URM radiology resident representation leads to a lack of URM potential applicants to breast imaging fellowships due to the pipeline effect. Strategies to improve diversity and inclusion in breast imaging include recruiting a diverse breast imaging workforce, establishing robust mentorship and sponsorship programs, fostering an inclusive training and workplace environment, and retaining and promoting a diverse workforce.

Impact of COVID-19

Factors associated with medical radiation and imaging professionals' willingness to work during the SARS-COV-2 pandemic: A cross-sectional study
Journal of Medical Imaging and Radiation Sciences, 2023
Willingness was associated with job role and levels of personal distress. Personal distress was higher in participants with less years of practice. Interventions to reduce personal distress in early career MRIPs may enhance willingness to work during crises and thereby support HSR.

"It has been the most difficult time in my career": A qualitative exploration of UK obstetric sonographers' experiences during the COVID-19 pandemic
Radiography, 2023
Survey respondents' self-reported experiences of ineffective leadership and management, and perceived lack of understanding of the complexity of the sonographer role are potential contributory factors in the high levels of moral injury and occupational burnout reported within the workforce during the pandemic.

Pandemic preparedness of diagnostic radiographers during COVID-19: A scoping review
Radiography, 2023
Four themes that reflected pandemic preparedness were extrapolated: infection control and prevention, knowledge and education, clinical workflow, and mental health. Notably, the findings highlighted pronounced trends in adaptation of infection protocols, adequate infection knowledge, and pandemic-related fears. However, inconsistencies in the provision of personal protective equipment, training, and psychological support were revealed.

[South Africa] Experiences of Radiographers during the COVID-19 Pandemic: A Qualitative Systematic Review
International Journal of Medical Reviews, 2023
Radiographers, like many other healthcare professionals, faced information, fear, anxiety, and heightened mental issues. Despite these challenges, some radiographers complained about a lack of adequate support. We hope that this review will enhance the understanding of the experiences of radiographers during pandemics so as to create specific support mechanisms and also prepare for future pandemics or health crises.

UK obstetric sonographers' experiences of the COVID-19 pandemic: Burnout, role satisfaction and impact on clinical practice
Ultrasound, 2022
Job and context-specific interventions are required to mitigate burnout and its consequences on the workforce and service provision beyond the pandemic.

Experiences of diagnostic radiographers through the Covid-19 pandemic
Radiography, 2022
The adaptability of radiographers came across strongly in this study. Anxieties attributed to the provision of personal protective equipment (PPE), fear of contracting the virus and spreading it to family members were evident. The resilience of radiographers working throughout this pandemic came across strongly throughout this study. A significant factor for coping has been peer support from colleagues within the workplace. The study highlighted the lack of understanding of the role of the radiographer and how the profession is perceived by other health care professionals.

The challenges, coping mechanisms, and recovery from the initial waves of the COVID-19 pandemic among academic radiographers
Radiography, 2022
These data demonstrate a multitude of challenges for academic radiographers and the pressure they worked under during the first year of the COVID-19 pandemic was clear. However, the majority employed healthy coping strategies to help them deal with the pressure, uncertainty and trauma of the situation.

The impact of the COVID-19 pandemic on clinical guidance and risk assessments, and the importance of effective leadership to support UK obstetric sonographers
Journal of Medical Imaging and Radiation Sciences, 2022
Obstetric sonographers will need support from the wider service team and professional organisations to facilitate post-pandemic recovery of the workforce. Formal clinical supervision programmes may be beneficial in facilitating a more holistic approach to peer-support, although there is currently limited evidence of their use in sonographic practice.

Towards describing the global impact of the COVID-19 pandemic on clinical radiography education: A systematic review
Journal of Medical Imaging and Radiation Sciences, 2022
Globally, radiography students experienced several challenges, especially during the initial acute phase of the pandemic. The pandemic-related challenges identified in this review could negatively influence the radiography student attrition rates, consequently worsening the existing radiography workforce shortage. Thus, urgent institutional level support systems and interventions would be necessary to mitigate the pandemic impact and improve the students' learning experience.

The global impact of the COVID-19 pandemic on clinical radiography practice: A systematic literature review and recommendations for future services planning
Radiography, 2021
Globally, most radiographers received inadequate training for managing COVID-19 patients during the initial acute phase of the pandemic. Additionally, there were significant changes to clinical practice, working patterns and perceived increase in workload due to surges in COVID-19 patients and the consequent strict adherence to new infection protocols. These changes, coupled with fear emanating from the increased risk of the workforce to contracting the infection, contributed to anxiety and workplace-related stress during the pandemic.

Impact of COVID-19 on nuclear medicine in the UK
Nuclear Medicine Communications, 2021
There was a 65% reduction across all services; 97.6% of respondents reported some reduction in diagnostic procedures and 71.3% reduction in therapies; 85% worked with a reduced workforce.

Role of digital pathology in diagnostic histopathology in the response to COVID-19: results from a survey of experience in a UK tertiary referral hospital
Journal of Clinical Pathology, 2021
The COVID-19 pandemic has challenged our diagnostic services at a time when many histopathology departments already faced a diminishing workforce and increasing workload. Digital pathology (DP) has been hailed as a potential solution to at least some of the challenges faced. We present a survey of pathologists within a UK National Health Service cellular pathology department with access to DP, in which we ascertain the role of DP in clinical services during this current pandemic and explore challenges encountered.

Impact of the COVID-19 pandemic on radiography practice: findings from a UK radiography workforce survey
BJR Open, 2020
A total of 522 responses were received, comprising n = 412 (78.9%) diagnostic and n = 110 (21.1%) therapeutic RW categories from across the UK. 12.5% (65/522) of the respondents were redeployed. Redeployment did not appear to contribute (p = 0.31) to work-related stress. However, fear of contracting the infection and perceived inadequate personal protective equipment (PPE) were identified as key contributors to stress during the study period. Compared to the therapeutic RW, a significantly higher proportion of the diagnostic RW identified fear of being infected as a major stressor (166/412 (40.3%) vs 30/110 (27.3%), p = 0.01).

Escalation and de-escalation of the radiology response to COVID-19 in a tertiary hospital in South London: The King's College Hospital experience
British Journal of Radiology, 2020
The purpose of this manuscript is to present the steps that the Radiology Department of a large urban tertiary facility with a local vulnerable population, undertook to adapt the imaging service and structure, both initially escalating and then de-escalating a response to the COVID-19 pandemic. A step-by-step management strategy, effective and sustained staff deployment, imaging management are presented and discussed, to provide a guide for managing a major incident in a radiology department.

Early experiences of radiographers in Ireland during the COVID-19 crisis
Insights into Imaging, 2020
Clear communication regarding changing protocols and importantly patients' infectious status are essential to safeguard healthcare workers and to minimise unnecessary anxiety and distress. Attention is required to staff mental health including the identification of burnout symptoms to prevent long-term negative consequences of the pandemic on radiography services.

Post–COVID-19 New Normal for Molecular Imaging Departments: A United Kingdom Perspective
Journal of Nuclear Medicine Technology, 2020
Coronavirus disease 2019 has changed the way the world is navigated and has had a massive impact on health care. Depending on where you are in the world, the guidance on dealing with potential infected patients is varied. With the high risk of a second wave, it is important to learn from initial responses to plan for the future. With proper preparation, it is possible to minimize exposure and risk of contamination to individuals visiting molecular imaging departments. Such precautions will help departments operate at full capacity. From the widespread nature of this pandemic, a global perspective can be useful; what follows is the United Kingdom's perspective.

Community Diagnostic Hubs (CHDs)

CDCs unveiled: challenges and triumphs
The Royal College of Radiologists, 2024
Following an inquiry into Community Diagnostic Centres (CDCs), the All-Party Parliamentary Group for Diagnostics has published its first report. CDCs are multi-diagnostic facilities created to bolster local diagnostic capacity; enhance patient access, experience and outcomes; alleviate hospital burden; and address regional disparities in healthcare. They provide a range of imaging, endoscopy, physiological science and pathology services.

Community Diagnostic Centres 'in danger of being sunk by political incompetence,' warns SoR
Society of Radiographers, 2024
An independent report into the Community Diagnostic Centre programme has revealed that the scheme has been hampered by staff shortages, digital infrastucture, and choice of locations.

What is the effectiveness of community diagnostic centres: a rapid review
International Journal of Public Health, 2024
The evidence of effectiveness appeared mixed. There is evidence to suggest diagnostic centres can reduce various waiting times and reduce pressure on secondary care. However, cost-effectiveness may depend on whether the diagnostic centre is running at full capacity. Most included studies used weak methodologies that may be inadequate to infer effectiveness.

Community diagnostic centres: what, where and why?
British Journal of Healthcare Management, 2023
The British Journal of Healthcare Management's editor discusses the potential benefits of community diagnostic centres for patients and the wider NHS, along with key considerations to drive this model forward.

Radiographer advanced and consultant practice and community diagnostic hubs – a vision for the future
Radiography, 2021
It is acknowledged that some of these concepts are a combination of visionary and aspirational in outlook rather than being entirely based on current practice. The intention of this article, and the implications for practice, are to support on-going discussions to enable radiography, as a profession, to seek ways and opportunities to do things differently whilst ensuring that the patient remains at the centre of the services delivered.

Community Diagnostic Hubs (CDHs) in London
Ipsos and Imperial College Health Partners, 2021
The COVID-19 pandemic has amplified existing issues with diagnostic services, with an increase in the number of patients experiencing a wait of more than six weeks due to factors such as reduced staff capacity, lower attendance and referrals, and infection control measures. Community Diagnostic Hubs (CDHs) are a new initiative of the NHS aimed at building capacity for more diagnostic testing in England and relieving pressure on hospitals in relation to diagnostic testing. They are to be multi-diagnostic facilities, separate from acute hospitals and placed in local communities. The concept of CDHs originated from Professor Sir Mike Richards' Independent Review of Diagnostic Services for NHS England in November 2020.

Community diagnostic centres: bringing diagnostics closer to home
British Journal of General Practice, 2021
In October 2021, NHS England announced the creation of 40 new community diagnostic centres in England. The aims are to create faster, more direct access to diagnostic testing, divert

patients from hospital to reduce waiting times and the spread of COVID-19, and tackle the backlog of diagnostic activity created by the pandemic. GPs will be able to refer patients to local centres directly for diagnostic tests and reduce the need for hospital outpatient visits.

Leadership and management

A Shared Governance Model: Implementation Into the Sonographer Workforce
Journal of Diagnostic Medical Sonography, 2024
A shared governance structure is not a buzz word, but rather a progressive set of actions that empowers employees. Shared governance is an innovative organizational management model; it is the structure for the process of shared decision-making and outcomes of shared leadership.

Leadership in imaging services
Society of Radiographers, 2023
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.

[United States] Leadership: Causing and Curing Burnout in Radiology
Journal of the American College of Radiology, 2023
Burnout in US radiology has reached crisis proportions. Leaders play critical roles in both causing and preventing burnout. This article will review the current state of the crisis and how leaders can work to stop causing burnout as well as developing proactive strategies for preventing and mitigating burnout.

The Society of Radiographers pilot leadership mentoring scheme
Journal of Medical Imaging and Radiation Sciences, 2022
In order to support and encourage the progression of our members into higher leadership positions the Society of Radiographers has initiated a pilot leadership mentoring scheme. The pilot was launched in June 2022 with a small cohort of ten mentor and mentee pairs.

The impact of the COVID-19 pandemic on clinical guidance and risk assessments, and the importance of effective leadership to support UK obstetric sonographers
Journal of Medical Imaging and Radiation Sciences, 2022
Obstetric sonographers will need support from the wider service team and professional organisations to facilitate post-pandemic recovery of the workforce. Formal clinical supervision programmes may be beneficial in facilitating a more holistic approach to peer-support, although there is currently limited evidence of their use in sonographic practice.

A personal journey to build leadership skills through collaboration to support radiography research and evidence-based practice
Journal of Medical Imaging and Radiation Sciences, 2022
The higher level of knowledge and competences and the medical imaging staff shortage, in some countries, opened the doors for advanced practice in radiography namely on leadership and management, education and training, research, audit, and service evaluation as well as clinical reporting of medical imaging examinations [7, 8]. Advanced practice promotes a shift from “task-oriented” towards “provision of high-quality care considering patient individual pathway”, requiring more advanced studies and research to reach evidence-based practice, leadership, knowledge transfer, and clinical expertise.

Leadership that puts people first
Journal of Medical Imaging and Radiation Sciences, 2022
My name is Gemma, and I am a 37-year-old UK-based radiographer working within the national healthcare service (NHS). My career started in a conventional manner; a university degree in diagnostic radiography that led to a rotational role working in plain film imaging, interventional radiography, CT and MRI. Having completed a master's qualification in MRI and many continuous personal development (CPD) activities later, I am now a part-time deputy MRI lead radiographer alongside being a part-time research radiographer.

[United States] How Radiology Leaders Can Address Burnout
Journal of the American College of Radiology, 2021
In this article, common misperceptions that may contribute to radiology practice leaders not addressing burnout are described, followed by outlining practical skills that leaders should develop to effectively address burnout.

Reflections on leadership in advanced and consultant radiographic practice within the UK
Journal of Medical Imaging and Radiation Sciences, 2021
A clearer understanding of leadership is needed to help conceptualise and measure its impact at advanced and consultant levels of practice. The content is intended to provide an opportunity for reflection and discussion around the topic, serving as a development tool in practice.

[Canada] Leadership Development Programs for Radiology Residents: A Literature Review
Canadian Association of Radiologists Journal, 2021
The review highlighted a paucity of published literature describing leadership development efforts within radiology residency programs. The heterogeneity of programs highlighted the need for guidance from regulatory bodies regarding delivery of leadership curricula.

Leadership skills in radiology: five basic principles
Translational Pediatrics, 2021
Leaders lead the way. They inspire and ignite in teams the desire to ‘Be More and Do More’. They are recognized for the zeal they possess to have enhanced outcomes each time, every time. Ever so often, all we need is a different way to look at things.

Crisis Leadership During and Following COVID-19
Canadian Association of Radiologists Journal, 2020
Firstly, leadership is not confined to those at the top of the organizational chart; we all lead every day, be it at home, in our communities, or within our profession, so such skills apply to us all. The first step is summed up nicely by the expression, “Failing to prepare is preparing to fail.”

[Australia and UK] Examining the Relationship between Emotional Intelligence, Leadership Attributes and Workplace Experience of Australian Chief Radiographers
Journal of Medical Imaging and Radiation Sciences, 2020
This study demonstrated relationships between years of experience, hospital size, EI, and leadership behaviours of Australian chief radiographers. Overall, increasing years of experience as a chief radiographer was associated with a reduction across some EI and LSAT factors. The findings could be used as a starting point to provide increased support to senior leaders of the profession to aid leadership and job performance.

How do consultant radiographers contribute to imaging service delivery and leadership?
British Journal of Healthcare Management, 2019
Consultant radiographer numbers remain low despite the ongoing capacity challenges in diagnostic imaging. This is compounded by the limited evidence of how such roles can positively impact on service delivery, particularly in relation to their leadership expectations.

Artificial Intelligence, Machine Learning, and other technological innovations

Medical students' perceptions of an artificial intelligence (AI) assisted diagnosing program
Medical Teacher, 2024
Students expressed future positive outlooks involving AI-assisted diagnosing systems in healthcare, provided strict regulations, are set to protect patient privacy and safety, address legal liability, remove system biases, and improve quality of patient care. In conclusion, first year medical students are aware that AI will play a role in their careers as students and future physicians.

Workforce Crisis in Radiology in the UK and the Strategies to Deal With It: Is Artificial Intelligence the Saviour?
Cureus, 2023
We highlight the benefits of AI tools in improving efficiency and patient safety. AI has a role along the patient's entire journey from the clinician requesting the appropriate radiological investigation, safe image acquisition, alerting the radiologists and clinicians about critical and life-threatening situations, cancer screening follow up, to generating meaningful radiology reports more efficiently. It has great potential in easing the workforce crisis and needs rapid adoption by radiology departments.

Disparities in Breast Cancer Diagnostics: How Radiologists Can Level the Inequalities
Cancers, 2023
In the era of artificial intelligence, this paper emphasizes the necessity of validating its models across a spectrum of populations to prevent bias and achieve equitable healthcare outcomes. Finally, the importance of international collaboration is illustrated, showcasing its role in sharing insights and strategies to overcome global access barriers in medical imaging. Overall, this paper offers a comprehensive overview of the challenges related to disparities in medical imaging access and proposes actionable strategies to address these challenges, aiming for equitable healthcare delivery.

Applications of artificial intelligence in clinical management, research, and health administration: imaging perspectives with a focus on hemophilia
Expert Review of Hematology, 2023
In this paper, concepts, perks, and quirks of the use of artificial intelligence (AI), machine learning (ML), and deep learning are reviewed within clinical and research contexts of hemophilia and other blood-induced disorders' patient care, targeted to the imaging diagnosis of hemophilic joints, under the perspective of different stakeholders (radiologists, hematologists, nurses, physiotherapists, technologists, researchers, managers, and patients/caregivers).

Blinded, randomized trial of sonographer versus AI cardiac function assessment
Nature, 2023
The AI-guided workflow saved time for both sonographers and cardiologists, and cardiologists were not able to distinguish between the initial assessments by AI versus the sonographer (blinding index of 0.088). For patients undergoing echocardiographic quantification of cardiac function, initial

assessment of LVEF by AI was non-inferior to assessment by sonographers.

Artificial intelligence: a new field of knowledge for nephrologists?
Clinical Kidney Journal, 2023
In short, AI holds the promise of advancing personalized medicine to new levels. While AI has tremendous potential, there are also significant challenges to its implementation, including data access and quality, data privacy and security, bias, trustworthiness, computing power, AI integration and legal issues. The European Commission's proposed regulatory framework for AI technology will play a significant role in ensuring the safe and ethical implementation of these technologies in the healthcare industry. Training nephrologists in the fundamentals of AI is imperative because traditionally, decision-making pertaining to the diagnosis, prognosis and treatment of renal patients has relied on ingrained practices, whereas AI serves as a powerful tool for swiftly and confidently synthesizing this information.

An AI-powered navigation framework to achieve an automated acquisition of cardiac ultrasound images
Scientific Reports, 2023
Results suggest that achieving an automated echocardiography system is feasible using the proposed framework. The long-term vision is of a widely accessible and accurate heart imaging capability within hospitals and community-based settings that enables timely diagnosis of early-stage heart disease.

Cost-effectiveness requirements for implementing artificial intelligence technology in the Women's UK Breast Cancer Screening service
Nature Communications, 2023
We developed a simulation model replicating NHS screening services to evaluate the potential value of the technology. Our results indicate that if non-inferiority is maintained, the use of artificial intelligence technology as a second reader is a viable and potentially cost-effective use of NHS resources.

[Australia] The application of artificial intelligence in the sonography profession: Professional and educational considerations
Ultrasound, 2022
A key recommendation is for the sonography community to address ultrasound education, particularly how AI knowledge could be incorporated into university education. This is an important consideration that should be extended to practising professionals as they may be involved in evaluating the efficiency and methodologies used in new research that may incorporate AI technologies.

No sonographer, no radiologist: Assessing accuracy of artificial intelligence on breast ultrasound volume sweep imaging scans
PLoS Digital health, 2022
Integration of artificial intelligence and VSI could allow both acquisition and interpretation of ultrasound images without a sonographer and radiologist. This approach holds potential for increasing access to ultrasound imaging and therefore improving outcomes related to breast cancer in low- and middle- income countries.

Radiographers' knowledge, attitudes and expectations of artificial intelligence in medical imaging
Radiography, 2022
Overall positive attitudes towards AI implementation were observed. The slight apprehension may stem from the lack of technical understanding of AI technologies and AI training within the community. Greater educational programs focusing on AI principles are required to help increase European radiography workforce engagement and involvement in AI technologies.

An Artificial Intelligence–based Mammography Screening Protocol for Breast Cancer: Outcome and Radiologist Workload
Radiology, 2022
Artificial intelligence (AI)–based screening could detect normal, moderate-risk, and suspicious mammograms in a breast cancer screening program, which may reduce the radiologist workload. AI-based screening performed consistently across breast densities.

Remote scanning support in magnetic resonance imaging: Friend or foe?
Radiography, 2022
As an early evaluation of practitioner views on remote scanning within MRI, the results highlight the areas that would benefit from further development before further roll out in practice. A clear vision of its use and robust governance is needed to effectively support its implementation and acceptance by radiographers.

UK reporting radiographers' perceptions of AI in radiographic image interpretation – Current perspectives and future developments
Radiography, 2022
Responses indicate that AI will have a strong impact on reporting radiographers' decision making in the future. Respondents are confident in how an AI makes decisions but less confident explaining this to others. Trust levels could be improved with explainable AI solutions.

Artificial Intelligence and the Medical Physicist: Welcome to the Machine
Applied Sciences, 2021
AI can extend the expertise area of MPs, extracting even more information to improve patient care, and the MP is ready to welcome the AI revolution. On the other hand, the MPs' knowledge and skills will be required and beneficial for safe and optimal implementation of AI, especially in radiological sciences, and their involvement in the multidisciplinary AI team is crucial.

Beauty Is in the AI of the Beholder: Are We Ready for the Clinical Integration of Artificial Intelligence in Radiography? An Exploratory Analysis of Perceived AI Knowledge, Skills, Confidence, and Education Perspectives of UK Radiographers
Digital Health, 2021
Knowledge of AI terminology, principles, and applications by healthcare practitioners is necessary for adoption and integration of AI applications. The results of this survey highlight the perceived lack of knowledge, skills, and confidence for radiographers in applying AI solutions but also underline the need for formalised education on AI to prepare the current and prospective workforce for the upcoming clinical integration of AI in healthcare, to safely and efficiently navigate a digital future. Focus should be given on different needs of learners depending on age, gender, and highest qualification to ensure optimal integration.

Impact of artificial intelligence on clinical radiography practice: Futuristic prospects in a low resource setting
Radiography, 2021
Some of the barriers to AI integration into radiographic practice relate to lack of regulatory and legal policy frameworks and limited resource availability including unreliable internet connectivity and low expert skillset.

Students and university education

Graduate competencies, employability and the transnational Radiography workforce shortage: A systematic literature review of current pre-registration Radiography education and training models
Radiography, 2024
The findings highlight and advocate for an innovative model for Radiography education and underscores the significance of graduates possessing multi-modality skills, varied competencies, and effective accreditation processes for training. Prioritising alignment with industry needs and holistic skill development is vital to closing the employability gap, ultimately improving graduate skills and competencies to address workforce shortage while improving patient care outcomes.

Survey of clinical placements within pre-registration diagnostic radiography programmes in the UK and Ireland
Radiography, 2023
The collective engagement and innovation of higher education institutions and service providers will be needed to create sustainable quality models of clinical training and assessment to meet diagnostic radiography workforce requirements.

Attracting the next generation of radiologists: a statement by the European Society of Radiology (ESR)
Insights into Imaging, 2022
Faculties of medicine, but also national and international societies such as the European Society of Radiology have an important role to play in showcasing radiology and attracting the next generation of radiologists. Radiologists should participate in the design of local undergraduate programmes and dedicated Bachelor or Masters imaging programmes can provide an opportunity for in depth study of radiology practice, latest innovations and research. Mentorship of medical students by radiologists can improve engagement in the specialty, as well as stressing the importance of the radiologist's role for diagnosis and clinical decision making and discussing other job aspects that require clinical skills, e.g., interventional procedures or involvement in multidisciplinary tumour boards. Undergraduate radiology societies enable greater engagement with medical students to promote the specialty.

First year student radiographers' perceptions of a one-week simulation-based education package designed to increase clinical placement capacity
Radiography, 2022
A successful, engaging simulation-based education package is presented, which first year student radiographers perceived as a suitable replacement for one-week of clinical placement. Further research into the acceptability of use of simulation-based education packages in second- and third-year student radiographers would be a useful next step.

Degree apprenticeships for the radiography profession; are clinical departments ready?
Radiography, 2022
Recommendations were formulated to increase awareness, understanding and employment of apprentices. Further clarity was needed on the role of mentors and the academic and practice education split and strong collaborations between clinical departments and higher education institutions was imperative.

Work readiness attributes: Comparative views of clinical supervisors and final year sonography students
Sonography, 2021
Student results rated 'works as a team', 'technical knowledge', and 'communication with a range of people' to be of the highest

importance whilst clinical supervisors felt ‘communication with a range of people’, ‘seeks support’, ‘technical knowledge’, and ‘clinical reasoning’ were vital for new graduates. Both groups agreed ‘communication with a range of people’ and ‘seeks support’ were important skills.

[United States] Quality Improvement Initiatives in Sonography Education: A Review of the Literature
Journal of Diagnostic Medical Sonography, 2021
Much of the contemporary sonography educational literature focuses on clinical, lab, or didactic quality improvement initiatives. Overall, it is clear that more research is needed in the field of sonography education. This review provides examples of quality initiative research in other allied health fields that can be useful guides for future sonography educational research.

A study to investigate undergraduate diagnostic radiographer preferences and expectations of clinical role development: Quantitative findings
Radiography, 2021
Other than a larger percentage having A-level as their highest qualification, the participant demographics were similar to the UK radiography workforce. Reporting, CT, MRI and ultrasound are the specialisation preferences of final year undergraduate diagnostic radiography students. Expectations for the timeline of role development were slightly more ambitious than previously found.

Education of Radiologists in Healthcare Disparities
Clinical Imaging, 2021
At the individual level, educating radiologists, understanding individual contribution to disparities, developing radiology-specific cultural competency training, and increasing awareness of political action committees is needed. At the institutional level, embracing the concept of systemic change through reevaluation of goals and incentives and creating new mandated requirements addressing disparities with outcomes measures would be an initial start. At the national level, leveraging radiology organizations to co-sponsor an annual national meeting on radiological disparities based on diversity would enable an open forum of discussion among a diverse group of radiologists.

Educational Strategies to Achieve Equitable Breast Imaging Care
Journal of Breast Imaging, 2021
While patient-, provider-, and system-level initiatives are necessary to overcome disparities, our purpose is to describe educational strategies targeted to breast imaging radiologists at all levels to provide equitable care to a diverse population. These strategies may include, but are not limited to, diversifying the breast imaging workforce, understanding the needs of a diverse population, cultural sensitivity and bias training, and fostering awareness of the existing issues in screening mammography access, follow-up imaging, and clinical care.

Ultrasound clinical teaching capacity in England: A scoping exercise
Radiography, 2020
The survey supported previous publications that have shown sonographer shortages in England and this is predicted to increase over the next five years. Departments were teaching a similar number of sonographers as other health care professionals. Many experienced competing demands, which challenged their ability to increase clinical capacity.

Trailblazers: Stakeholder motivations for developing degree apprenticeships for the radiography profession
Radiography, 2020
Whilst the benefits on recruitment and retention of staff through widening participation were acknowledged, there were concerns around apprentice pay and mentorship. Evidence of professional protectionism was uncovered, balanced by professional pride and a strong desire for team working within and between institutions.

Workforce perspectives and experiences

The imaging support workforce: Stakeholder perceptions of role, impact and career progression
Radiography, 2025
The SWAP workforce was consistently recognised as crucial for maintaining operational efficiency and enhancing patient care. Four overarching themes emerged: (1) operational efficiency and service impact, where SWAPs were critical in optimising workflows; (2) roles and responsibilities, recognising both role clarity and ambiguity leading to role strain; (3) career progression, support, and training, highlighting opportunities yet significant barriers to advancement; and (4) workforce dynamics and job satisfaction, where high job satisfaction contrasted with challenges in role stability and professional recognition.

"Making it work in the face of extreme adversity" - Exploring perceptions for the future of the imaging and oncology workforce using 'soundbite' interviews
Radiography, 2025
The current workforce perceives a greater number of threats/risks for the future than potential opportunities/solutions. In particular, burnout and staff attrition were the most frequent perceptions of risk, though role development was often highlighted as the biggest opportunity. Interestingly AI and technology were frequently considered both opportunity and threat.

Radiographers' insights on the impact of their potential role in image interpretation within a low resource setting
Radiography, 2024
Theme one revealed the potential for enhanced healthcare delivery through improved diagnostic support, bridging radiologist shortages, career development and fulfilment as positive outcomes of role extension. Theme two revealed possible implementation hurdles including radiographer resistance and reluctance, limited training, lack of professional trust, and legal and ethical challenges.

Understanding experiences of the radiography workforce delivering medical imaging as part of patients' end of life care: An exploratory qualitative interview study
Radiography, 2024
There is a clear need to develop policy and education to support the radiography workforce to ensure care is appropriately identified and adapted to those nearing the end of life. Furthermore, staff support and wellbeing needs to be considered.

Professional identity and role perception of Radiographers and Clinical Technologists in Nuclear Medicine – An exploratory qualitative study
Radiography, 2024
Four themes were identified: "Becoming the Unexpected" which detailed various training pathways; "Caring with Science" which described the NMT's role and defined their PI; "Same View, Different Lens" which portrayed how Radiographers and Clinical Technologists practise as team of NMT's; and "Confirmation of Professional Self" which presented how individuals view their professional status.

What makes a good clinical practice experience in radiography and sonography? An exploration of qualified clinical staff and student perceptions
Radiography, 2024
Four key themes emerged: 1) favourable/unfavourable traits, 2) creating an optimal learning environment 3) challenges and 4) considerations for clinical education. Key factors for a positive learning experience included clinical supervisors being approachable, whilst encouraging and empowering students. Qualified radiography/sonography clinical staff highlighted student motivation as an important aspect for successful placement learning.

Sonographers' perspectives on research – A worldwide online questionnaire study
Radiography, 2024
Most sonographers work in large hospitals, and half of them have obtained academic level 7 education. A limited number of sonographers have published peer reviewed papers. Many sonographers expressed an interest in research. This suggests a potential for future development of the sonographers' role in research.

Job satisfaction among general radiographers and assistant practitioners: a mixed-methods survey
British Journal of Healthcare Management, 2023
Strategies are needed to understand and address issues that may be causing more experienced radiography staff to experience less happiness in their job role. Lack of experience in computed tomography and fluoroscopy also needs to be addressed, possibly by ensuring that radiography staff regularly work in these areas to build their confidence.

Evidence based practice, research and the diagnostic radiographer role. An exploration of engagement, expectations and attitudes at a single centre
Radiography, 2023
A strong evidence-based culture needs to be prioritised, to embrace the current enthusiasm from radiographers to engage, and accordingly bridge the gap between aspirations of their professional body and actual clinical practice.

Expectations of radiographer reporting roles: A multimethod evaluation across a single imaging network
Radiography, 2023
Inconsistent development and utilisation of radiographers in such roles may hamper collaboration and service delivery across a network. Identifying variation and working towards role standardisation could promote cross-organisational working and improve career progression opportunities.

[Saudi Arabia] Perspectives of radiographers on the emergence of artificial intelligence in diagnostic imaging in Saudi Arabia
Insights into Imaging, 2022
Radiographers were generally positive about introducing AI to radiology departments. To integrate AI successfully into radiology departments, radiographers need training programs, transparent policies, and motivation.

Radiographers' knowledge, attitudes and expectations of artificial intelligence in medical imaging
Radiography, 2022
Overall positive attitudes towards AI implementation were observed. The slight apprehension may stem from the lack of technical understanding of AI technologies and AI training within the community. Greater educational programs focusing on AI principles are required to help increase European radiography workforce engagement and involvement in AI technologies.

Difficulties associated with Reporting Radiographer working practices – A narrative evidence synthesis
Radiography, 2022
Governance in many centres would benefit from renewal and standardisation, particularly relating to scopes of practice and performance monitoring audits. Measures are also required to encourage compliance with guidance, address staffing issues and reduce variation between centres. Failure to address these issues has the potential to impair collaboration, delay patient care and increase economic inefficiencies whilst negatively impacting satisfaction for service users and staff.
Lack of involvement in professional development, education and research suggests Reporting Radiographers are not accomplishing their full potential, educating the next generation of the reporting workforce and driving evidence-based change for further development of the specialism.

UK reporting radiographers' perceptions of AI in radiographic image interpretation – Current perspectives and future developments
Radiography, 2022
Responses indicate that AI will have a strong impact on reporting radiographers' decision making in the future. Respondents are confident in how an AI makes decisions but less confident explaining this to others. Trust levels could be improved with explainable AI solutions.

"There's Not Enough Bodies to Do the Demand:" An Exploration of Key Stakeholder Views on the Role of Health Service Capacity in Shaping Cancer Outcomes in 7 International Cancer Benchmarking Partnership Countries
International Journal of Health Policy and Management, 2022
We identified 3 themes as important in shaping cancer outcomes: primary care and access to diagnostic evaluation, specialist care and access to treatment, and workforce pertaining to diagnostic and treatment phases. Improved infrastructure for diagnosis and treatment had improved cancer outcomes in all jurisdictions. However, this was seen as insufficient if staffing was inadequate.

Exploring the perceptions of advanced practitioner radiographers at a single breast screening unit in extending their role from delivering benign to malignant biopsy results; a preliminary study
British Journal of Radiology, 2021
The findings indicate the ambiguity of radiographers delivering results within their profession, outlining the potential impact on themselves and patients. Mammography APRs are skilled to deliver results, and whilst enforced barriers may restrict extension a supportive environment can overcome these. Additional training is necessary to implement the role in the screening service.

Job satisfaction and perceived stress among radiology technicians: a questionnaire survey in relation to sociodemographic and occupational risk factors
International Archives of Occupational and Environmental Health, 2024
In conclusion, our findings revealed job satisfaction and perceived stress of radiology technicians to be at moderate levels and to be negatively correlated with each other. Our findings emphasize the importance of continuing education, in-service refresh training and continuing practice of regularly updating self-knowledge along with balance workload, income and safety at work to improve job satisfaction among radiology technicians.

Managing the unmanageable: A qualitative study exploring sonographer experiences of and training in unexpected and difficult news delivery
Radiography, 2021
Long patient lists are prioritised to deal with high demand for services. However, sonographer wellbeing needs to be a key priority to avoid stress and burnout. This means facilitating protected time to access support from colleagues, multidisciplinary working where possible, and regular access to training to support DUN. Training focusing on communication practices, alongside dealing with emotional burdens of the role would be beneficial.

Sonographers' level of autonomy in communication in Australian obstetric settings: Does it affect their professional identity?
Ultrasound, 2020
A strong professional identity and level of autonomy came from the construction of attributes that were built over time based on multiple factors, including previous experience, geographical location, critical incidents, training and supportive work environments.

Workforce well-being

Factors Contributing to Disproportionate Burnout in Women Breast Imaging Radiologists: A Review
Journal of Breast Imaging, 2024
The major organizational factors discussed are work–life integration, control and flexibility, workload and job demands, efficiency and resources, finding meaning in work, social support and community at work, and organizational culture and values. We also propose potential strategies for institutions and practices to mitigate burnout in women breast imaging radiologists.

Prevalence, characteristics and clinical impact of work-related musculoskeletal pain in echocardiography
Echo Research & Practice, 2024
Work-related musculoskeletal pain (WRMSP) is very common amongst echocardiographers, with a fifth having a related musculoskeletal injury. WRMSP has considerable on impact on personal, social and work-related activities. Strategies to reduce the burden of WRMSP are urgently required to ensure sustainability of the workforce and patient access to imaging.

[United States] Occupational Burnout in Sonography Research and Workplaces: What Is It, How Do We Measure It, and How Do We Address It?
Journal of Diagnostic Medical Sonography, 2024
Overall, there are abundant opportunities to continue developing research about occupational burnout among sonographers. Recent experiences with the strains of the pandemic have increased the visibility and urgency of issues related to occupational burnout among health care workers, including sonographers. Carefully choosing assessments and factors to study and elevating the quality of studies to include robust longitudinal, observational, and trial designs may move us toward better addressing occupational burnout.

[United States] A Prospective Intervention to Reduce Burnout Among Academic Radiologists
Academic Radiology, 2023
Despite numerous departmental initiatives intended to improve culture, workplace efficiency, work-life balance, and personal wellness, self-reported burnout among academic medical center radiologists showed no measurable improvement over time.

[France] Self-compassion and psychological well-being of radiographers at work
International Journal of Qualitative Studies on Health and Well-being, 2023
Particular attention should be paid to radiologists who are female, young, and with only a few years of experience. Self-compassion is a protective factor for radiologists and may help them take care of themselves to continue caring for others. Training related to self-compassion should be promoted in medical imaging departments.

Incidence and factors associated with burnout in radiologists: A systematic review
European Journal of Radiology Open, 2023
Burnout in radiology is increasing globally, with prevalence estimates reaching 88% and 62% for overall and high burnout, respectively. A myriad of factors has been identified as contributing to the increased prevalence. Our data demonstrated significant variability in burnout prevalence estimates among radiologists and major disparities in burnout criteria, instrument tools, and study quality.

Sonographers and Vascular Technologists Offer Potential Solutions to Promote the Health and Well-being of Their Workforce
Journal of Diagnostic Medical Sonography, 2023
Five themes were identified: “Limits and Guidelines,” “Injury Education,” “Ergonomics Training Constraints,” “Resources and Equipment,” and “Individual Habits.” Participant suggestions within these themes were categorized and mapped onto a sociotechnical systems model that was developed previously to study the healthcare system(s) in which sonography users work.

Are radiographers suffering from symptoms of compassion fatigue due to occupational stress: A systematic review
Radiography, 2022
Diagnostic radiographers are prone to suffering from symptoms that can be attributed to CF. This has been present for an extended period, and the main changes have been a decrease in job satisfaction and accomplishment. Patient interaction was identified as a cause, but it is unclear if this affects staff ability to be compassionate. Further work is required to find ways to mitigate these effects and prevent continued deterioration.

[Jordan and Australia] Assessment and correlation between job satisfaction and burnout among radiographers
Radiography, 2022
Burnout was associated with work experience and caseload and JS was associated with section of work. Most of the JS domains were significantly inversely related to emotional exhaustion and depersonalisation domains. Emotional exhaustion and depersonalization drew a significant positive correlation. Emotional exhaustion and depersonalization drew a significant positive correlation.

[United States] A qualitative investigation of resilience and well-being among medical physics residents
Journal of Applied Medical Physics, 2022
With regard to the medical physics residency experience, four key themes emerged during qualitative analysis: the demanding nature of medical physics residencies, the negative impacts of residency on MPRs during training and beyond, strategies MPRs use to cope with residency stress, and the role of professional societies in addressing residency-related change.

Is there a role for professional supervision in supporting the professional and personal wellbeing of the sonographic workforce? A literature review
Radiography, 2022
Professional supervision has an important role in supporting the sonography workforce and enable increased wellbeing and emotional support. There are clear benefits to undertaking professional supervision to support the workforce however there are competing demands which may affect the effectiveness of professional supervision.

[United States] It Takes a Village: A Multimodal Approach to Addressing Radiologist Burnout
Current Problems in Diagnostic Radiology, 2022
Institutions can work to validate the radiologists they employ and work toward mitigating the impact of occupational stressors. Lastly, engaging in conversations about burnout throughout the course of one's medical career can affect a sea change in the way burnout is envisioned, and treated.

[Pakistan] Burnout amongst radiologists: A bibliometric study from 1993 to 2020
World Journal of Psychiatry, 2022
Current analysis casts a spotlight on important trends being witnessed in regard to the mental health of radiologists, including lack of funding for mental health research, narrowing of female vs male citation gap, as well as authorship and citation trends.

Exploring sonographer emotional well-being: NHS sonographers' experience of the restorative function of professional supervision
BMUS, 2022
This study found that participants identify professional supervision in its formative and normative functions more commonly than its restorative functions. It also found that sonographers are found wanting of emotional support, with 50% of sonographers feeling unsupported and identifying a restorative supervision need to their working practice.

[United States] Self-reported Burnout: Comparison of Radiologists to Nonradiologist Peers at a Large Academic Medical Center
Academic Radiology, 2022
Compared to nonradiologist colleagues, radiologists were less likely to find work meaningful and more likely to feel unhappy and undervalued in the workplace and by leadership. Initiatives to increase perceived appreciation, leadership relationships, and meaningfulness of work for radiologists may reduce burnout.

Burnout in the sonographic environment: The identification and exploration of the causes of sonographer burnout and strategies for prevention and control
Sonography, 2022
Recommendations include considering reducing the required number of scans per week by increasing appointment times, counselling and skills training for adverse news delivery and use of technical assistants to perform soft tasks. Current literature relating to sonographer burnout appears isolated to the obstetrics domain with further study required on sonographer burnout in other fields of sonography, including burnout because of lack of career progression.

What Causes the Most Stress in Breast Radiology Practice? A Survey of Members of the Society of Breast Imaging
Journal of Breast Imaging, 2021
Prevalence of stress related to new regulation requirements, job security, financial strain, decreased reimbursement, dependent care, call, delivering bad news, and dealing with difficult patients, difficult referrers, and difficult radiologists were present in fewer than 50% of respondents.

[Australia] Does participatory ergonomics reduce musculoskeletal pain in sonographers? A mixed methods study
Ultrasound, 2021
This small study provides preliminary evidence that a participatory ergonomics approach facilitated identification of occupation and site-specific risks for WMSD in the WNSWLHD, allowing implementation of ergonomic changes to be tailored to the workplace, resulting in a safer work environment for sonographers.

The impact of the Covid-19 pandemic on the mental health and work morale of radiographers within a conventional X-ray department
Radiography, 2021
Three key themes emerged from the data. These include mental health challenges/work morale in Radiology, demand of mobile imaging and departmental and Trust-wide mental health support. Results indicate a high demand in mobile imaging which has made a significant difference in the working life of some radiographers.

Burnout in the disciplines of medical radiation science: A systematic review
Journal of Medical Imaging and Radiation Sciences, 2021
For the past 20 years, levels of burnout in MIRS professionals has remained relatively steady, with the majority of studies reporting moderate levels of burnout. However, more research is needed in radiographers, sonographers and nuclear medicine technologists.

Compassion fatigue and the effectiveness of support structures for diagnostic radiographers in oncology
Journal of Medical Imaging and Radiation Sciences, 2021
Sixty percent of those questioned responded. Almost half found their work affected their mental wellbeing, but they felt they could manage this stress at work. Almost all felt that some sort of support should be offered to the radiographers. The most popular options were already provided by the hospital, however many felt they were not accessible for a variety of reasons. When discussed further, it was found that the timings were prohibitive as most were held when they could not attend.

Work-related muscular-skeletal disorder among UK sonographers: understanding the challenges
RAD Magazine, 2021
Work-related musculoskeletal disorders (WRMSD) are a set of conditions characterised by persistent pain in the muscles, joints, bones, nerves and/or tendons. Typically caused and exacerbated by repetitive action and/or over-exertion, they have been a noted problem in the general UK workforce for a significant period. In 2019/20, the UK's Health and Safety Executive (HSE) estimated that around 480,000 workers were suffering from a new or long-standing WRMSD, at a prevalence of 1,420 cases per 100,000 workers. Although there has been a slight downward trend in incidence over the last two decades, the latest HSE statistics indicate that around nine million working days are still being lost per annum due to this problem, which amounts to 27% of all health-related absence.

Quality improvement initiatives and innovation

Research culture, barriers and facilitators within the radiography workforce in the UK – results of a national survey
Radiography, 2025
Research remains underdeveloped in UK radiography roles. This national survey highlights that currently less than half of the UK radiographers have experience in research within their role. Protected time, funding, managerial support, and supervision access are crucial to embedding research into practice.

[United States] Multimodality Cardiac Imaging and the Imaging Workforce in the United States: Diversity, Disparities, and Future Directions
Circulation: Cardiovascular Imaging, 2024
Innovations in cardiac imaging have fundamentally advanced the understanding and treatment of cardiovascular disease. These advances in noninvasive cardiac imaging have also expanded the role of the cardiac imager and dramatically increased the demand for imagers who are cross-trained in multiple modalities. However, we hypothesize that there is significant variation in the availability of cardiac imaging expertise and a disparity in the adoption of advanced imaging technologies across the United States.

The value of case reports in diagnostic radiography
Radiography, 2023
Case reports are short accounts of novel pathologies, trauma or treatment with a critical review of relevant literature. Examples within diagnostic radiography include the appearances of COVID-19 alongside examination-level scenarios involving image artefacts, equipment failure and patient incidents in radiology.

Clinical-scientist-led transoesophageal echocardiography (TOE): using extended roles to improve the service
BMJ Open Quality, 2023
In this quality improvement project, we improved access by redesigning workforce roles. The clinical scientist, who had been supporting the consultant during TOE clinics, took on performing the procedure as the main operator. We used the Model for Improvement to develop this clinical-scientist-led service-delivery model, and then test and refine it. This increased capacity and frequency of TOE clinics, reducing waits and releasing around 2 days per month of consultant time.

Designing Clinical MRI for Enhanced Workflow and Value
Journal of Magnetic Resonance Imaging, 2023
Here, we highlight various opportunities for optimizing MRI workflow and enhancing value by offering many of our own on-the-ground experiences and conclude by anticipating some of the future directions for process improvement and innovation in clinical MR imaging.

Ultrasound Practice Redesign to Improve Image Quality: Implementation of a Quality Control Sonographer
Journal of the American College of Radiology, 2020
Removing a sonographer from the clinical line to work as a QC sonographer resulted in a 60% decrease in parameter errors that was maintained over time. Another benefit of the QC sonographer role is improved sonographer education.

Retention, attrition, recruitment

[Taiwan] Demands for medical imaging and workforce Size: A nationwide population-based Study, 2000–2020
European Journal of Radiology, 2024
Taiwan has 2.4 to 2.9 times fewer radiologists than the United States and 3 times fewer than Europe, while the annual workload is approximately 2 to 3.4 times greater than that of the United States and 1.4 to 2.5 times greater than that of the United Kingdom. This report may serve as a reference for policy makers who address the challenges of the growing workload among radiologists in countries of similar situations.

[United States] Should I Stay, or Should I Go? Early Phase Instrument Development of Workforce Movement—A Pilot Study with Breast Radiologists
Journal of American College of Radiology, 2024
The goal of this study was to develop a psychometrically valid survey on workplace satisfaction and examine predictors of workforce movement among breast radiologists.

Retention of radiographers in the NHS: Influencing factors across the career trajectory
Radiography, 2023
Early career radiographers were found to be a more transient workforce leaving for increased career opportunities, mid-career radiographers were more likely to leave due to the lack of progression and CPD and late career radiographers due to the inflexibility of working patterns and conditions. It is imperative managers consider the needs and requirements of each generation of radiographers to improve radiographer retention.

Recruitment and retention of radiography clinical practice educators
Radiography, 2023
The main motivators for CPEs were an interest in teaching, inspiration from role models, personal learning goals and the appeal of part-time employment. Job satisfaction was influenced by efficacy in the role, professional growth, autonomy, and relationships with stakeholders. The main disincentives were the CPE grade not being commensurate with work involved, lack of protected time and lack of support from colleagues. A variety of reasons for resignation were provided, many of which related to grading of the CPE post and lack of career progression opportunities in the role.

International recruitment of radiographers and the development of a workplace integration support package: Project evaluation
Radiography, 2023
Principal recommendations include ensuring digital accessibility for new recruits as part of the on-boarding process, considering the timing of delivery of any online connected support sessions, the provision of long-term pastoral support; and mandating the training requirement for managers and team leaders.

Research should remain a priority in 21st century radiology recruitment to training
British Journal of Radiology, 2023
It is vital for the future radiology workforce to engage with research and in order to fulfil the Royal College of Radiologist's new curriculum aims of strengthening research within training, we must continue attracting the brightest and best candidates and ensure research remains a priority.

The shortage of radiographers: A global crisis in healthcare
Journal of Medical Imaging and Radiation Sciences, 2023
In this opinion article, the author attempts to provide insight into radiography workforce shortages worldwide. Challenges and shortages in the radiography workforce across different regions are recorded. The purpose of this is to bring a chronic and persistent problem back to the attention of the international community of radiographers, decision and policymakers, with examples from the international literature, whilst highlighting some important and necessary conditions to mitigate these shortages.

A Recommendation for Addressing the Physician Workforce Crisis Contributing to Burnout in Radiology and Radiation Oncology
Journal of the American College of Radiology, 2022
We believe that a unified, cohesive, and coordinated approach designed to address and mitigate the current and progressively worsening workforce shortages would lead to a significant reduction in our current burnout problem and position our profession to provide high-quality patient care services in the future.

[New Zealand] Maintaining the Cardiac Sonographer Pipeline: A Regional Approach to Trainee Cardiac Sonographer Recruitment and Training that Rationalises use of Resource and Mitigates Impact on Echo Department Productivity
Heart Lung and Circulation, 2022
COVID lockdown prevented trainees leaving their home DHB. They attended presentations by Zoom and provided constructive and generally positive feedback. The time commitment for each DHB and impact on throughput was reduced. Relationships between the DHBs and the trainees was enhanced.

[United States] Ultrasound Ergonomics to Attract and Retain Sonographers
AXIS Imaging News, 2022
The demand for sonographers continues to grow, and hospitals and clinics need to differentiate themselves to recruit the best talent. The U.S. Bureau of Labor Statistics estimates the demand for sonographers will grow through 2030 by 14%, with an estimated 12,000 sonographer jobs available each year. Ergonomics can be a critical—and likely overlooked—factor in recruiting and maintaining a talented ultrasound workforce, especially during difficult hiring times.

[South Africa] Determining diagnostic radiographer staffing requirements: A workload-based approach
Radiography, 2022
The diagnostic radiographer staffing framework consists of seven steps that comprise a workload-based approach to determining the number of full time equivalent diagnostic radiographers that are required for each modality, or group of modalities. Both clinical and non-clinical activities are considered, and guidance is provided on calculating staffing requirements to cover leave allowances. A number of potential approaches to determining activity times are also discussed.

[United States] Strategies to Improve Racial and Ethnic Diversity in Breast Imaging Training and Beyond
Journal of Breast Imaging, 2022
This lack of URM radiology resident representation leads to a lack of URM potential applicants to breast imaging fellowships due to the pipeline effect. Strategies to improve diversity and inclusion in breast imaging include recruiting a diverse breast imaging workforce, establishing robust mentorship and sponsorship programs, fostering an inclusive training and workplace environment, and retaining and promoting a diverse workforce.

Retention of radiographers: A qualitative exploration of factors influencing decisions to leave or remain within the NHS
Radiography, 2021
Three over-arching themes were identified across all radiographer professional groups (n = 44): 1) Challenging working patterns and the impact on employee health and wellbeing; 2) Lack of flexibility in working terms and conditions; 3) Lack of timely career progression and access to CPD, and the need to feel valued. Radiographers were keen to express how they ‘loved being a radiographer’; small concessions and changes to workplace culture might be the incentive to remain in

radiography that some were clearly searching for. Manager participants recognised the need to offer greater flexibility in working patterns but this was challenging within financial and service delivery constraints.

[United States] Elevating the Orientation Process: Recommendations for Successful Sonographer Onboarding
Journal of the American Society of Echocardiology, 2021
Onboarding a new sonographer in an echo lab varies between institutions and presents unique challenges. Labs must strive for efficiency and consistency in this area. This article will provide guidance on the orientation process and competency-based training.

[United States] Pediatric Radiologist Workforce Shortage: Action Steps to Resolve
Journal of the American College of Radiology, 2021
Growing imaging volumes, retirements, and shifting practice models, such as corporatization of private practice groups and academic health–based systems, account for most of the more than 1,000 available radiology jobs currently listed on the ACR Career Center. The radiologist workforce shortage will likely be further exacerbated by the projected overall physician shortage.

Understanding student radiographer attrition: Risk factors and strategies
Radiography, 2020
Phase one: Attrition was 19%. Increased age, non A-level entry qualifications and poor academic performance were predictors of attrition ($p < 0.005$). Phase two: Challenges reported by groups identified as ‘at risk’ showed that for mature students and those with non-traditional entry qualifications, external responsibilities/pressures and financial pressures were likely to be the greatest cause of attrition and for younger students with traditional qualifications, academic difficulty and excessive workload were most significant. Scientific learning and academic writing were identified as the most common academic difficulties by all groups. Poor mental health may also be a risk factor.

[United States] Recruiting Future Radiologists: How Can We Do Better?
Academic Radiology, 2019
Our field faces a number of challenges in this arena: the division of diagnostic and interventional radiology (IR) residency programs, the decreasing time available for teaching and mentoring medical students, the impact of medical school debt on choice of postgraduate training, and the development of new technology, including artificial intelligence, that may quickly change the face of our profession. We must address these issues for medical students in order to continue attracting them to our field.

Competency Frameworks

The standards of proficiency for radiographers
HCPC, September 2023
These standards set out safe and effective practice in the professions we regulate. They are the threshold standards we consider necessary to protect members of the public.

[Australia] Australian sonographer competency—A new framework
Sonography, 2022
The article provides an overview of research used to develop a contemporary competency framework for sonographers. It describes each framework component and how these components have a potential role in sonographer education and clinical practice at different levels of expertise.

[Australia] Development of a professional competency framework for Australian sonographers—perspectives for developing competencies using a Delphi methodology
International Journal for Quality in Health Care, 2022
The Delphi methodology is an effective way to develop professional competency standards. This paper describes the methods and challenges in developing such standards for sonographers which could be translated to other health professionals.

[Australia] Professional Competency Framework for Sonographers
Australian Sonographer Accreditation Registry, 2021
This document is the output of a research project describing a professional competency framework for sonographers. Competency frameworks organise a collection of competencies relevant to the effective performance of a particular job, job family or functional area. A key component of competency frameworks is the idea of observable behaviours. These describe behaviours that evidence the ability to effectively perform the task, and which are underpinned by knowledge, skills and attitudes.

AHP Support Worker Competency, Education and Career Development Framework
NHS England Workforce, Transformation & Education, 2021
This framework enables employers, networks, integrated care systems (ICSs) and services effectively plan, develop, and deploy their AHP support workforce. It provides guidance on training, education and competencies for AHP support workers and demonstrates a clear pathway for recruitment and progression, with common and transferrable skills across eight domains.

Competencies and training of radiographers and technologists for PET/MR imaging - a study from the UK MR-PET network
European Journal of Hybrid Imaging, 2020
The report identified the need for establishing competencies for the PET/MRI workforce, particularly for technologists and radiographers. It also helped defining these competencies as well as identifying the demand for bespoke training and the development of local and national courses to be implemented to fulfil this new training need.