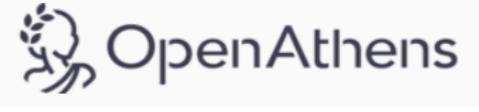# Library Current Awareness Bulletin
Radiology – March/April 2021

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OpenAthens

News

NHSE begins review of children's radiotherapy services
The Royal College of Radiologists
February 2021
[There is now capacity for more children to receive proton beam therapy (PBT) in the UK. NHSE plans to review children's radiotherapy provision overall, including the co-ordination and resourcing of conventional radiotherapy treatment and support services, such as play therapists.]

Radiographers missing out in NHS research work
The Society of Radiographers
March 2021
[Findings of a review by Cancer Research UK expose fundamental barriers to research in the UK that existed before the Covid-19 pandemic.]

Sonographers under attack – SoR calls for government action
The Society of Radiographers
February 2021
[The SoR is calling for urgent discussions with government and NHS employers to protect sonographer members from an alarming rise in physical, verbal and public abuse during the pandemic.]

[Ten tips for promoting therapeutic radiography](#)
The Society of Radiographers
March 2021
[The SoR would like to encourage all therapeutic radiographers to become ambassadors for the profession and raise awareness of therapeutic radiography. They have identified ten top tips for promoting the profession.]

Statistics

[Diagnostic imaging dataset for November 2020](#)
NHS England
March 2021
[The Diagnostic Imaging Dataset (DID) is a central collection of detailed information about diagnostic imaging tests carried out on NHS patients, extracted from local Radiology Information Systems (RISs) and submitted monthly.]

Guidance

[Bowel cancer screening: guidelines for CTC imaging](#)
Public Health England
Updated March 2021

[Butterfly iQ+ for diagnostic ultrasound imaging](#)
Medtech innovation briefing [MIB254]
Published March 2021

[COVID-19 and exceeding permit limits for medical use of radioactive substances: RPS C15](#)
Environment Agency
Updated March 2021

[Good infection prevention practice: using ultrasound gel](#)
Public Health England
Updated February 2021

Artificial Intelligence

[Initial chest radiographs and artificial intelligence (AI) predict clinical outcomes in COVID-19 patients: analysis of 697 Italian patients.](#)
Mushtaq J., Pennella R., Lavalle S., Colarieti A., Steidler S., Martinenghi C.M.A., Palumbo D., Esposito A. et al.
European Radiology, vol. 31 (3) pp. 1770-1779
Mar 2021
[**Objective**: To evaluate whether the initial chest X-ray (CXR) severity assessed by an AI system may have prognostic utility in patients with COVID-19. **Methods**: This retrospective single-center study included adult patients presenting to the emergency department (ED) between February 25 and April 9, 2020, with SARS-CoV-2 infection confirmed on real-time reverse transcriptase polymerase chain reaction (RT-PCR). Initial CXRs obtained on ED presentation were evaluated by a deep learning artificial intelligence (AI) system and compared with the Radiographic Assessment of Lung Edema (RALE) score, calculated by two experienced radiologists. Death and critical COVID-19 (admission to intensive care unit (ICU) or deaths occurring before ICU admission) were identified as clinical outcomes. Independent predictors of adverse outcomes were evaluated by multivariate analyses. **Results**: Six hundred ninety-seven 697 patients were included in the study: 465 males (66.7%), median age of 62 years (IQR 52-75). Multivariate analyses adjusting for demographics and comorbidities showed that an AI system-based score ≥ 30 on the initial CXR was an independent predictor both for mortality (HR 2.60 (95% CI 1.69 - 3.99; p < 0.001)) and critical COVID-19 (HR 3.40 (95% CI 2.35-4.94; p < 0.001)). Other independent predictors were RALE score, older age, male sex, coronary artery disease, COPD, and neurodegenerative disease. **Conclusion**: AI- and radiologist-assessed disease severity scores on CXRs obtained on ED presentation were independent and comparable predictors of adverse outcomes in patients with COVID-19.]

[Ankle fracture classification using deep learning: automating detailed AO Foundation/Orthopedic Trauma Association (AO/OTA) 2018 malleolar fracture identification reaches a high degree of correct classification](#).
Olczak J., Emilson F., Razavian A., Antonsson T., Stark A., Gordon M.
Acta Orthopaedica, vol. 92(1) pp.102-108
February 2021
[**Background and purpose**: Classification of ankle fractures is crucial for guiding treatment but advanced classifications such as the AO Foundation/Orthopedic Trauma Association (AO/OTA) are often too complex for human observers to learn and use. We have therefore investigated whether an automated algorithm that uses deep learning can learn to classify radiographs according to the new AO/OTA 2018 standards. **Method**: We trained a neural network based on the ResNet architecture on 4,941 radiographic ankle examinations. All images were classified according to the AO/OTA 2018 classification. A senior orthopedic surgeon (MG) then re-evaluated all images with fractures. We evaluated the network against a test set of 400 patients reviewed by 2 expert observers (MG, AS) independently. **Results**: In the training dataset, about half of the examinations contained fractures. The majority of the fractures were malleolar, of which the type B injuries represented almost 60% of the cases. Average area under the area under the receiver operating characteristic curve (AUC) was 0.90 (95% CI 0.82-0.94) for correctly classifying AO/OTA class where the most common major fractures, the malleolar type B fractures, reached an AUC of 0.93 (CI 0.90-0.95). The poorest performing type was malleolar A fractures, which included avulsions of the fibular tip. **Interpretation**: We found that a neural network could attain the required performance to aid with a detailed ankle fracture classification. This approach could be scaled up to other body parts. As the type of fracture is an important part of orthopedic decision-making, this is an important step toward computer-assisted decision-making.]

[Multi-Radiologist User Study for Artificial Intelligence-Guided Grading of COVID-19 Lung Disease Severity on Chest Radiographs](#)
Li M.D., Little B.P., Alkasab T.K., Mendoza D.P., Succi M.D., Shepard J-A.O., Lev M.H., Kalpathy-Cramer J.
Academic Radiology, vol. 28(4) pp. 572-576
April 2021
[**Rationale and objectives**: Radiographic findings of COVID-19 pneumonia can be used for patient risk stratification; however, radiologist reporting of disease severity is inconsistent on chest radiographs (CXRs). We aimed to see if an artificial intelligence (AI) system could help improve radiologist interrater agreement. **Materials and methods**: We performed a retrospective multi-radiologist user study to evaluate the impact of an AI system, the PXS score model, on the grading of categorical COVID-19 lung disease severity on 154 chest radiographs into four ordinal grades (normal/minimal, mild, moderate, and severe). Four radiologists (two thoracic and two emergency radiologists) independently interpreted 154 CXRs from 154 unique patients with COVID-19 hospitalized at a large academic center, before and after using the AI system (median washout time interval was 16 days). Three different thoracic radiologists assessed the same 154 CXRs using an updated version of the AI system trained on more imaging data. Radiologist interrater agreement was evaluated using Cohen and Fleiss kappa where appropriate. The lung disease severity categories were associated with clinical outcomes using a previously published outcomes dataset using Fisher's exact test and Chi-square test for trend. **Results**: Use of the AI system improved radiologist interrater agreement (Fleiss κ = 0.40 to 0.66, before and after use of the system). The Fleiss κ for three radiologists using the updated AI system was 0.74. Severity categories were significantly associated with subsequent intubation or death within 3 days. **Conclusion**: An AI system used at the time of CXR study interpretation can improve the interrater agreement of radiologists.]

COVID-19: Impact on Radiology Services

[A survey of anxiety and burnout in the radiology workforce of a tertiary hospital during the COVID-19 pandemic](#).
Huang H.L., Chen R.C., Teo I., Chaudhry I., Heng A.L., Zhuang K.D., Tan H.K., Tan B.S.
Journal of Medical Imaging and Radiation Oncology
February 2021
[**Introduction**: We aimed to study anxiety and burnout among Division of Radiological Sciences (RADSC) staff during the COVID-19 pandemic and identify potential risk and protective factors. These outcomes were compared with non-RADSC staff. **Methods**: A cross-sectional online study was conducted between 12 March and 20 July 2020 in the largest public tertiary hospital receiving COVID-19 cases. Burnout and anxiety were assessed with the Physician Work-Life Scale and the Generalized Anxiety Disorder-7 Scale, respectively. Workplace factors were examined as potential risk and protective factors using multivariable ordinary least squares regression analyses, adjusting for

pertinent demographic characteristics. **Results**: RADSC staff (n = 180) and non-RADSC staff (n = 1458) demonstrated moderate-to-severe anxiety rates of 6.7 and 13.2 % and burnout rates of 17.8 and 23.9 %, respectively. RADSC staff reported significantly lower anxiety (mean ± SD: 4.0 ± 3.7 vs 4.9 ± 4.5; P-value < 0.05), burnout (mean ± SD: 1.9 ± 0.7 vs 2.1 ± 0.8; P-value < 0.01), increased teamwork (82.2% vs 74.1%; P-value < 0.05) and fewer night shifts (36.7% vs 41.1%; P-value < 0.01). Among RADSC staff, higher job dedication was associated with lower anxiety (b (95% CI) = -0.28 (-0.45, -0.11)) and burnout (b (95% CI) = -0.07 (-0.11,-0.04)), while longer than usual working hours was associated with increased anxiety (b (95% CI) = 1.42 (0.36, 2.45)) and burnout (b (95% CI) = 0.28 (0.09, 0.48)). **Conclusions**: A proportion of RADSC staff reported significant burnout and anxiety, although less compared to the larger hospital cohort. Measures to prevent longer than usual work hours and increase feelings of enthusiasm and pride in one's job may further reduce the prevalence of anxiety problems and burnout in radiology departments.]

[Container CT scanner: a solution for modular emergency radiology department during the COVID-19 pandemic](#).
Huang Z., Zhao S., Leng Q., Hu S., Li Z., Song B.
Diagnostic and Interventional Radiology
February 2021
[During the coronavirus disease 2019 (COVID-19) pandemic period, container computed tomography (CT) scanners were developed and used for the first time in China to perform CT examinations for patients with clinically mild to moderate COVID-19 who did not need to be hospitalized for comprehensive treatment, but needed to be isolated in Fangcang shelter hospitals (also known as makeshift hospitals) to receive some supportive treatment. The container CT is a multidetector CT scanner installed within a radiation-protected stand-alone container (a detachable lead shielding room) that is deployed outside the makeshift hospital buildings. The container CT approach provided various medical institutions with the solution not only for rapid CT installation and high adaptability to site environments, but also for significantly minimizing the risk of cross-infection between radiological personnel and patients during CT examination in the pandemic. In this article, we described the typical setup of a container CT and how it worked for chest CT examinations in Wuhan city, the epicenter of COVID-19 outbreak.]

[Covid-19: as a fear factor in response to stroke code and other interventional radiology emergencies?](#)
Fernández Cacho L.M., Cacho P.M., Lope J.J., Arriola R.A.
Journal of Radiology Nursing
February 2021
[The COVID-19 coronavirus crisis has posed an international challenge for all health systems. The first patient registered in Spain with the COVID-19 coronavirus was known on January 31, and the state of alarm was declared on March 14, 2020. The advance of the infection worldwide has caused a modification of the usual pattern in hospital emergency responses. This paper describes the incidence of emergencies in the Interventional Radiology section of the Marqués de Valdecilla University Hospital and to analyze whether the presence of COVID-19 caused a decrease in the number of patients treated especially for ischemic strokes. A descriptive cross-sectional study was carried out on a sample of 236 patients treated at the Interventional Radiology on call locatedGuard between June 1, 2019 and May 10, 2020, at the Marqués de Valdecilla University Hospital. No specific results were found that indicate a decrease in the incidence of urgent procedures, especially mechanical thrombectomies in patients with ischemic strokes performed by the Interventional Radiology team since the establishment of the alarm state by COVID-19 in Cantabria. Patients' fear of contracting COVID-19 infection in the hospital environment has not led to a decrease in urgent procedures, especially for ischemic strokes.]

[CT Volumes from 2,398 Radiology Practices in the United States: A Real-Time Indicator of the Effect of COVID-19 on Routine Care, January to September 2020](#).
Davenport M.S., Fruscello T., Chatfield M., Weinstein S., Sensakovic W.F., Larson D.B.
Journal of the American College of Radiology, vol. 18(3)
March 2021
[**Purpose**: To determine the effect of coronavirus disease 2019 (COVID-19) on CT volumes in the United States during and after the first wave of the pandemic. **Methods**: CT volumes from 2,398 US radiology practices participating in the ACR Dose Index Registry from January 1, 2020, to September 30, 2020, were analyzed. Data were compared to projected CT volumes using 2019 normative data and analyzed with respect to time since government orders, population-normalized positive COVID-19 tests, and attributed deaths. Data were stratified by state population density, unemployment status, and race. **Results**: There were 16,198,830 CT examinations (2,398 practices). Volume nadir occurred an average of 32 days after each state-of-emergency declaration and 12 days after each stay-at-home

order. At nadir, the projected volume loss was 38,043 CTs per day (of 71,626 CTs per day; 53% reduction). Over the entire study period, there were 3,689,874 fewer CT examinations performed than predicted (of 18,947,969; 19% reduction). There was less reduction in states with smaller population density (15% [169,378 of 1,142,247; quartile 1] versus 21% [1,894,152 of 9,140,689; quartile 4]) and less reduction in states with a lower insured unemployed proportion (13% [279,331 of 2,071,251; quartile 1] versus 23% [1,753,521 of 7,496,443; quartile 4]). By September 30, CT volume had returned to 84% (59,856 of 71,321) of predicted; recovery of CT volume occurred as positive COVID-19 tests rose and deaths were in decline. **Conclusion**: COVID-19 substantially reduced US CT volume, reflecting delayed and deferred care, especially in states with greater unemployment. Partial volume recovery occurred despite rising positive COVID-19 tests.]

[Initial data from an experiment to implement a safe procedure to perform PA erect chest radiographs for COVID-19 patients with a mobile radiographic system in a "clean" zone of the hospital ward](#).
Sng L.H., Arlany L., Toh L.C., Loo T.Y., Ilzam N.S., Wong B.S.S., Lanca L.
Radiography, vol. 27(1) pp. 48-53
February 2021
[**Introduction**: With the current Covid-19 pandemic, general wards have been converted into cohort wards for Covid-19 patients who are stable and ambulant. A 2-radiographer mobile radiography team is required to perform bedside Chest X-rays (CXR) for these patients. Hospital guidelines require both radiographers to be in full Personal Protective Equipment (PPE) throughout the image acquisition process and the mobile radiographic unit needs to be disinfected twice after each case. This affects the efficiency of the procedure and an increase usage of limited PPE resources. This study aims to explore the feasibility of performing mobile chest radiography with the mobile radiographic unit in a "clean" zone of the hospital ward. **Methods**: An anthropomorphic body phantom was used during the test. With the mobile radiographic unit placed in a "clean" zone, the phantom and the mobile radiographic unit was segregated by the room door with a clear glass panel. The test was carried out with the room door open and closed. Integrated radiation level and patient dose were measured. A consultant radiologist was invited to review and score all the images acquired using a Barco Medical Grade workstation. The Absolute Visual Grading Analysis (VGA) scoring system was used to score these images. **Results**: A VGA score of 4 was given to all the 40 test images, suggesting that there is no significant differences in the image quality of the images acquired using the 2 different methods. Radiation exposure received by the patient at the highest kV setting through the glass is comparable to the regular CXR on patient without glass panel at 90 kV, suggesting that there is no significant increase in patient dose. **Conclusion**: The result suggests that acquiring CXR with the X-ray beam attenuating through a glass panel is a safe and feasible way of performing CXR for COVID-19 patients in the newly converted COVID wards. This will allow the mobile radiographic unit as well as one radiographer to be completely segregated from the patient. **Implications for practice**: This new method of acquiring CXR in an isolation facility set up requires a 2-Radiographer mobile radiography team, and is applicable only for patients who are generally well and not presented with any mobility issues. It is also important to note that a clear glass panel must be present in the barriers set up for segregation between the "clean" zone and patient zone in order to use this new method of acquiring CXR.]

[Modifications to mobile chest radiography technique during the COVID-19 pandemic - implications of X-raying through side room windows](#).
England A., Littler E., Romani S., Cosson P.
Radiography, vol. 27(1) pp. 193-199
February 2021
[**Introduction**: Modifications to common radiographic techniques have resulted from the challenges presented by the COVID-19 pandemic. Reports exist regarding the potential benefits of undertaking mobile radiography through side room windows. The aim of this study was to evaluate the impact on image quality and exposure factors when undertaking such examinations. **Methods**: A phantom based study was undertaken using a digital X-ray room. Control acquisitions, using a commercially available image quality test tool, were performed using standard mobile chest radiography acquisition factors. Image quality (physical and visual), incidence surface air kerma (ISAK), Exposure Index (EI) and Deviation Index (DI) were recorded. Image quality and radiation dose were further assessed for two additional (experimental) scenarios, where a side room window was located immediately adjacent to the exit port of the light beam diaphragm. The goal of experimental scenario one was to modify exposure factors to maintain the control ISAK. The goal of experimental scenario two was to modify exposure factors to maintain the control EI and DI. Dose and image quality data were compared between the three scenarios. **Results**: To maintain the pre-window (control) ISAK (76 μGy), tube output needed a three-fold increase (90 kV/4 mAs versus 90 kV/11.25 mAs). To

maintain EI/DI a more modest increase in tube output was required (90 kV/8 mAs/ISAK 54 µGy). Physical and visual assessments of spatial resolution and signal-to-noise ratio were indifferent between the three scenarios. There was a slight statistically significant reduction in contrast-to-noise ratio when imaging through the glass window (2.3 versus 1.4 and 1.2; P = 0.005). **Conclusion**: Undertaking mobile X-ray examinations through side room windows is potentially feasible but does require an increase in tube output and is likely to be limited by minor reductions in image quality. **Implications for practice**: Mobile examinations performed through side room windows should only be used in limited circumstances and future clinical evaluation of this technique is warranted.]

[Teleworking beyond teleradiology: managing radiology departments during the COVID-19 outbreak](#).
Martín-Noguerol T., Lopez-Ortega R., Ros P.R., Luna A.
European Radiology, vol. 31(2) pp. 601-604
February 2021
[Teleradiology solutions are playing an essential role during the COVID-19 outbreak. Activity at radiology departments must be maintained and adapted to this new situation beyond teleradiology. Teleworking should be extended to the rest of non-medical radiology department areas. A comprehensive perspective based on our own experience during the COVID-19 outbreak has been performed highlighting the value of teleworking for almost all areas implied in the workflow of radiology departments beyond radiologists. Personal and technical requirements for successfully adapting to this new scenario are discussed including the opportunities that this unprecedent situation is bringing for reorganizing workflow and developing new projects.]

Diagnostic Radiology

[Use of Chest Imaging in the Diagnosis and Management of COVID-19: A WHO Rapid Advice Guide.](#)
Akl E.A., Blažić I., Yaacoub S., Frija G., Chou R., Appiah J.A., Fatehi M., Flor N., Hitti, E., Jafri, H., Jin, Z-Y et al.
Radiology, vol. 298(2)
February 2021
[The World Health Organization (WHO) undertook the development of a rapid guide on the use of chest imaging in the diagnosis and management of coronavirus disease 2019 (COVID-19). The rapid guide was developed over 2 months by using standard WHO processes, except for the use of "rapid reviews" and online meetings of the panel. The evidence review was supplemented by a survey of stakeholders regarding their views on the acceptability, feasibility, impact on equity, and resource use of the relevant chest imaging modalities (chest radiography, chest CT, and lung US). The guideline development group had broad expertise and country representation. The rapid guide includes three diagnosis recommendations and four management recommendations. The recommendations cover patients with confirmed or who are suspected of having COVID-19 with different levels of disease severity, throughout the care pathway from outpatient facility or hospital entry to home discharge. All recommendations are conditional and are based on low certainty evidence (n = 2), very low certainty evidence (n = 2), or expert opinion (n = 3). The remarks accompanying the recommendations suggest which patients are likely to benefit from chest imaging and what factors should be considered when choosing the specific imaging modality. The guidance offers considerations about implementation, monitoring, and evaluation, and also identifies research needs. Published under a CC BY 4.0 license. Online supplemental material is available for this article.]

[The use of imaging in COVID-19-results of a global survey by the International Society of Radiology](#).
Blažić I., Brkljačić B., Frija G.
European Radiology, vol. 31(3) pp. 1185-1193
March 2021
[**Objectives**: This survey conducted by the International Society of Radiology and supported by the European Society of Radiology aimed to collect information regarding radiology departments' current practices in the management of patients with COVID-19. **Methods**: Responses from 50 radiology departments involved in the management of COVID-19 patients representing 33 countries across all continents were analyzed. The analysis revealed important variations in imaging practices related to COVID-19 across the world for different disease severity and various clinical scenarios. **Results**: Imaging is usually not performed in asymptomatic patients (69% of institutions do not image) but is used at the end of confinement (in 60% of institutions). In the majority of institutions, chest imaging is used in suspected or confirmed patients with COVID-19 (89% and 94%). All imaging departments involved in this survey reported the use of imaging in COVID-19 patients showing severe symptoms or who were critically ill. However, there is a wide

variation in imaging modality type used for each clinical scenario. The use of imaging is applied in line with existing guidelines and recommendations in 98% of institutions with structured reporting recorded in 58% of institutions. The vast majority of institutions reported a significant impact of the COVID-19 pandemic on the imaging department's routine activity (83%).**Conclusion**: We believe that the results of this survey will help to understand current heterogeneities in radiology practice and to identify needs and gaps in the organization and function of radiology departments worldwide in relation to the COVID-19 pandemic. The results of this survey may inform the development of an overall strategy for radiology department organization and imaging protocols in pandemic conditions.]

[Requests for radiologic imaging: Prevalence and determinants of inadequate quality according to RI-RADS](#).
Kasalak Ö., Alnahwi H.A.A., Dierckx R.A.J.O., Yakar D., Kwee T.C.
European Journal of Radiology
April 2021
[**Purpose**: To determine the prevalence and determinants of radiologic imaging requests that are of inadequate quality according to the Reason for exam Imaging Reporting and Data System (RI-RADS). **Methods**: This study included a random sample of 673 radiologic examinations performed at a tertiary care center. The quality of each imaging request was graded according to RI-RADS. Ordinal regression analysis was performed to determine the association of RI-RADS grade with patient age, gender, and hospital status, indication for imaging, requesting specialty, imaging modality, body region, time of examination, and relationship with previous imaging within the past one year. **Results**: RI-RADS grades A (adequate request), B (barely adequate request), C (considerably limited request), and D (deficient request) were assigned to 159 (23.6 %), 166 (24.7 %), 214 (31.8 %), and 134 (19.9 %) of cases, respectively. Indication for imaging, requesting specialty, and body region were independently significantly associated with RI-RADS grades. Specifically, routine preoperative imaging (odds ratio [OR]: 3.422, P = 0.030) and transplantation imaging requests (OR: 8.710, P = 0.000) had a higher risk of poorer RI-RADS grades, whereas infection/inflammation as indication for imaging (OR: 0.411, P = 0.002), pediatrics as requesting specialty (OR: 0.400, P = 0.007), and head (OR: 0.384, P = 0.017), spine (OR: 0.346, P = 0.016), and upper extremity (OR: 0.208, P = 0.000) as body regions had a lower risk of poorer RI-RADS grades. **Conclusion**: The quality of radiologic imaging requests is inadequate in >75 % of cases, and is affected by several factors. The data from this study can be used as a baseline and benchmark for further investigation and improvement.]

[Time Requirement and Feasibility of a Systematic Quality Peer Review of Reporting in Radiology](#).
Maurer M.H., Brönnimann M., Schroeder C., Ghadamgahi E., Streitparth F., Heverhagen J.T., Leichtle A., de Bucourt M., Meyl T.P.
RoFo : Fortschritte auf dem Gebiete der Rontgenstrahlen und der Nuklearmedizin, vol. 193(2) pp. 160-167
February 2021
[**Objective**: To estimate the human resources required for a retrospective quality review of different percentages of all routine diagnostic procedures in the Department of Radiology at Bern University Hospital, Switzerland. **Materials and methods**: Three board-certified radiologists retrospectively evaluated the quality of the radiological reports of a total of 150 examinations (5 different examination types: abdominal CT, chest CT, mammography, conventional X-ray images and abdominal MRI). Each report was assigned a RADPEER score of 1 to 3 (score 1: concur with previous interpretation; score 2: discrepancy in interpretation/not ordinarily expected to be made; score 3: discrepancy in interpretation/should be made most of the time). The time (in seconds, s) required for each review was documented and compared. A sensitivity analysis was conducted to calculate the total workload for reviewing different percentages of the total annual reporting volume of the clinic. **Results**: Among the total of 450 reviews analyzed, 91.1 % (410/450) were assigned a score of 1 and 8.9 % (40/450) were assigned scores of 2 or 3. The average time (in seconds) required for a peer review was 60.4 s (min. 5 s, max. 245 s). The reviewer with the greatest clinical experience needed significantly less time for reviewing the reports than the two reviewers with less clinical expertise (p < 0.05). Average review times were longer for discrepant ratings with a score of 2 or 3 (p < 0.05). The total time requirement calculated for reviewing all 5 types of examination for one year would be more than 1200 working hours. **Conclusion**: A retrospective peer review of reports of radiological examinations using the RADPEER system requires considerable human resources. However, to improve quality, it seems feasible to peer review at least a portion of the total yearly reporting volume.]

Education, Training and Workforce Development

[Is Empowerment of Female Radiologists Still Needed? Findings of a Systematic Review](#).
Fichera G., Busch I.M., Rimondini M., Motta R., Giraudo C.
International Journal of Environmental Research and Public Health, vol. 18(4)
February 2021
[Considering that radiology is still a male-dominated specialty in which men make up more than two thirds of the workforce, this systematic review aimed to provide a comprehensive overview of the current role of women in radiological imaging, focusing on the main aspects such as career progression, leadership, academic practice, and perceived discrimination. Three electronic databases were searched up to 21 October 2020. To identify additional records, weekly automatic email alerts were set up on PubMed until December 2020 and reference lists of key studies and included papers were screened. Two reviewers independently performed the search, study selection, quality appraisal, data extraction, and formal narrative synthesis. In case of disagreement, a third reviewer was involved. Across the 61 included articles, women worked more often part-time and held fewer positions of power in hospitals, on editorial boards, and at the academic level (associate and full professors). Women were less often in relevant positions in scientific articles, had fewer publications, and had a lower H-index. Discrimination and sexual harassment were experienced by up to 40% and 47% of female radiologists, respectively. Our study highlights that women in radiology are still underrepresented and play a marginal role in the field, struggling to reach top and leading positions.]

[Radiology for medical students: Do we teach enough? A national study](#).
Chew C., O'Dwyer P.J., Sandilands E.
The British Journal of Radiology, vol. 94(1119)
February 2021
[**Objective**: A recent study has shown that the averaged time tabled teaching for a medical student across 5 years in the UK was 4629 hours. Radiology has been demonstrated to be an excellent teaching source, yet the number of hours allocated to this has never been calculated. The aims of this study were to evaluate and quantify the hours allocated to radiology teaching in Scottish Medical Schools and to evaluate if they can fulfil requirements expected from other Clinical disciplines and the upcoming General Medical Council Medical Licensing Assessment (GMC MLA). **Methods**: Data pertaining to timetabled teaching for Radiology in Scottish Universities were obtained from the authors of the Analysis of Teaching of Medical Schools (AToMS) survey. In addition, University Lead Clinician Teachers were surveyed on the radiological investigations and skills medical students should have at graduation. **Results**: Medical students in Scottish Universities were allocated 59 h in Radiology (0.3%) out of a total 19,325 h of timetabled teaching. Hospital-based teaching was variable and ranged from 0 to 31 h. Almost half (15 of 31) of Clinician Teachers felt that there was insufficient radiology teaching in their specialty. Thirteen of 30 conditions included in the GMC MLA were listed by Clinician Teachers, while 23 others not listed by the GMC were considered important and cited by them. **Conclusion**: This study demonstrates that medical students do not receive enough radiology teaching. This needs to be addressed by Universities in collaboration with the NHS in an effort to bring this up to line with other developed countries and prepare students for the GMC MLA.]

Interventional Radiology

[Mixed Reality Visualization of Radiation Dose for Health Professionals and Patients in Interventional Radiology](#).
Takata T., Nakabayashi S., Kondo H., Yamamoto M., Furui S., Shiraishi K., Kobayashi T., Oba H., Okamoto T. et al
Journal of Medical Systems, vol. 45(4) p. 38
February 2021
[For interventional radiology, dose management has persisted as a crucially important issue to reduce radiation exposure to patients and medical staff. This study designed a real-time dose visualization system for interventional radiology designed with mixed reality technology and Monte Carlo simulation. An earlier report described a Monte-Carlo-based estimation system, which simulates a patient's skin dose and air dose distributions, adopted for our system. We also developed a system of acquiring fluoroscopic conditions to input them into the Monte Carlo system. Then we combined the Monte Carlo system with a wearable device for three-dimensional holographic visualization. The estimated doses were transferred sequentially to the device. The patient's dose distribution was then projected on the patient body. The visualization system also has a mechanism to detect one's position in a room to estimate

the user's exposure dose to detect and display the exposure level. Qualitative tests were conducted to evaluate the workload and usability of our mixed reality system. An end-to-end system test was performed using a human phantom. The acquisition system accurately recognized conditions that were necessary for real-time dose estimation. The dose hologram represents the patient dose. The user dose was changed correctly, depending on conditions and positions. The perceived overall workload score (33.50) was lower than the scores reported in the literature for medical tasks (50.60) for computer activities (54.00). Mixed reality dose visualization is expected to improve exposure dose management for patients and health professionals by exhibiting the invisible radiation exposure in real space.]

[Risk factors of interventional radiology/surgery for colonic diverticular bleeding](#)
Sato Y., Yasuda H., Nakamoto Y., Kiyokawa H., Yamashita M., Matsuo Y., Maehata T., Yamamoto H., Itoh F. et al
JGH Open, vol. 5(3) pp. 343-349
March 2021
[**Background and Aim**: Colonic diverticular bleeding (CDB) stops spontaneously, but sometimes, excessive bleeding does not allow hemostasis and requires interventional radiology (IR)/surgery. We examined risk factors in patients who required IR/surgery for CDB and late recurrent bleeding rate after IR/surgery. **Method(s)**: This retrospective case-control study was conducted at a tertiary center. We included 608 patients who required hospitalization for CDB. Patients were investigated for risk factors using logistic regression analysis. We also investigated early and late recurrent bleeding rates following IR/surgery. **Result(s)**: In 261 patients (42.9%), the bleeding source was identified, and endoscopic hemostasis was performed; 23 (3.8%) required IR/surgery. In multivariate analysis, shock state with a blood pressure of <=90 mmHg (P < 0.001; odds ratio [OR], 20.1; 95% confidence interval [CI], 5.08-79.5), positive extravasation on contrast-enhanced computed tomography (P < 0.001; OR 9.5, 95% CI 2.85-31.4), two or more early recurrent bleeding episodes (P = 0.002; OR 7.4, 95% CI 2.14-25.4), and right colon as the source of bleeding (P = 0.023; OR 4.1, 95% CI 1.25-14.0) were independent risk factors requiring IR/surgery. Early recurrent bleeding was observed in 0% and 28% patients (P < 0.001) in the IR/surgery and no IR/surgery groups, respectively, whereas late recurrent bleeding rate was observed in 43.4% and 30.7% patients (P = 0.203) in the IR/surgery and no IR/surgery groups, respectively. Four patients who required surgery experienced late recurrent bleeding at a site different from the initial CDB. **Conclusion(s)**: Although IR/surgery is an effective hemostatic treatment wherein endoscopic treatment is unsuccessful, late recurrent bleeding cannot be prevented.]

[Role of interventional radiology in the treatment of COVID-19 patients: Early experience from an epicenter](#).
Lee K.S., Talenfeld A.D., Browne W.F., Holzwanger, D.J., Harnain C., Kesselman A., Pua B.B.
Clinical Imaging, vol. 71 pp. 143-146
March 2021
[**Objective**: To highlight the role of interventional radiology (IR) in the treatment of patients hospitalized with coronavirus disease 2019 (COVID-19). **Methods**: Retrospective review of hospitalized patients who tested positive for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and had one or more IR procedures at a tertiary referral hospital in New York City during a 6-week period in April and May of 2020. **Results**: Of the 724 patients admitted with COVID-19, 92 (12.7%) underwent 124 interventional radiology procedures (79.8% in IR suite, 20.2% at bedside). The median age of IR patients was 63 years (range 24-86 years); 39.1% were female; 35.9% in the intensive care unit. The most commonly performed IR procedures were central venous catheter placement (31.5%), inferior vena cava filter placement (9.7%), angiography/embolization (4.8%), gastrostomy tube placement (9.7%), image-guided biopsy (10.5%), abscess drainage (9.7%), and cholecystostomy tube placement (6.5%). Thoracentesis/chest tube placement and nephrostomy tube placement were also performed as well as catheter-directed thrombolysis of massive pulmonary embolism and thrombectomy of deep vein thrombosis. General anesthesia (10.5%), monitored anesthesia care (18.5%), moderate sedation (29.8%), or local anesthetic (41.1%) was utilized. There were 3 (2.4%) minor complications (SIR adverse event class B), 1 (0.8%) major complication (class C), and no procedure-related death. With a median follow-up of 4.3 months, 1.1% of patients remain hospitalized, 16.3% died, and 82.6% were discharged. **Conclusion**: Interventional radiology participated in the care of hospitalized COVID-19 patients by performing a wide variety of necessary procedures.]

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