NHS
Health Education England

National Review of Radiology Academies

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Contents

Introduction

Health Education England conducted the first formal evaluation of the Radiology Academy training model in 2017. The purpose of the review was to consider the academic performance, service impact and cost-effectiveness of the three Radiology Academies established jointly by the Royal College of Radiologists and, what was then, the Department of Health in 2005. The review was undertaken to establish if the original radiology Academy training model remained 'fit for purpose' and to inform Health Education England future decisions concerning, and investment in, Clinical Radiology training infrastructure.

Given the explicit multi-professional approach Health Education England takes to managing the quality of education and training for all healthcare learners, consideration was given in the review, to accessibility of Radiology Academy training infrastructure to wider multi-professional imaging and clinical teams.

The review generated a fair and balanced assessment and its findings were well received by stakeholders. This summary is being made available to a wider audience to share the main findings of the review. We hope it will be useful to the health professional community and will provide a springboard to develop support for education and training across the wider multi-professional healthcare workforce.

The findings should be of interest to local workforce planning and commissioning bodies and NHS provider Trusts considering development of further education and training academies to help ensure they are cost-effective and support development of the multi-professional clinical workforce at local, regional and national level.

This review, and the activity that follows from the recommendations, should ensure that imaging professionals and their patients continue to benefit from Health Education England investment in high quality training resources and educational infrastructure.

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Executive summary

This review was the first formal evaluation of the RA training model. The review considered the organisation, academic performance, service impact and cost-effectiveness of the three radiology academies established in 2005 by the Department of Health and Royal College of Radiologists (RCR). Three traditional hospital based schemes from the same HEE regions were included in the review for comparison.

The RA model was considered to have been successful in increasing local clinical radiology trainee numbers.

Academic outcomes of RA trainees were similar to those of non-academy trainees. Academy training was highly structured, used more simulation based teaching and included more formal assessment opportunities than exclusively hospital based training. This appeared to accelerate development and demonstration of early core competencies and progression to independent practice.

The non-clinical (offsite) academy location offered trainees a calm and undisturbed environment better suited to learning than the busy clinical radiology department. RA trainees were more satisfied with their training environment and experience than HB trainees.

In addition to standard educational tariff (approx. £12K per trainee per annum) each academy trainee required, on average, additional 'premium' funding of £13.3K per annum. The contribution of educational tariff and academy funding to CR training costs varied between the three academies.

Academy estate and resources appear to be underutilised and thus return on academy investment might be improved, for example through closer scrutiny of how educational tariff and academy funding are disbursed against CR training costs, by increasing the number and type of trainees that academies support, by recovering costs of service provision and non-educational activity undertaken on academy premises.

Non-medical imaging professionals (experienced senior sonographers and reporting radiographers) had a valuable role in academy teaching at two sites and received excellent trainee feedback. The expertise, scope of practice and volume of work undertaken by reporting radiographers had increased where they had access to RA resources and reported alongside radiology trainees and their supervising consultant radiologists. Increased cross professional teaching and learning would better reflect current and evolving models of service provision and HEE multi-professional strategy.

Continued investment would build on the success of the radiology academy model, but RA need to work with their Local Offices and professional bodies to develop proposals that would extend the training and development benefits RA provide, across both CR and the wider multi-professional imaging workforce, and deliver better value for money.

Background and review methods

In 2005 the Department of Health and the RCR collaborated to set up three Radiology Academies – Leeds & West Yorkshire, Norwich and Peninsula (Plymouth). These innovative purpose-built training environments were intended to increase CR training numbers and enhance the provision of effective and high-quality specialist training for a medical workforce acknowledged to be suffering a national shortage. The first complete cohort of trainees from the initial pilot project qualified in 2010.

Since 2013, HEE has invested £2.43m per year in the three original RA.

Despite a long-standing record of 100% recruitment to clinical radiology training numbers many radiology departments are unable to meet demand for diagnostic and interventional imaging and approx. 1 in 10 CR consultant posts are vacant (*Clinical Radiology UK Workforce Census 2015 Report*. BFCR16(6). London, Royal College of Radiologists, 2016.). Increases in radiology training numbers and establishment of more radiology training academies have been proposed (*Radiology Training 2016 – 2026: a vision and a solution*. London, Royal College of Radiologists, 2016).

Increasing use of medical / non-medical skill mix, with the development of advanced and consultant practice radiographers to undertake performance and interpretation of a greater range of imaging examinations alongside radiologists, is helping to maintain imaging service productivity - in 2015 for example, 71% departments were using radiographers to report images (*Clinical Radiology UK Workforce Census 2015 Report*. BFCR16(6). London, Royal College of Radiologists, 2016). In addition, some diagnostic imaging and interventional therapeutic image-guided procedures are being undertaken by non-radiology medical professionals (e.g. vascular, emergency care and cardiology clinicians).

Expansion of the non-medical workforce in imaging is fully supported by HEE as part of the wider programme of investment in the multi-professional healthcare workforce. HEE no-longer commissions pre-registration training or post-registration specialist skills development for the non-medical imaging workforce, but remains responsible for assuring the quality of the learning environment and for developing support for life-long learning in this workforce.

Since the performance of the RA had never been evaluated formally, HEE took the opportunity to review their role and achievements and consider if the model remained ‘fit for purpose’. The terms of reference for the review were agreed by HEE and RCR representatives on 24th March 2017 (Appendix 1).

The review was undertaken with a ‘mixed method’ approach using a range of qualitative and quantitative data. The findings are grounded in the knowledge and expertise of clinical radiology training ‘stakeholders’ - those having first-hand experience of providing and participating in RA and HB training, and in local and national process and performance metrics. The review is limited to the data that could be obtained between April – July 2017.

Evidence for the review was collected using:

- questionnaires & proformas – local teams were invited to provide details of their teaching and learning facilities & resources and statistics related to local recruitment and retention of trainees;

- document review – local teams were invited to provide trainee timetables, summary Fellowship of the Royal College of Radiologists (FRCR) examination and Annual Review of Competence Progression (ARCP) data, academy personnel job descriptions & timetables; the panel also considered GMC & RCR trainee performance and satisfaction data and financial information from HEE and from local team business plans, returns & reports;

- visits to training sites - members of the review team visited all three academy sites and the review manager visited three hospital based programme sites to inspect the learning environment and meet with local stakeholders;

- interviews – the review manager and review team members conducted multiple individual and group interviews, by telephone and face-to-face with trainees, local faculty, administration teams and strategic leadership teams (Appendix 2).

Overall academy funding and configuration

In addition to lump sum educational 'tariff' payments paid to Local Education Providers to cover the direct costs of delivering medical education and training (approx. £12K per trainee per annum), RA receive additional HEE funding to cover the costs of providing protected learning spaces and equipment and direct teaching and supervision outside of the normal / hospital based learning environment and administrative support over and above standard tariff funded functions associated with managing an increased number of trainees. HEE invests approx. £2.4m extra per year in the RA scheme.

'Tariff' funding did not appear in RA financial returns or business plans; in both RA and HB training schemes tariff funding did not appear to be ring-fenced for educational activity by host Trusts. The contribution to CR training costs of educational tariff (for teaching and student facilities e.g. library services, some administration and infrastructure activity e.g. pastoral and supervisory support, in-course feedback and assessment) and academy premium funding, policies for allocating expenditure again RA income and recharging costs between academies and hosts Trusts, varied across the academies and needed to be more transparent.

The funding 'premium' varies across the three academies reflecting differences in estate configuration and number of trainees.

The Leeds & West Yorkshire academy, the hub of the West Yorkshire CR training scheme, has the greatest number of trainees but the smallest amount of physical space of the three RA. The Leeds & West Yorkshire academy has no additional estate costs (by implication these are 'tariff' funded), as its dedicated teaching and learning spaces are co-located on existing hospital premises; combined with the highest number of trainees (73.3 Whole Time Equivalent (WTE), headcount 75 trainees), this makes it the most cost-effective estates model. Leeds Teaching Hospitals NHST has a Lead Employer Agreement for the Leeds & West Yorkshire academy trainees who undertake clinical placements at its own (40 trainees) and 6 other NHS Trusts in the region (35 trainees), although on-call payments are made direct.

The Norwich academy occupies the refurbished first floor of a stand-alone building, the Cotman Center, approx. 10 minutes' walk from Norfolk and Norwich University NHS Foundation Trust Hospital. 2016-17 estate costs were £150K. It has 48, and can take up to 50, trainees within existing resource. NNUH acts as the Single Lead Employer for the Norwich CR training scheme which has core and sub-speciality training clinical placements at 10 other DGH hospitals and one tertiary hospital in EoE.

Peninsula Academy has the largest physical space of the three RA - it is the sole occupant of a bespoke design modern two-storey building approx. 1 mile from Derriford Hospital, Plymouth. The building is occupied on a 20-year (2005 – 2025) leasehold basis; in 2016-17 estates (fixed) costs were £395K. The Peninsula CR training scheme covers the Devon & Cornwall southwest peninsula geography; it has 62 NHS and 3 Ministry of Defence trainees and will take an additional NHS trainee in

2017 (n=66 trainees) taking it to capacity. Plymouth Hospitals NHS Trust is the Single Lead Employer for Peninsula NHS trainees who undertake placements at 5 hospitals in the region. Plymouth NHST have SLAs to assign trainees to peripheral sites and recover costs calculated at the average Trust cost of the trainee year group less the average contribution from HEE.

The academy buildings at Peninsula and Norwich have spare capacity and could be better utilised to expand training activity within existing HEE resource. In addition to their HEE training activity, the Peninsula and Norwich facilities are also suitable, and already being used to some extent, to support other activity, e.g. professional society / special interest group / industry study days and courses, service provision (reporting and ultrasound lists). If this activity was offered at competitive commercial rates / recharged to the host Trusts, it has the potential to offset HEE infrastructure costs.

The three hospital based schemes reviewed for comparison all operated from large University Teaching Hospital (UTH) radiology departments. The Severn scheme based in Bristol had 42 trainees, 70% of whom had placements at the three central Bristol hospitals. Bristol Royal Infirmary issued 5-year contracts to all Severn trainees for continuity of HR / payroll functions and uses secondments for peripheral hospital clinical placement rotations. The Cambridge scheme had 29 trainees primarily based at Addenbrooke's Hospital, Cambridge with DGH rotations to Luton and Bury St Edmunds and cardiothoracic sub-speciality placements at Papworth hospital. The Sheffield scheme had 44 trainees, based mainly at the central Royal Hallamshire, Northern General and Sheffield Children's hospitals.

Trainees across all schemes had access to (tariff funded) study, travel and accommodation budgets. All training schemes reviewed had accessed additional HEE monies through competitive regional bidding processes. Further sources of funding included commercial sponsorship (medical equipment supplier funded educational grant to support trainee conference expenses), charitable trusts (ultrasound simulator) and use of RA premises by external organisations, although this was usually not done at commercial rates.

Recruitment & retention

Although the RA initiative was in response to a UK wide need for more radiologists, academies were sited in Norwich and Peninsula to help address local recruitment and retention difficulties, their remote / rural geography & prevalence of small DGH sites arguably making them less attractive. Without the attraction of the Peninsula Academy it was considered unlikely that South West (SW) region could meet local demand for radiologists.

Trainee numbers have increased between two and five-fold in the respective training schemes since the academies were established. The RA schemes had 47.6% (20), 65.5% (19) and 66.7% (29.3) more trainees, respectively, than their regions' large UTH HB schemes reviewed for comparison.

Some capacity increase had been achieved by basing trainees at a relatively large central site, particularly over the core curriculum, and, for example at Norwich academy, incorporating (6 month) clinical rotations to smaller outlying rural DGH sites for ST2 and ST4.

RA trainees considered large number of trainees to be a strength of their schemes, bringing a sense of camaraderie and (friendly) completion / rivalry; this had a positive impact on trainee morale, well-being and job satisfaction as well as driving a desire to perform well. Large numbers also had tangible benefits for service provision - making on call rotas easier to cover.

Trainees suggested they were attracted to academy schemes because of the time, resources, structure, supervision, feedback and assessment available and '*not being thrown in the deep end of service provision'.* Some trainees at HB schemes expressed a preference for training at a single site / over a small geographical footprint, making travelling & accommodation easier.

Training scheme choice was also strongly influenced by local connections - graduating from the local medical school and personal links (family / friends already there) as well as the good reputation the academy had. Trainees without local connections, explained how once in an academy scheme, they settled during training and intended to stay locally post CCT; trainees in the hospital based schemes appeared to face more competition for local posts.

Some trainees wanting to pursue an academic career were attracted to, or transferred out to, the large UTH HB schemes which offered Academic Clinical Fellowships. Increased provision of Academic Clinical Fellowships (ACF) in RA might help attract / retain more trainees. The academy environment is ideally suited to support academic trainees to manage the combined demands of research and clinical learning activity.

Although it was difficult to track trainee numbers accurately, leaver attrition from CR training appeared to be very low (approx. 2%) despite a surprising amount of movement between training schemes.

Retention of trainees locally post CCT varied considerably. Leeds & West Yorkshire RA retained the highest number of trainees locally (63.5%) with 17% attrition (transfers out and leavers); Norwich had the lowest local retention (21.6%) and the highest attrition with approx. 1 in 3 trainees transferring out or leaving their RA scheme before CCT. Peninsula retained just under half of their trainees locally with 15% attrition (transfers out or leavers). Trainees suggested that most transfers were for geographical / family reasons rather than dissatisfaction with the training programme but further, in-depth analysis of transfer and leaver data across the UK might be a useful exercise.

Net transfers out reduced the number of higher trainees (ST4/5) which compromised a schemes' ability to cover service provision / on call rotas and reduced return on the host Trusts' (50%) investment in trainee salaries. RA might have a differential role in supporting initial (ST1) / core curriculum (ST1-3) training across a wider geographic spread of Trusts who could then support a higher number of (ST4/5) trainees or might be suited preferentially to supporting younger trainees with less clinical experience. Some trainees suggested that allocating according to preference, rather than ranking, might help to address consultant post vacancies in academy regions.

Local faculty suggested there was scope to increase RA capacity within existing infrastructure resource at Norwich (to 60, 12 p.a.) and Leeds & West Yorkshire (to 80, 16 p.a). Further increases in capacity, to meet planned service expansion would be contingent on increased rotations to DGH, adequate consultant supervision / recognition of training in job plans, adequate access to work / workspaces in the clinical environment. RA need to work with their local Trusts, commissioners and workforce planners to ensure that training is recognised in their STP, but RA capacity to train appeared to exceed current local demand (RCR, 2016 workforce vacancy and retirement data) thus they could explore the feasibility of cross regional recruitment to fill their training places.

Trusts with large numbers of trainees (RA and HB) benefit from their contribution to service provision and more robust on call rotas for example. Conversely, in small Trusts with low trainee numbers, consultants have a high service provision burden and less time for training activity - making it difficult to increase trainee numbers. Widening access to existing RA teaching, resource and support, to a greater number of DGH based (& funded) trainees might overcome the reluctance of some Trusts to take on more (junior) trainees who inevitably require more supervision and contribute less service than their senior counterparts. The RA approach is particularly suited to managing large numbers of trainees across the core (ST1-3) curriculum.

Supporting the development of academy-style learning environments, with dedicated teaching faculty, administrative support and access to other simulation / TEL resources, would also help alleviate the problem of increasing training numbers in smaller Trusts. Linking this to networked service provision / on call developments should be attractive to service providers and commissioners (Trusts, CCG, STP, CA).

Education and training

Leadership and management

Dedication and passion for Clinical Radiology training were evident during the review. TPD consultant radiologists had extensive experience and expertise in both CR and in education. They were supported by committed faculties of consultant radiologist colleagues in HEE (Head of School, Educational Supervisor) and RCR (College Tutor, Adviser) roles. RA are in an ideal position to establish Clinical Academic Teaching posts and become Centres of Teaching Excellence. Developing a coordinated collaborative national programme of educational research would help build an evidence based body of knowledge to underpin CR education practice and promote educational leadership in the profession.

The review team had no concerns about the quality of CR training in any of the training schemes reviewed. CR training quality was monitored through a combination of national regulatory and professional body surveys (GMC National Training Survey, RCR trainee survey), regional visits, meetings and surveys (HEE Quality Framework, Head of School inspections, Annual Quality Panel Review, School Board, trainee survey) and local measures (TPD / trainee discussions, HEE Trust visits), in addition to review of trainee outcomes (ARCP, FRCR pass rates).

All training schemes reviewed had robust systems in place to identify and manage trainees in difficulty. Serious issues that required referral to the local Educational Support Unit were rare. At all sites trainees felt that personal and academic difficulties were managed sympathetically and effectively. RA administrative teams provided an additional forum for pastoral support of academy based trainees.

The Peninsula academy website included a trainee log in section. In addition to external content the website allows trainees to access training information wherever they are on placement. Resources included induction packs, curriculum documents, annual leave forms, links to external educational and professional sites. Trainees expressed a preference for online timetable management. Future planned website developments included hosting corresponding information for outlier sites, clinical protocols, Junior Radiologists Forum (JRF) information, case studies/interesting cases, Fellowship information, addition of a ‘trainer’ section.

Training scheme organisation

CR trainees meet the competence requirements of the RCR curriculum through a variety of learning methods including formal academic teaching and experiential learning ‘on the job’. ST1-3 years covers the core curriculum and FRCR Part 1 and 2A exams; in ST4/5 years core competences are maintained alongside sub-speciality training and the FRCR 2B examination.

Traditional CR training schemes used a hospital based ‘apprenticeship’ training model where all theoretical and practical training occurred in NHST Clinical Radiology departments using ‘live’ patient case material. Classroom based

consultant delivered academic teaching in these schemes occurred for 1-2 hours per week prior to morning clinical sessions and/or at lunchtimes.

RA schemes could manage larger numbers of trainees because they spent less time in clinical radiology departments, particularly during core (ST1-3) training. All three RA used an integrated training model comprising a blend of 'off site' theoretical learning and simulation interspersed with rotations to NHS Trust Clinical Radiology departments. This reduced the 'early years' training burden (one-to-one supervision, longer examination performance, reporting and reflection [feedback] times, no direct contribution to service provision) on clinical departments. Of note, Severn HB scheme operated a 'semi-academy' model with trainees spending most of their core training time (ST1 100%, ST2/3 50%) in the two large Bristol Hospitals (Southmead and Bristol Royal Infirmary) where some whole group teaching / simulation (peer scanning) sessions were provided.

Each of the three RA adopted a different blend of academy & clinical time.

Academy time **1.0 WTE** **10 sessions per week**	ST1	ST2	ST3	ST4	ST5
Leeds & West Yorkshire	0.6 Sep - Mch 0.4 Apr - Aug	0.3	0.2	Ad hoc	
Norwich	1.0 Sep - Feb 0.2 Mch - Aug	Thursday afternoon	Thursday afternoon	Ad hoc (used for reporting)	
Peninsula	0.5 (two groups; alternate weeks)	0.5	0.33 or 0.5	3 months block/separate	3 months block/separate IR 0.2 (1 day per week)

Peninsula's approach accommodated double the number of trainees as only half were ever in clinical practice at one time, but involved duplicate teaching. Being the smallest RA physically with the largest number of trainees, West Yorkshire's approach freed up academy space for regular (1 day per week) ST2 / ST3 teaching. Each strategy appeared academically effective - the average percentage pass rates for the FRCR 1 exams across the three academies were within 4% of each other (we acknowledge that this impression could be confounded by 'ranking' data).

FRCR pass at 1st attempt (2012 – 2016) – data by training scheme supplied by RCR

	HB1	HB2	HB3	RA1	RA2	RA3	national average
CR1 Physics	98.2	90.7	86	82.4	84.1	80.2	81.7
CR1 Anatomy	96.1	81.1	84.6	86.0	87.3	89.2	82.5
2A 1: Chest	87.5	83.3	83.3	71.6	74.5	77.6	72.4
2A 2: MSK	79.1	64.5	72.9	54.7	61.4	53.4	58.0
2A 3: GI	66.7	77.8	60.0	67.6	78.0	66.2	65.8
2A 4: UroGyn	65.1	70.0	65.9	64.9	73.2	67.1	58.1
2A 5: Paediatric	88.9	87.1	71.1	65.3	75.5	68.2	70.9
2A 6: Neuro	81.4	76.7	65.4	54.4	72.5	68.7	63.2
CR2B	76.1	73.9	83.7	73.5	66.7	63.3	67.5

Differences in structure and organisation of higher sub-speciality training between RA and HB schemes were less noticeable than differences in core training (especially ST1) although the academy continued to offer a preferred learning environment.

Initial RA training was '*highly comprehensive, incredibly well organised and broad*' – (Norwich trainee feedback, written evidence). Although the classroom based '*didactic, structured and intense'* teaching offered by the RA can seem like '*being back at med school*' for trainees that have experience of *'working in a busy clinical team'*, they recognised that formal '*lectures, structured tutorials, demonstrations and hands-on'* simulation gave them a solid grasp of the '*fundamental basics of radiology'* and gave them *a 'solid foundation for future practice'* (ex-Norwich trainees, written evidence, quotes in italics).

RA trainee Workplace Based Assessment targets exceeded RCR minimum requirements with Leeds and West Yorkshire RA suggesting that doubling the RCR recommendations helped them monitor better the performance of trainees on 3 month rotations.

In addition to mock FRCR sessions / revision courses, structured formal in-house teaching and assessment of ultrasound and image interpretation & reporting competence were undertaken at two RA and one HB ultrasound sites. Following successful assessment RA trainees were authorised to undertake and report examinations independently and cover on call duties. This type of of assessment might allow trainees to scan and report independently much sooner, in comparison to an arbitrary 'sign off' process.

Good Practice - Formal directly observed ultrasound clinical assessments

Ability to identify and image anatomical structures and common pathologies evaluated by a senior sonographer and / or consultant radiologist.

In addition to technical skills, assessments include evaluation of the trainee's abilities to communicate and empathise appropriately with patients, manage examination times and work within teams. Gaps in specific examination experience, e.g. gynaecology referrals, can be identified and addressed before a final summative assessment – before trainees are authorised to scan patients independently.

Learning resources

RA offered exceptionally good training spaces and learning resources that were prioritised and protected for learning: e.g. large tiered lecture theatre, seminar rooms, PACS and iMAC suites, skills laboratory containing ultrasound machines, simulators and anatomic models, traditional book and web-based digital image libraries (e.g. OSIRIX). HB programmes offered some dedicated teaching & learning spaces / facilities but these tended to be dispersed or co-located in (busy) clinical departments (offices / meeting rooms). Remote location of academies reduced the risk of distraction and interruptions; close proximity to the normal (Trust based) clinical working environment facilitated consultants' ability to teach and supervise in the academy.

Responsibility for, and attribution of capital (purchase and replacement) and revenue (maintenance, repair) costs for equipment (PACS workstations, ultrasound machines, simulators, Audio Visual and Information Technology equipment) between academy and Trusts varied across the three RA.

Each RA had a large PACS suite where trainees could report in the presence of at least one supervising consultant radiologist – this environment was calmer, less stressful and free from interruption, compared to the hospital setting. Academies were also proactive in securing protected PACS teaching spaces at their associated clinical sites, e.g. 1 or 2 workstations dedicated for trainee use (in a 'registrar' room). In the busy clinical environment HB scheme trainees could not always access PACS workstations, did not always have a supervising consultant radiologist present and were often disturbed by telephone or face-to-face interruptions.

Use of simulation was greater in the RA than HB training schemes and included ultrasound scanning simulators and (normal) volunteer (peer) scanning with clinical ultrasound machines, vascular intervention simulators, paediatric intussusception doll simulator, electronic libraries of verified 'cold' cases. Technology enhanced

learning (TEL) / simulation resources were used for didactic teaching and for self-directed learning and assessment; they reduced patient risk and allowed trainees to develop psychomotor (hand-eye coordination) and pattern recognition skills in a controlled and safe environment.

Structured and supervised TEL / simulation evaluated well in terms of building trainee competence, confidence and speed. It allowed (ST1-3) trainees to develop technical competence earlier than they would be able to do in real life clinical practice as simulation overcame the problem of cases occurring sporadically / opportunistically (in real life) and made the learning opportunity active and experiential, rather than passive and observational. Trainers and trainees believed simulation learning to be transferable and good preparation for 'real world' practice.

RA and HB radiology technical simulation resources were underutilised and could be made more widely available for use across the multiprofessional clinical teams within which radiologists operate. RA off-site learning spaces could also be more widely utilised for non-interpretive non-procedural skills simulation based training across the multiprofessional workforce e.g. human factor errors, communication and consultation.

Good practice

Norwich RA had developed a communications skills strategy in collaboration with 'CAST' – a consultancy based at the University of East Anglia. With HEE Innovation Funding support CAST had delivered a bespoke training programme incorporating sessions on: introduction to communication, radiological consultation skills (breaking bad news, communication whilst conducting procedures and operating equipment in radiology) and MDT meeting communication skills.

Electronic resources were considered complementary to traditional learning methods with RA continuing to host (small) 'text book' libraries. Use of Radiology Integrated Training Initiative (RITI) modules was encouraged but not mandated, access to Stat-Dx (commercially available web-based radiology decision support tool) varied across RA and HB schemes.

RA teleconferencing facilities (for remote access to lectures / webinars) had been installed originally with a view to sharing teaching to trainees in other schemes. These had potential to reduce travelling time & cost and increase participation to geographically dispersed trainees and although some didactic lectures had been delivered, this method was considered not really suited to the majority of CR teaching because of its case-based interactive nature and PACS (image viewing & manipulation) dependence. Regional and national sub-speciality themed teaching days were usually attendance based – the RA facilities being ideal for face-to-face teaching in large groups.

RA trainees valued their unparalleled access to PACS workstations (24 hours a day) and ultrasound scanners, close supervision and feedback and the focus on

dedicated time for training the academy environment provided. In the academy environment there was always a nominated CR (and / or radiographer / sonographer) supervising (reporting) training sessions. In the clinical learning environment (RA and HB) trainees faced competition for resources (equipment and supervision) from other professional groups of trainees (e.g. radiographers, sonographers) - I *had difficulty where there has been a sonographer student… I have missed out on a learning opportunity* (Norwich trainee feedback – written evidence).

Medical Physicists contributed to teaching the science syllabus in RA and HB schemes but many trainees considered the depth and content to be too specialised for their needs and that centrally developed standard bespoke teaching materials might be more suitable.

Research, audit, teaching, fellowships and other indicators of esteem

CR academic Chairs appeared to be particularly supportive of research activity but across the six schemes reviewed, RA trainees were more likely to have protected time and space for research and audit activity than HB trainees. RA supported Doctorate (Philosophy, PhD; Medicine, MD) OOP Research (OOPR) opportunities for trainees at sites that were not designated UTH / Academic Departments.

Two of the UTH HB schemes had National Institute of Health Research funded academic clinical trainees. The Leeds & West Yorkshire RA had recently established a CR research fellowship (OOPR) as part of the Leeds Teaching Hospitals NHST strategy to develop an Academic Dept. of Radiology and secured funding to appoint its first ACF in 2017 – a similar approach was being encouraged at Norfolk & Norwich UH. Encouraging these initiatives and building closer links with HEI would support development and raise the profile of radiology as an academic discipline.

Time and opportunity to conduct service based audit and quality improvement projects and undertake management and leadership projects varied. RA trainees did not have the same responsibility as HB trainees for organisation of their clinical rotations but had plenty of other management and leadership opportunities e.g. undertake Lead ST or Training / Teaching Lead roles, represent CR ST colleagues at in the RCR JRF and on Trust groups and organise on-call or teaching rotas, organisation of study days / teaching sessions (peer & undergraduate medical).

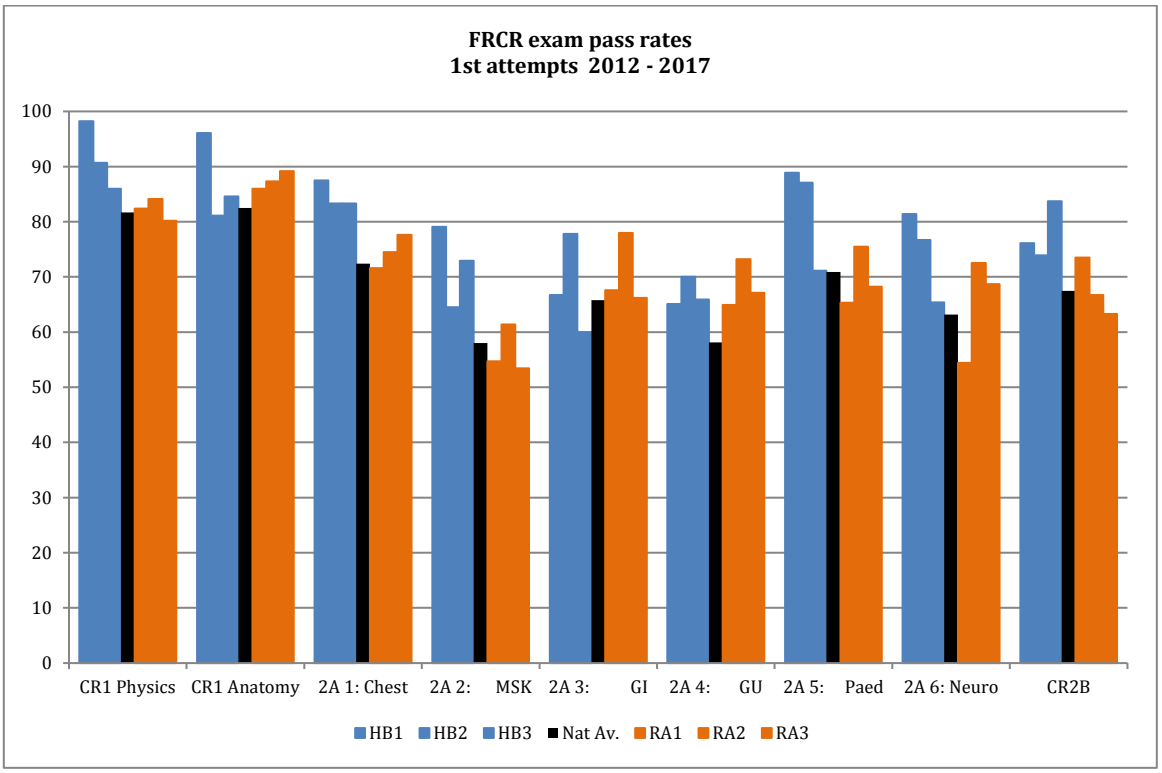
Good practice

Peninsula academy incorporated MDT style discussions into their teaching sessions – this gave trainees simulated experience of MDT participation, in addition to observation of real MDTs, before they have to participate actively / lead them.

National and international fellowships and access to external postgraduate qualifications (Clinical Education, Healthcare Leadership and Management, Business Administration) were available to trainees from all schemes reviewed. All training schemes reviewed offered fellowship opportunities to both local trainees and through national competitive application.

Trainee outcomes

RCR data demonstrated that the three HB schemes reviewed had higher FRCR first attempt pass rates than the national average. In comparison, success rates for trainees based in the three RA were similar or slightly lower to those of the HB trainees reviewed and more closely aligned to the national average success rates. The review team acknowledge that this comparison is confounded by, and not limited to, the effects of: individual trainees who move locations, or into and out of training, and the baseline ability of trainees on entry to training (ranking at recruitment and selection).



GMC data (FRCR pass rates by attempt, aggregated for 2014 - 2016) demonstrated that the performance of trainees in the three HEE regions that had academies was, generally, within national (UK) benchmark (BM) limits.

GMC ARCP data revealed rising rates of unsatisfactory outcomes across the UK for 2010 – 2016. Although Peninsula was noted to be a high outlier in 2015 and 2016, this was the only RA to be separately identifiable in otherwise regionally (YH, EoE) reported data.

Trainee satisfaction

Regional and local faculty and leadership teams reported no significant problems with CR trainees overall. All the trainees who participated in the review expressed satisfaction overall with their training programmes.

Radar plots of GMC National Training Survey scores for 2016 suggested that trainees in RA schemes were more satisfied with their training experience than those in HB schemes. The focus of praise for RA trainees was invariably primary emphasis on training, as opposed to service provision, educational support (supervision, formative assessment and feedback), range of experiences available, and the extra administrative and pastoral support available in academies. HB trainee concerns related to clinical supervision out of normal working hours and access to PACS workstations in quiet undisturbed locations.

2017 GMC National Training Survey data supported the overall impression given by stakeholders contributing directly to the review. The GMC data showed a tendency for low outliers for HB trainees (clinical supervision, educational governance, feedback, induction) and more high outliers for RA trainees (out-of-hours supervision, workload, support, regional teaching). Trainer scores for resources and support were low outliers for HB schemes; curriculum was a high outlier for both RA and UTH HB schemes; resources, rotas, training time, development and overall satisfaction being high outliers for RA schemes.

Staff costs

Radiologist teaching

All staff involved directly in CR training held contracts with NHS hospital Trusts. Attribution of staff costs to HEE (Local Office), Local Education Provider tariff and HEE RA premium funding was complex, inconsistent and lacked transparency.

HEE Local Offices funded Head of School (0.2 WTE, 8 hours per week), TPD (0.1 - 0.2 WTE, 4-8 hours per week) and assistant / deputy TPD (0.05 - 0.1 WTE, 2-4 hours per week x1-4) roles in RA and HB training schemes although Trust SPA (Supporting Professional Activity) allocation for this varied across schemes.

Some Trusts recognised training scheme roles with (tariff funded) PA (Professional Activity) financial responsibility supplements (TPD), fractional (hours) PA allocations (assistant TPD); other roles (Educational Supervisors) were not recognised with additional pay and had to trade training time (e.g. 2 hours per week) against clinical PA time on a goodwill / ad hoc basis. One Trust recognised contribution to educational activity with (tariff funded) 0.25 SPA per trainee / week in consultant job plans.

HEE provided additional funding of £404K - £453K per annum to RA for pay costs associated with direct teaching and administration staff. The largest staff pay cost was consultant radiologist salaries (approx. 2.0 WTE [20 PA @4h = 80h per week] per academy) for direct teaching and supervision of reporting sessions on academy premises). 'On the job' direct teaching and supervision of (academy) trainees on clinical attachments in hospital radiology departments was covered by the Placement Fee component of the Local Education Provider 'tariff'. Where teaching was not provided by the Trust hosting the RA, for example, it was provided under a SLA with another Trust, at an equivalent rate of £100 per hour. One RA funded an (0.2 WTE - 1 day per week) 'Academy Lead' role within their consultant radiologist allocation to work in a coordination role with the TPD and aTPD to deliver the programme, review organisation, provision & quality of training and develop the academy / its future potential.

> ***Good practice***
>
> Leeds & West Yorkshire RA produced monthly reports on quality and quantity of training delivered – these were used for audit / accountability, to review impact on exam results, they fed into consultant appraisal and job planning. They were considered to motivate and improve the performance of the teaching consultants, ensured their release from clinical commitments and raised the profile of investment in development of future workforce.

Peer teaching was considered to be inspiring & motivating and reduced / supplemented the need for consultant teaching. Post-CCT (ST6) teaching fellows, or timetabling sessions for ST4/5 trainees, including those undertaking external postgraduate qualifications in education, was used for image interpretation and

ultrasound teaching, core curriculum, clinical sub-specialty training and / or for leading interesting case discussions. HB schemes incorporated more peer teaching because they had less consultant funded / recognised teaching time than RA.

Multi-professional teaching

The expertise of senior radiographers & sonographers was recognised with a significant number having formal roles in teaching (radiography, image interpretation, ultrasound), supervision (checking of commenting / reporting, ultrasound lists) and assessment (ultrasound competence). This was more structured and formalised in RA schemes. Trainee evaluation of radiographer / sonographer led teaching was excellent and attributed to their expertise and confidence developed through high volumes of, for example A&E (Accident & Emergency) acute cases (image interpretation). A multi-professional approach to training, and service provision, combining the relative expertise of each profession was believed to improve the quality of local diagnostic examination performance and reporting.

Formal involvement in CR training was a good developmental opportunity for senior non-medical imaging professionals and contributed to the 'education' pillar of the career and competence framework for advanced and consultant practitioners. Radiographers / sonographers were less comfortable teaching / supervising CR trainees in traditional HB training schemes possibly due to their involvement being informal, not recognised in job plans, less of a priority than supervision of radiographer / sonographer colleagues and maintaining service provision.

Financial recognition and funding of the contributions of sonographers and radiographers to CR training varied across the three RA. Arguably, RA 'premium' funding should cover *off site* (non-service provision / cold case) teaching, supervision, assessment, peer scanning and simulation. All other activity, i.e. '*on the job'* hospital department based teaching / supervision (cases that contribute to service provision) is covered by placement tariff funding. Better clarification and identification of a standardised funding allocation for radiographers / sonographers in RA pay allocations would recognise and reward their established role in CR training, underpin HEE multi-professional approach to teaching and learning, and provide a springboard for developing the remit of RA to support postgraduate training across the wider imaging workforce.

Administration staff

A robust and well organised administrative infrastructure was fundamental to successful management of RA estate and resources and organisation of academy teaching and clinical placement rotas for large numbers of trainees across multiple clinical sites over a large geographic footprint. The RA administrative team also served as a centralised source of pastoral support for trainees. Configuration of the RA administration teams was varied to reflect local context (size of estate and complexity of management) and talent (professional background, experience and abilities).

All RA had a ‘Business Manager’ (range 0.6 WTE Band 6 - 1.0 WTE Band 8b) for strategic management of corporate services and business activities (administration, finance, HR, estates), operational oversight of educational activity and line management of non-clinical staff. Each RA had an operational administrator (range 0.73 WTE Band 3 - 0.5 WTE Band 5) to provide day-to-day administrative support for the academy & trainees and manage delivery of teaching. Additional support staff covered office duties and clerical services for trainees and consultant radiologists, front-of-house clerical and cleaning and security house-keeping functions (range 0.5 WTE Band 2 - 1.0 WTE Band 3). Academy premium funding was also being used to funded a 25h (0.67 WTE) A&C Band 2 Archivist post at Peninsula to support digitisation of two radiographic film collections of important historical significance purchased from the former Royal National Orthopaedic Hospital.

HEE Local Office, Postgraduate Medical Education (PGME) centre and local Trusts were the only sources of administrative support for HB training schemes. Local administrative support for TPDs and trainees in HB schemes (essentially consultant radiologists’ secretaries) was less robust than in RA schemes. Additional administrative support for traditional HB training schemes could bring some of the advantages of the RA approach but at significantly less cost. Dedicated administrative support might help ensure that CR trainees, and the wider healthcare team, were able to access all available teaching opportunities / sessions and that all available teaching resources were utilised to maximum effect. Existing academies might expand their remit to encompass this; in other geographic locations coordinating administrative support on a regional basis could deliver a *'virtual academy'* experience.

Service provision & cross charging

It was acknowledged that speciality trainees contributed to service provision during their training, e.g. interpreting and reporting imaging investigations, performing imaging / image-guided procedures; RA had targets for trainees to maintain competence in image interpretation and ultrasound throughout training (Appendix 3). This contribution to service provision was recognised financially in 50% Trust funding of ST basic salaries and out-of-hours (on call) supplements.

Combining education and training with service provision has educational value and use of any spare RA capacity for service provision could be mutually beneficial, generating income to offset RA costs and reducing Trust outsourcing expenditure, for example. Sometimes, however, it was difficult to separate education and training from service provision and a potential 'conflict of interest' was noted where radiology service provision could be subsidised by HEE 'premium' funding to academies

For example, 'supervised' lists where trainees interpreted and reported 'live' cases in academy PACS suites with clinical staff available for ad hoc consultation / second opinions as and when needed. Trusts benefitted from the additional (estate & equipment) resource of the RA, and an increased number of cases being interpreted (by an increased number of trainees) and if undisturbed, clinical staff reported cases as if in their normal hospital environment. Some normal service reporting sessions even took place on academy premises because the staff considered the environment better suited (quiet, dark, undisturbed).

Senior trainees (ST4/5) also delivered clinical ultrasound lists on RA premises and some training lists (direct supervision and longer appointment times) were organised in Trust clinical radiology departments. In the latter example one academy reimbursed the Trust for supervising sonographer time (at commercial agency rates), one incurred no direct cost to the local RA, at the other RA academy there was a SLA to cover one session (3.5h) per week of teaching / supervision.

Scheduling of clinical MDT meetings in an RA lecture theatre co-located on Trust premises, combined service provision with an on-site learning opportunity for trainees. In contrast, use of academy facilities for operational activity (consultant offices & associated clerical support, delivery of organisational training and development) had no education and training value for CR trainees and was of no value to without recognition (reimbursement / re-charging) in RA budgets.

The ability of some Trusts, in particular smaller DGHs, to support on call placements was limited because of an increasing tendency for outsourcing of out-of-hours work. RA are ideal environments for networked / out of hours reporting collaborations - Peninsula Radiology on call (PROC) being a collaborative venture providing networked overnight on call in radiology for 4 acute NHST in the SW Peninsula from a single location. PROC is managed by Peninsula PG School of Radiology and staffed by ST supported by a consultant at each location optimising out-of-hours learning & supplementing day time learning. Emerging networked reporting sites should be encouraged to consider the value of incorporating academy style teaching opportunities for CR trainees and reporting radiographers.

Multi-professional learning

In addition to delivering CR speciality training RA delivered teaching activity that supported the education, training and professional development of medical students and other postgraduate medical trainees, RA activity had also evolved over time to include some support for the education and development of non-medical healthcare professionals (Appendix 4).

Some of this was organised by and incorporated into the timetables of senior CR trainees, to help them fulfil the 'teaching' and 'leadership and management' requirements of the FRCR syllabus; some activity was organised and run by radiographers / sonographers, many of whom had high profile positions and reputations as expert practitioners in national professional organisations.

All three RA had the potential to host training hubs for non-medical image interpretation and ultrasound training – some of which could be achieved within existing (space and equipment) and staff resource (access to ultrasound scanners and clinical placement supervision). Further formal appointments of consultant / advanced practice radiographers and sonographers to RA teaching faculty, and their engagement with HEE national and local initiatives, e.g the maternity programme 'obstetric ultrasound 200' project, the Integrated Imaging Workforce Working Group sonography subgroup, would facilitate this.

The concept that medical and non-medical imaging professionals who work together might learn together was explored during the review. Some of the CR teaching delivered by RA, and some HB, schemes was 'open' to radiographer / sonographer imaging professionals, but medical / non-medical shared learning was rarely offered within a planned and structured strategy of inter- / multi- professional education. Despite some considering inter- / multi- professional learning to be relevant only to team (human factor) functions and non-clinical areas of the syllabus (audit, quality improvement and research methods for example), clear benefits from including radiographers, who were often more experienced in image interpretation than ST1/2 radiology trainees, in ST1 image interpretation teaching and giving reporting radiographers and trainee reporting radiographers access to the academy reporting environment were evident at the two academies where this occurred. Multi professional learning had been instrumental in the development of the reporting radiographer services at Leeds and Norwich for example, doubling the number of reporting radiographers, extending their scope of practice, quadrupling the number of their reporting sessions and the number of cases they reported, managing demand without outsourcing. Shared learning (training and supervision) and practice environments gave immediate access to second opinions, improved inter-professional team working culture and enabled radiographer professional development into a teaching role.

The review underlined the added value that radiographers bring to CR training. Closer links between RA and HEI providing postgraduate radiographer training could increase the reach and therefore cost-effectiveness of HEE investment in RA and HEI resources. Greater involvement of CR teaching faculty in sonographer and radiographer training could help assure quality standards and promote safe medical /

non-medical skills mix across the clinical imaging service. RA were beginning, and are encouraged, to explore this further.

Summary conclusions

Clinical Radiology continues to face workforce challenges as the range and volume of service demand on the specialty increases. This review, the first of its kind, evaluated the three Radiology Academies – Leeds & West Yorkshire, Norwich and Peninsula set up in 2005 by the Department of Health and the RCR. The review encompassed evaluation of three traditional (non-academy) training schemes in order that contrasts and comparisons might be drawn. The review findings are grounded in, but also limited to, data supplied by local training scheme stakeholders, publicly available data and data provided on request from central HEE and RCR sources from April - July 2017.

The review demonstrated the benefits of the RA and how the model has been successful in expanding local CR training numbers and offering a high standard of training alongside the more widespread traditional hospital based approach to training. The RA model did not demonstrate any overall advantage over exclusively hospital based training, but had boosted training in more rural areas and had increased output overall in terms of CR consultant numbers. The review did not support the creation of additional Clinical radiology training academies as configured currently.

The three initial RA had been successful in fulfilling their original aim of increasing clinical radiology training numbers - they had doubled the number of CR trainees in their respective training schemes and regional geographies and had been producing trainees fit to practise as consultant radiologists since 2010. FRCR exam performance outcomes of RA trainees were comparable to those of non-academy trainees (at or above the UK average). CR trainees' satisfaction overall was high. Learning in the protected environment of the academy setting improved training quality and enhanced trainee learning experience.

RA had a highly-structured approach to teaching. The quality of the learning environment and trainee learning experience was higher in RA schemes because trainees had greater access to protected learning spaces, educational resources including more technology enhanced and simulation based learning, and more direct consultant supervision. Structured and supervised simulation offered an active and experiential learning opportunity. Alongside more formal assessments than HB schemes, this enabled RA trainees to develop technical competence earlier than they would be able to do in real life clinical practice. Accelerated learning and development of early core competences helped RA trainees transition from full supervision to working independently more confidently and sooner than their contemporaries in HB schemes.

An efficient and adequately resourced administrative infrastructure was essential for managing RA teaching estate and resources and large numbers of trainees at multiple clinical placement sites across a large geographical footprint. In RA and HB schemes, the Single Lead Employer model provided trainees with administrative stability and continuity throughout their training and reduced the administrative burden on trainees and smaller District General Hospital (DGH) placement sites.

Training in RA was more expensive in comparison to training in traditional HB schemes because of the additional costs to fund estates, off-site learning resources and administrative infrastructure. In addition to normal 'training tariff' (c.£12K per trainee) RA required average supplementary funding of £13.3K per trainee per year in comparison to HB trainees (tariff funding only). Financial attribution and reporting of academy and tariff funded activity, and recharging for non-HEE activity (e.g. service provision), varied between the three academies.

RA estate and resources were underutilised. Return on HEE investment could be improved by recovering some overhead costs (making spare building, resource and staff capacity available to other groups for educational activity), other associated healthcare related income generation activity (cross charging for clinical meetings / service provision) and by use and cross charging for combined learning and service provision, e.g. to support networked reporting, reduction in outsourcing.

Multi- / inter-professional education and training in RA did not reflect current and evolving models of service provision. Return on HEE investment could be improved by expanding RA access to support multi- / inter-professional education and training across the wider healthcare workforce (post-graduate reporting radiographer and sonography education) and to better support required increases in sonographer and reporting radiographer training and placement capacity.

Recommendations

The review team proposed that HEE works with the professional imaging community to build on the success to date of the existing RA and to improve return on its investment. The following recommendations were proposed to support continued provision of high quality training to increased numbers of CR trainees, minimise financial risk to HEE and promote safe and sustainable medical / non-medical skills mix in future service provision.

The review team recommended that:

HEE supports RA to continue to provide high quality education and training for CR trainees by continuing to invest in the estate and resource infrastructure of the three existing RA;

HEE supports RA (and HB) training schemes to maximise CR trainee numbers and training capacity using the existing three RA resources to support national, as well as local, demand for increased CR training, working closely with Trusts and commissioning bodies (CCG, STP, CA); where feasible this should be across traditional and geographic organisational boundaries with consideration of the Single Lead Employer model to support training and practice across multiple Trusts.

HEE clarifies financial expectations and works closely with RA and their host Trusts to improve financial record keeping and reporting processes; to include establishing the true cost of radiology training, clarifying, standardising and agreeing the relative contributions of educational tariff and academy premium funding, identifying where overhead / running costs might be reduced or recovered and developing cost-effective proposals for continued investment;

HEE maximises its return on RA investment by supporting the existing three RA to expand their scope of activity to encompass support for education and training of the multi-professional workforce that contributes to clinical imaging service provision, e.g. developing formal relationships with Higher Education Institutions (HEI), and other education providers to facilitate cross professional teaching and learning, increase clinical placement capacity and expand training, supervision and life-long learning opportunities for non-medical imaging professionals, e.g. sonographers, midwives, reporting radiographers.

In addition, the review team recommended that:

HEE should share good organisational practices identified in RA to better support Training Programme Directors (TPD) and trainees working more closely with them and their Trusts to improve the educational experience of HB trainees by identifying tariff funded operational support (educational and operational support roles, e.g. clinical supervision and administration, recognised in job plans) & securing improved access to CR specific educational resources and protected learning spaces (simulation equipment, Picture Archiving & Communications System [PACS] workstation access, radiographer / sonographer / radiologist supervision).

Good educational practice identified in the review be shared regionally and nationally – e.g. simulation, formal roles for sonographers and (reporting) radiographers in the training, supervision and assessment of CR trainees; pre on call assessment of competence, OSIRIX & cloud based digital image libraries.

RA develop support for training a wider range of stakeholders in clinical imaging, e.g. to raise awareness and understanding that could improve referral and access to imaging (demand management);

HEE supports the development and implementation of additional regional and national clinical imaging academies / academy-style learning environments / academy-style arrangements, working with Trusts, HEIs, local workforce planning and commissioning bodies (e.g. CCG, STP, CA) and the national radiology and radiography professional bodies to ensure these are cost-effective, multiprofessional and support regional and national clinical imaging workforce development plans.

HEE encourages local / regional / national networked reporting / on call services to offer academy-style learning environments and supervised clinical training placements for CR trainees and reporting radiographers.

Next steps

HEE Executive approved the National Review of Radiology Academies report and recommendations on 3rd October 2017. A Review Implementation Steering Group was established in in December 2017 with the following membership:

Mr. Patrick Mitchell	Regional Director, HEE South. Project Sponsor
Dr. Julia Whiteman	PGD, HENW London, HEE Lead Dean for Radiology
Dr. Anne-Marie Culpan	HEE Project Director – Imaging Education
Mr. Jon Hossain	Deputy PGD, HE Yorkshire & the Humber
Ms. Rozeen Mahroof	Senior Business Partner (tariff development), HEE
Mr. Jeremy Brinley-Codd	Assoc. Director of Finance, Guy's & St Thomas' NHSFT
Dr. William Ramsden	Medical director, Education & Training, RCR
Mrs Charlotte Beardmore	Director of Professional Policy & Practice, SCoR

The Terms of Reference of the Steering Group were:

1. to oversee, coordinate and monitor implementation of the HEE National Review of Radiology Academies recommendations;

2. to receive and consider plans and proposals from host Trusts on how they will operationalise the Review recommendations;

3. to consider workforce need and the need to work within available resources and to ensure that the future multidisciplinary nature of academies is central to all proposals considered;

4. to assist and support the work of HEE National, Regional and Local teams to respond to the proposals arising from the respective academies to develop in line with the Review recommendations;

5. to consult with the national bodies representing the imaging workforce, and be cognisant of their education and training workstreams, including the Royal College of Radiologists (RCR) and Society and College of Radiographers (SCoR);

6. to make recommendations to HEE Executive on future investment in the three radiology training academies reviewed;

7. to supply regular reports to HEE Executive concerning progress against implementing review recommendations;

8. to consider how evolving models of clinical imaging academies / networked services might benefit from the findings and next steps of this Review.

The Steering Group will report to HEE Executive in March 2018 making recommendations about Radiology Academy funding for the 2018-2019 financial year and outlining a proposal for future governance and oversight of the Radiology Academies.

Appendix 1 - Terms of reference

1. Compare the three academy-based radiology training programmes (Leeds &West Yorkshire, Norwich and Peninsula) with three hospital based programmes from the same HEE regions (Sheffield; Cambridge; Severn).

2. Audit training programme facilities and capacity, including how the current academies are using technology enhanced learning and utilising opportunities for multiprofessional learning.

3. Review process & outcome data for trainees exiting programmes 2010 to 2016:
    - 3.1 audit training programme content & delivery;
    - 3.2 audit trainee outcomes;
    - 3.3 review trainee satisfaction;
    - 3.4 review the impact of any multiprofessional learning activities;

4. Compare where possible, recruitment & retention, impact on local vacancies; local trainee retention after CCT.

5. Compare relative costs of each scheme and proposed investment plans.

6. Collect evidence of any ‘added value’ / ‘return on investment’, e.g. use of facilities / shared learning with other professional groups; ‘conflict of interest’, e.g. learning ‘capacity restriction’ - down time / income generation from clinical service provision.

7. Make recommendations to inform HEE future support and investment decisions about radiology training academies.

Appendix 2 - Stakeholders contributing to review

HEE

PGD / Deputy PGD
Head of School
TPDs / aTPDs
PG Postgraduate Medical School Manager

Local faculty

Academy Lead Radiologist

Consultant Radiologists including - educational supervisors, curriculum / special interest / clinical / research / resource / museum leads, RCR tutors, individuals with experience of / at academy lead site, DGH sites, pre-academy trainee, head of training when academy set up, first academy trainee cohort, previous academy TPD, academic Chair; Advanced /

Radiographers - (reporting) radiographers, sonographers, practice educator.

Strategic leadership team - (in addition to above)

COO

Medical Director / Associate Medical Director, Director of Clinical Professions / Care Group Manager

Director / Deputy Director / Associate Director of Finance / Finance Manager / Trust finance representative / Senior Business Advisor

Chief / Clinical Director Radiology / Imaging; Imaging Service Manager

RA Administration team

Academy (business) manager; Administration manager; Academy / radiologist secretaries

Trainees

Academy – 43; Hospital based – 18;
including ST1 – 5, recent post CCT, LTFT, OOP

Appendix 3 - Service provision / competence maintenance targets

	'Plain Film' Reporting (unaided)	**Ultrasound**
ST1	1000 (S - Severn) 750 (P -Peninsula) 1200 – 2000 (1000) (N - Norwich)	Hands on under supervision (S) 200 (N)
ST2	2000 (S) 2200 – 3000 (N) 3000 (P)	Hands on under supervision (S) 600 (N)
ST3	3000 (S) 2200 – 3000 (N) 3000 (P)	400 (N)
ST4	4000 (S) 3200 – 4000 (4500) (N) 4500 (N, P)	Academy based service list (P) 600 (N)
ST5	5000 (S) 2000 – 3000 (3500) (N) 4500 (P)	Academy based service list (P) 400 (N)

Appendix 4 - Additional activity

Medical

Academy	Target audience	Educational activity
Norwich	University of East Anglia - Norwich Medical School undergraduate medical students	3 hours x 6 days / 1 day lectures, interactive (case discussion) workshops and production of workbooks
	Surgical (ST2/3) registrars	overview of acute CT / GI path with PACS based CT image viewing / discussion
	Obstetrician / gynaecologist, midwives, vascular surgical ST, Emergency dept. practitioners	1 week basic ultrasound (theory & practice) course; access to ultrasound equipment and simulation
	CR ST, Consultant body (& radiographers)	RCR / British Institute of Radiology IR national training days / meetings Local Special Interest group evening meetings
Leeds & West Yorkshire	University of Leeds undergraduate medical students	medical student placement in radiology undergraduate Medical Society; breakfast club Radiology image library – available on university intranet; resource for exam cases
	Foundation year doctors	taster sessions and electives FY post in radiology administered through RA
Peninsula	F1/F2, medical students	Open days; taster weeks (clinical) / days (academy)
	CR ST with an interest in IR (nationally)	Interventional (basic and beyond basic) courses
	CR ST nationally	FRCR 2B revision course
	CR ST nationally	Cardiac CT course (run by GE Healthcare - equipment manufacturer) Society of Cardiovascular Computed Tomography
	Psychiatry & Radiology healthcare professionals	Neuroimaging in dementia
	ST3, junior doctors – region	Chest & MSK imaging
	Radiologists, trainees and radiographers	Monthly CME days – morning prior to audit in afternoon; includes visiting Professorial presentations National Special Interest group (British Society of Interventional Radiology, British Society of Urological Radiology, Society of Radiologists in Training) meetings / conferences

	Surgical trainees / surgeons, Medical practitioners	Basics Surgical Skills course, Core Laparoscopic Skills (Royal College of Surgeons accredited) ATLS (Advanced Trauma Life Support)

Non-medical

Academy	Target audience	Educational activity
Norwich	Emergency Nurse Practitioners	2 day image interpretation course run by reporting radiographers; Develop and maintain web based resource *www.imageinterpretation.co.uk*
	Sonographers	Regional General Medical ultrasound study day open to sonographers / doctors / students
	Reporting radiographers, including students	Access to PACS suite for teaching and supervised reporting
	Undergraduate radiographers	Image interpretation and ultrasound teaching
Leeds & West Yorkshire	Dental students, vascular surgical trainees, AHPs (radiographers)	CR ST physics sessions
Peninsula	Support workforce / nurses	Plymouth Hospitals NHST Learning & Development dept. courses – Care certificate, HCA (Health Care Assistant) Level 1-3, Apprenticeship / Assistant Practitioner / Nurse Associate; IV drug, cannulation, venepuncture, catheterisation, managing confused patient
	Multiprofessional	Organisation & development – non-clinical skills – appraisal, coaching & mentoring, preceptorship, management and leadership
	Multiprofessional	Resuscitation & clinical education - Advanced / Intermediate / Paediatric Life Support, European Trauma course; Instructors course

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