Title - Clinical Academic Radiographers – a challenging but rewarding career.

Authors:

Ian Craig Simcock [a, b, c] - Ian.Simcock@gosh.nhs.uk

Ruth Reeve [d, e] - R.Reeve@soton.ac.uk

Carole Burnett [f, g, h] – Carole.Burnett1@nhs.net

Carolyn Costigan [i, j] - Carolyn.Costigan@nuh.nhs.uk

Helen McNair [k] – Helen.McNair@rmh.nhs.uk

Claire Robinson [l] - Claire.Robinson@uhl-tr.nhs.uk

Owen John Arthurs [a, b, c] – Owen.Arthurs@gosh.nhs.uk

Affiliations:

[a] Department of Clinical Radiology, Great Ormond Street Hospital for Children, London, UK.

[b] UCL Great Ormond Street Institute of Child Health, Great Ormond Street Hospital for Children, London, UK.

[c] National Institute of Health Research, Great Ormond Street Hospital Biomedical Research Centre, London, UK.

[d] Diagnostic Imaging Department, Portsmouth Hospitals University NHS Trust, Portsmouth , UK.

[e] University of Southampton, Southampton, UK.

[f] Leeds Teaching Hospitals NHS Trust, UK.

[g] Leeds Institute of Medical Research, University of Leeds, UK.

[h] Leeds National Institute of Health Research Biomedical Research Centre, UK.

[i] Nottingham University Hospitals NHS Trust, Nottingham, UK.

[j] National Institute of Health Research, Nottingham Biomedical Research Centre, University of Nottingham, Nottingham, UK.

[k] Royal Marsden NHS Foundation Trust and Institute of Cancer Research, London, UK.

[l] Imaging Department, Leicester Royal Infirmary, Infirmary Square, Leicester, UK

Corresponding Author:
Mr Ian C. Simcock
Radiology, Great Ormond Street Hospital for Children, Great Ormond Street, London, UK
Email: ian.simcock@gosh.nhs.uk
Telephone: +44 (0) 207 405 9200 (x0562)
Twitter: @ian_simcock

Conflicts of interest:
The authors declare that they have no competing financial interests.

Classifications:
Clinical academic career
Research capacity
Workforce development

Abbreviations:

AHP	Allied Health Professional
HEE	Health Education England
HEI	Higher Education institution
KPI	Key performance indicators
NHS	National Health Service
NIHR	National Institute of Health Research
NMAHP	Nursing, Midwifery and Allied Health Professionals
SCoR	Society and College of Radiographers

Funding:
Acknowledgements:
This work was supported by the National Institute of Health Research [ICS - ICA-CDRF-2017-03-53, HMcN - ICA-SCL-2018-04-ST2-002 and OJA - NIHR-CDF-2017-10-037]. This article presents independent research and the views expressed are

those of the author(s) and not necessarily those of the funding bodies or the Department of Health & Social Care

Abstract

Objectives

To explain what a clinical academic career can be, what it can lead to for the individual, profession and most importantly the patient, and why these roles are so important to Radiography.

Key findings

Multiple challenges to the adoption of clinical academic careers exist, including achievable measurable outcomes, visibility & senior support, and balancing different time demands.

Equally the rewards are wide ranging and can advance both the individual and profession through role extension opportunities, increased career progression, patient benefits, and academic and research skills.

Conclusion

Clinical academic careers can provide advantages for the individual, department, profession and most importantly the patient with advanced clinical practice through evidenced based research.

Implications for practice

Improving clinical academic careers within Radiography will promote research participation and increase radiographic roles in patient-centred research delivery and development. Combining evidenced based research with academic skills will lead to improved patient care and better clinical outcomes.

Keywords:

Clinical academic

Research leadership

Research capacity

Research capability

Workforce development

Introduction

Clinical academics are health researchers who actively research ways to improve patient care and deliver better clinical outcomes, whilst also providing good clinical care. The clinical academic role is often hosted by or in partnership with higher education institutions (HEI) alongside the clinical role, ensuring that any research is directly engaged with the issues of patients and services (1). Research and evidence-based practice are core features of the National Health Service (NHS) within the UK, and other healthcare providers around the World, enabling improvements in patient treatment for current and future generations through advancement in clinical practice (2-4). Engagement and leadership in research within the radiographic professions has been key for the development of imaging techniques and advancing patient treatment (3). The clinical academic role enables radiographers to maintain a clinical career and undertake research rather than having to choose between the two (5), although clearly other roles such as consultant radiographers and clinical researchers also play valuable roles in conducting clinical research. Anecdotally, radiographers have been more involved with research delivery, recruiting, imaging, and treating patients, rather than instigating and leading research projects. Many barriers can inhibit clinical academic aspirations (1, 3, 6, 7), but there are now funding schemes for radiographers (8-10) which can provide them with personal funding to run and direct research independently. However, the number of research studies that empower radiographers by being in a decision-making position, such as Chief Investigator are few. Without these examples of research leadership within radiography individuals may become disconnected from the principles of research within their own practice (11).

Allied health professions form the third largest workforce in the UK (12), in 2007 there was a concerted step change in thinking and the need to develop research capability and capacity within this diverse group of professions was recognised (6, 13, 14). This has resulted in dedicated funding streams being created by Health Education England (HEE), the public body that coordinates public health education and training within England, and the National Institute of Health Research (NIHR) which funds research into health and care within the UK. Together these fund individuals to complete training through research qualifications from Masters, through doctoral level and on to senior clinical lectureships (10).

The NIHR recognises a wide range of professions, with different opportunities available for them to become research active. In recognition of this, the non-medical pathway was developed, providing ring fenced monies to the non-medical professionals (15), although this remains largely focussed on nursing and midwifery. Whilst only 0.1% of radiographers were studying for or hold a PhD award or equivalent, the majority are education based and supported by their employing Universities (16). Up to 2021, fewer than 10 radiographers have been awarded fellowships through the NIHR funded Integrated Clinical Academic Programme, out of several hundred applicants. Whilst Radiography is a relatively small AHP group, it is important that as a profession we are competitive in applying for this valuable funding.

Radiographers can play a significant role in research delivery: for example, recent advances in enabling adaptive radiotherapy have improved outcomes for patients

with bladder cancer alongside introducing an advanced practice competency in therapeutic radiographers (17, 18). In alignment with this, radiographers also lead in the improvement of patients' clinical outcomes through advanced evidence based clinical practice following rigorous research (19-23).

In addition to the NIHR, other professional organisations, Universities and healthcare organisations are now embracing clinical academic partnership models in order to develop a cadre of clinical academics, forming strategic relationships with other professional organisations (24) with this model also applicable to the independent healthcare setting. The Society and College of Radiographers (SCoR) have committed to providing grants for radiographer-led research and by becoming a non-commercial partner to the NIHR, these studies may be eligible for NIHR Clinical Research Network support if recruiting patients for clinical trials (9). Such funding streams allow for direct academic supervision, links to a HEI and the progressive development of increased research independence, with the aim of developing future clinical academic leaders (25). In this way, radiographers can increase the visibility, leadership, and capability of Allied Health Professionals (AHP) to deliver research that is relevant to the public within the NIHR's remit (15).

Challenges and Benefits for Clinical Academic Roles

Clinical academic careers can provide a variety of impacts, both on a personal level and as a group of professionals, summarised in Table 1. This article discusses those challenges and benefits relevant to the radiography profession.

Challenges

Access to Funding

Providing funding for clinical academic radiographers allows targeted research within multiple radiographic specialities and has a direct impact through improved patient benefit (11, 17). The challenges for radiographers are the same as for other professional groups in that funding streams are highly competitive and may require senior mentorship and supervision over several application attempts to become successful. Although there are now an increasing number of funding streams available, it is often difficult to identify the most appropriate funding. To combat these barriers, organisations such as the NIHR, HEE and SCoR within the UK have increased the visibility of these schemes through greater publicity and by supporting individuals to become more successful in applications through encouraging mentorship and supervision (9, 26). However, the challenge remains post fellowship funding, to maintain and develop these clinical academic posts with suitable support and direction (27, 28).

Although doctoral (or PhD equivalent) funding can provide full salaried support allowing full-time commitment to the clinical academic research role, post-doctoral posts require investment from healthcare providers to support these posts. With these new clinical academic roles requiring time to develop and prove fruitful, employers may be reluctant to provide this additional funding in the short-term, creating a potential bottle-neck in the clinical academic pathway before the advantages are fully recognised. Whilst not yet widely available, institutional support is important in attracting and retaining high calibre applicants and therefore embedding research into practice (27, 29, 30). Long term strategic vision will enable this specialised new role to grow, thus promoting evidence-based practice and developing a variety of skills throughout the whole workforce. It will also allow opportunities for subsequent grant applications to be developed, which will in turn will attract further funding to imaging and radiotherapy departments. One way to develop this role is by secondment from a healthcare clinical role into an academic one, such as that developed recently by Sanders et al., (27). It is recognised that clinical pressures both in terms of patients and workforce numbers, make this a challenging model to implement as it requires significant long-term vision and executive support. However, anticipated benefits include increased staff retention, financial advantages for the department and increased clinical practice standards (27).

Support

Successful completion of any post-registration qualification requires dedication by the individual, and support from their employer, either in study time and/or funding.

However, in practice it is often difficult to facilitate academic time and back-fill appropriately which causes a major barrier to undertaking research.

To develop academically and design and perform a study within a chosen speciality requires a comprehensive training and support system. Fellowship applications require the trainee to arrange suitable academic supervisors with expertise in a methodological area, whilst clinical supervisors should possess expertise within the clinical field of study. Selecting appropriate supervisor/s and mentor/s with proven previous experience and enthusiasm is key to developing within this arena (28).

The majority of post-doctoral radiographers (over 60%) within the UK are employed within academia (16). However, there is also expected to be a marked reduction in the number of radiography academics employed by HEI over the coming decade due to retirement (31). This will result in a loss of senior academic mentors to oversee the development of key academic skills within radiography. Clinical academic roles could provide these skills, and due to their placement in both clinical and academic institutions, accessibility may be increased for those professionals who have no contact with a HEI.

Links between healthcare providers and HEI are essential in allowing access to resources, both in terms of bridging grants, access to suitable support systems including statistics, software development and ethics training to ensure optimal efficient practice is developed (30). It is the combination of clinical research combined with suitable academic training, often accessed through academic institutions, that allows healthcare institutions to affect clinical impacts.

Continued support after successful completion of doctoral study will allow the individual to build on the skills and knowledge enabling them to move to the next

level in their research career (30, 32, 33) allowing role development to progress (1, 27, 33). Providing guaranteed research time after doctoral qualification can enable individuals to thrive but requires advance job planning before research study completion (27). Combining this future planning with a collaborative network is likely to have a positive impact on patients and professionals at all levels (1, 33).

Measuring Outcomes

Multiple measures can be used to assess the impact of the appointment of a clinical academic, including grant income and academic output in the form of conference proceedings, invited talks and journal papers. These are analogous to direct key performance indicators (KPIs) in a clinical role such as the number of scans performed, or number of patients treated. However, in this developing role, an open discussion is required between the clinical academic and their line manager about achieving these hard metrics, allowing a clear jointly agreed development expectation. Other forms of impact that are less easily measured but are equally important include increases in institutional reputation, professional advancement and diversification, staff morale, staff retention, but can be more difficult to justify to managers as value added (29). Being a valued member of staff, increases job satisfaction and engagement with other professions, as well as knowledge sharing, education, and increased exposure to evidence-based practice within a department (32).

All these outcomes have a role to play in determining the success of the clinical academic role, however the lack of clinical outcome measures for radiography

means that demonstrating the effectiveness of our research remains challenging. These difficulties are equally applicable to other healthcare research settings: would assist not only in validating the clinical academic role but also determining investment value.

Realistic time management and job descriptions

Clinical academic job descriptions can be extremely wide ranging and could easily become over-bearing and directionless, leading to a failure to provide impact. Whilst clinical academics may be a specialist within a particular clinical area, they also have wider generic skills in supporting aspiring researchers and promoting future research. This could be through providing advice and support in designing and adopting research into clinical practice, along with skill development in dissemination. It is imperative that an appreciation of the individual challenges within a department and the aims of both management and the clinical academic align (1). This allows a personalised approach to the clinical academic job description, allowing for mutually beneficial priorities the academic, department and institution to be identified (27). This will bring focus and clarity to the role, whilst avoiding over-expectation or unmanageable outcomes, ensuring targeted success can be delivered.

Research/Clinical Job Matching

Success in any hybrid role requires a job plan that has been agreed by the employee and their managers, who may have their own targets, yet accurately reflects the job and its objectives and be continually assessed with goal setting in performance

development reviews (28). Therefore, a clinical academic role could allow individuals to work clinically, develop grant applications, lead research studies and act as a principal investigator whilst also promoting research interest within the workforce through supervision and mentoring, within a realistic timeframe (25). However, individuals' strengths and departments priorities make it difficult to create a "one size fits all" job description.

There will also be an understanding that the individual will progress their own research career by applying for future grant funding where they will act as lead investigator and grow the team. Project or fellowship grants are highly competitive and require a high level of planning, evidence of support from a HEI and healthcare institution in combination with a collaborative network of professionals. This can be described as the right person, in the right place, with the right project and having the right people to support them. Such grant applications take a large amount of time to develop, and this should be factored within the job description. Published guidance on these appointments is extremely helpful in setting priorities and ensuring that 2 jobs with shared goals are created, allowing a combined structure to the role rather than an impossible number of targets (5).

Some post-doctoral grant funding allows 50% salary for an individual's post with the host partner expected to pay the other 50% of their salary, emphasising the need for long-term investment. Financial support for the clinical academic post may need to be flexible to ensure consistency in salary, with full salary costs being provided by the employer organisations when a gap in grant funding exists. This requires a flexible long-term strategy by the HEI or healthcare institution to allow the individual to plan long-term goals and to feel supported. Currently, these posts are not

commonplace although there are examples of previous boundary spanning success within healthcare institutions (6).

Investment in clinical academic roles within radiography is essential to ensure that the profession is not left behind and has the appropriate staff and funding to promote and advance research. Pump priming these clinical academic positions, allowing individuals time to develop comprehensive grant applications, and development of their research skills through supportive networks will ensure this specific career pathway will develop into the future, paying dividends in improved patient benefit.

Benefits of Clinical Academic Roles

The benefits are evident from current clinical academics, where changes led by research and evidence-based practice are improving the care for patients in health care settings in the NHS (24, 34). These combined roles allow a transfer of knowledge, innovation, and practices across a “theory-practice gap”, resulting in several benefits for patients, healthcare organisations and individuals (21-23, 35-37).

Increased Patient Benefit

There is a growing body of evidence demonstrating that being research active within a healthcare organisation is beneficial for patient care (38, 39). Positive differences do not only come from patient outcomes through developing care and interventions but have also been shown to improve the environment for patients and staff. When admitted to more research-active hospitals often patients have better confidence in staff and are more informed about their condition and care (34).

Patient benefit is and always should be the cornerstone of all health-related research with provision of an optimal, efficient service the end goal. Advancement of clinical practice can only truly be assessed through evidence-based research. The provision of appropriate funding, time and staff to cultivate these attitudes, whilst also developing and pursuing appropriate studies will provide evidence of patient benefit (1). Clinical academics can assist in leading this change, providing the skills for a department and profession to move forward and lead healthcare into the future.

Increased research skills

Advanced research skills require both theoretical and practical development throughout a clinical academic career and must be nurtured and refined. Whilst some generic skills are taught during all degree programs, they are often underutilised in clinical roles with the pressures modern healthcare practice brings (40). This lack of use often hinders a professional's long-term ability to interpret research evidence and incorporate it into clinical practice. However, it is the ability to interpret and question evidence, before incorporating it into clinical practice that will advance the profession. By supporting clinical academic roles for nursing, midwifery and allied health professions (NMAHP), these skills can be shared and extended throughout the professions, creating a culture of improvement (40).

Within the UK there also exists an opportunity to embed clinical research within radiographic and radiotherapy departments with its relevance to the Care Quality Commission (CQC) well-led framework. This iterates that research active hospitals have better patient outcomes and promotes clinical research as an opportunity for good patient care as a founding principle, and thus funding a clinical role can help an NHS Trust reach CQC targets (41).

Role extension opportunities

Collectively, role extension has resulted in wide reaching improvements to many NMAHP departments over the past decades, both in terms of cost efficiencies and patient benefit. Within diagnostic and therapeutic radiography, we have seen the impact of a multitude of skill developments from cannulation to consultant practice, to radiographers leading on primary image reporting, and leading novel therapies and

techniques. All these advances have allowed individuals to extend their clinical reach and impact on patient care. Clinical academic careers should also be viewed with the ability to provide leadership within the world of research and to increase the accessibility of evidence-based practice (25, 32).

Visibility

Clinical academics can provide a focus for research within a department and across different professions but require a platform within an institution from which to work and become visible. Supporting collaborations at executive level can enhance an institutions standing amongst multiple professions and create a “can do” attitude throughout the workforce (1) allowing alignment with the institution’s values (29). These collaborations can help clinical academics who are expected to develop their skills and expand their support networks, through engagement with local, national and/or International collaboratives. These areas are recognised as important for personal and professional development, as well as career progression (15). Such collaborations can increase the visibility of research leaders within an institution who can provide a link between clinicians, academics, and clinical academics along with commitment and direction. By radiographers becoming more visible in senior roles, engaging with other organisations at a senior level, leading studies, attracting research grants, and becoming advocates or champions for their specialty will all show the positive impact an academic career can have (33). It will also signpost where academic careers will progress to clinical academic pathways, thereby encouraging the development of future research leaders.

Career progression

Clinical academic careers also provide another specialised career pathway. One example is the HEE / NIHR Integrated Clinical Academic Programme structure which offers five levels of award from pre-doctoral, doctoral, and post-doctoral levels, up to senior clinical lecturers. This career structure offers guidance to the professional as to a defined progression, however, it is recognised that most individuals do not enter at the beginning or continue to the peak but take a more non-linear route! Therefore, at this early stage of development, guidance may come from other professions and career mentors who have also followed an academic pathway alongside a clinical role. Models do already exist within other professions (27) and it is together as a combined professional workforce that NMAHP can exert pressure on institutions, to demonstrate the continued need to develop and support these roles. Guidance is also available from the Council for Allied Health Professions research framework which consolidates existing AHP research frameworks (42). This can assist in structuring conversations, activity planning and offer a coordinated approach to plan clinical academic careers (43).

Conclusion

Radiographers need to be leading the efforts to embed patient-focussed research into the profession within the NHS (44). The national vision is for all imaging and radiotherapy departments to have a local research strategy with more of the workforce working towards doctoral-level research training (44). Clearly many of these issues discussed in this manuscript apply equally to other similar AHP practitioners, including sonographers. Clinical academics are at the forefront of

changing this research landscape within the healthcare workforce, with radiographers looking to fulfil their research potential.

Clinical academic careers provide a range of advantages for the individual, department, profession and most importantly the patient, by advancing clinical practice through evidence-based practice (11). However, this will require support in terms of time, education, and funding from healthcare institutions with a long-term view to allow career progression and development (28, 30, 33). The existing models and continued commitment of funders and the professional bodies, alongside managers and professionals alike, can ensure that clinical academics are a valuable resource which will advance our profession.

References

1. Westwood G, Richardson A, Latter S, Macleod Clark J, Fader M. Building clinical academic leadership capacity: sustainability through partnership. Journal of Research in Nursing. 2018;23(4):346-57.
2. NHS England/Policy PaIIaRU. NHS England research plan 2017 [cited NHS England. Available from: https://www.england.nhs.uk/wp-content/uploads/2017/04/nhse-research-plan.pdf.
3. Gambling T, Brown P, Hogg P. Research in our practice—a requirement not an option: discussion paper. Radiography. 2003;9(1):71-6.
4. ICT, Independent Cancer Taskforce. Achieving world-class cancer outcomes-a strategy for england 2015-2020. 2020.
5. Carrick-Sen D, Richardson A, Moore A, Dolan S. Transforming healthcare through clinical academic roles in nursing, midwifery and allied health professionals. A practical resource for healthcare provider organisations. Council of Deans; 2016.
6. Cowley A, Diver C, Edgley A, Cooper J. Capitalising on the transformational opportunities of early clinical academic career training for nurses, midwives and allied health professionals. BMC Med Educ. 2020;20(1):418.
7. Hurt E, McLoughlin A. Facilitating research amongst radiographers through information literacy workshops. J Med Libr Assoc. 2021;109(1):112-9.
8. NIHR, National Institute of Health Research. Link to Internship eligible professions: National Institute of Health Research; 2019 [Available from: https://www.nihr.ac.uk/documents/heenihr-ica-programme-eligible-professions-and-regulators/12204?pr=.
9. SCoR, The Society and College of Radiographers. College of Radiographers Industry Partnership Scheme Research Grant 2021 [Available from: https://www.sor.org/about-us/awards/corips-research-grant.
10. HEE, Health Education England. HEE Clinical Academic Careers. A framework for optimising clinical academic careers across healthcare professions. 2012.
11. Andersson BT, Lunden M, Lundgren SM. Radiographers' academic development in Sweden: Towards and after a doctoral degree. Radiography (Lond). 2020;26(4):275-81.
12. NHS, National Health Service Improvement and England. Allied health professionals supporting patient flow: A quick guide. 2018.
13. UKCRC, United Kingdom Clinical Research Collaboration. Developing the best research professionals. Qualified graduate nurses: recommendations for preparing and supporting clinical academic nurses of the future Online2007 [Available from: https://www.ukcrc.org/wp-content/uploads/2014/07/Nurses-report-August-07-Web.pdf.
14. NCRI, National Cancer Research Institute Clinical and Translational Radiotherapy Research Working Group (CTRad). Strategic vision 2021 [Available from: https://www.ncri.org.uk/how-we-work/ctrad/strategy/.
15. NIHR, National Institue of Health Research. NIHR CRN Allied Health Professionals Strategy 2018-2020 Online: National Institue of Health Research; 2018 [Available from: https://www.nihr.ac.uk/documents/nihr-crn-allied-health-professionals-strategy-2018-2020/11530.
16. Snaith B, Harris MA, Harris R. Radiographers as doctors: A profile of UK doctoral achievement. Radiography. 2016;22(4):282-6.
17. Duffton A, Li W, Forde E. The Pivotal Role of the Therapeutic Radiographer/Radiation Therapist in Image-guided Radiotherapy Research and Development. Clin Oncol (R Coll Radiol). 2020;32(12):852-60.
18. McNair HA, Hafeez S, Taylor H, Lalondrelle S, McDonald F, Hansen VN, et al. Radiographer-led plan selection for bladder cancer radiotherapy: initiating a training programme and maintaining competency. The British journal of radiology. 2015;88(1048):20140690.

19. Patel E, Tsang Y, Baker A, Callender J, Hafeez S, Hall E, et al. Quality assuring "Plan of the day" selection in a multicentre adaptive bladder trial: Implementation of a pre-accrual IGRT guidance and assessment module. Clin Transl Radiat Oncol. 2019;19:27-32.
20. Huddart R, Hafeez S, Lewis R, McNair H, Syndikus I, Henry A, et al. Clinical Outcomes of a Randomized Trial of Adaptive Plan-of-the-Day Treatment in Patients Receiving Ultra-hypofractionated Weekly Radiation Therapy for Bladder Cancer. Int J Radiat Oncol Biol Phys. 2020.
21. Shelmerdine SC, Simcock IC, Ciaran Hutchinson J, Guy A, Ashworth MT, Sebire NJ, et al. Post-mortem micro-CT for non-invasive autopsies: Experience in > 250 human fetuses. American Journal of Obstetrics and Gynecology. 2020.
22. Simcock IC, Shelmerdine SC, Hutchinson JC, Sebire NJ, Arthurs OJ. Human fetal whole body post-mortem microfocus computed tomographic imaging. Nature Protocols. 2020. (accepted for publication).
23. Burnett C, Wright P, Keenan AM, Redmond A, Ridgway J. Magnetic Resonance Imaging of synovitis in knees of patients with osteoarthritis without injected contrast agents using T1 quantification. Radiography (Lond). 2018;24(4):283-8.
24. Westwood G, Fader M, Roberts L, Green S, Prieto J, Bayliss-Pratt L. How clinical academics are transforming patient care. Health Service Journal. 2013;2021(21-01-2021).
25. Nightingale J, Fowler-Davis S, Grafton K, Kelly S, Langham C, Lewis R, et al. The role of Allied Health Professions and Nursing Research Internships in developing a research culture: a mixed-methods exploration of stakeholder perspectives. Health Res Policy Syst. 2020;18(1):122.
26. NIHR, National Institute of Health Research. HEE-NIHR Integrated Clinical Academic Programme 2021 [Available from: https://www.nihr.ac.uk/explore-nihr/academy-programmes/hee-nihr-integrated-clinical-academic-programme.htm.
27. Sanders J, Malcolmson J, Philpott Jones S, Kelly J. Embedding post-doctoral clinical academic careers in practice: The St Bartholomew's Hospital model. J Clin Nurs. 2020.
28. Henshall C, Kozlowska O, Walthall H, Heinen A, Smith R, Carding P. Interventions and strategies aimed at clinical academic pathway development for nurses in the United Kingdom: A systematised review of the literature. J Clin Nurs. 2021.
29. Newington L, Alexander CM, Wells M. What is a clinical academic? Qualitative interviews with healthcare managers, research-active nurses and other research-active healthcare professionals outside medicine. J Clin Nurs. 2020.
30. Avery M, Westwood G, Richardson A. Enablers and barriers to progressing a clinical academic career in nursing, midwifery and allied health professions: A cross sectional survey. J Clin Nurs. 2021.
31. Knapp KM, Wright C, Clarke H, McAnulla SJ, Nightingale JM. The academic radiography workforce: Age profile, succession planning and academic development. Radiography (Lond). 2017;23 Suppl 1:S48-S52.
32. Stutzman S, Olson D, Supnet C, Harper C, Brown-Cleere S, McCulley B, et al. Promoting Bedside Nurse-Led Research Through a Dedicated Neuroscience Nursing Research Fellowship. J Nurs Adm. 2016;46(12):648-53.
33. Pattison N, Deaton C, McCabe C, Coates V, Johnston B, Nolan F, et al. Florence Nightingale's legacy for clinical academics: A framework analysis of a clinical professorial network and a model for clinical academia. J Clin Nurs. 2021.
34. Jonker L, Fisher SJ, Dagnan D. Patients admitted to more research-active hospitals have more confidence in staff and are better informed about their condition and medication: Results from a retrospective cross-sectional study. Journal of Evaluation in Clinical Practice. 2019;0(0).
35. Rutty GN, Robinson C, Amoroso J, Coats T, Morgan B. Could post-mortem computed tomography angiography inform cardiopulmonary resuscitation research? Resuscitation. 2017;121:34-40.

36. Morgan B, Adlam D, Robinson C, Pakkal M, Rutty GN. Adult post-mortem imaging in traumatic and cardiorespiratory death and its relation to clinical radiological imaging. The British journal of radiology. 2014;87(1036):20130662.
37. Parker H, Hoad CL, Tucker E, Costigan C, Marciani L, Gowland P, et al. Gastric motor and sensory function in health assessed by magnetic resonance imaging: Establishment of reference intervals for the Nottingham test meal in healthy subjects. Neurogastroenterol Motil. 2018;30(12):e13463.
38. Boaz A, Hanney S, Jones T, Soper B. Does the engagement of clinicians and organisations in research improve healthcare performance: a three-stage review. BMJ Open. 2015;5(12):e009415.
39. Ozdemir BA, Karthikesalingam A, Sinha S, Poloniecki JD, Hinchliffe RJ, Thompson MM, et al. Research activity and the association with mortality. PLoS One. 2015;10(2):e0118253.
40. Bagley K, Hoppe L, Brenner GH, Crawford M, Weir M. Transition to Nursing Faculty: Exploring the Barriers. Teaching and Learning in Nursing. 2018;13(4):263-7.
41. Research NIfH. CQC inspections to give more exposure to clinical research taking place in NHS trusts 2019 [Available from: https://www.nihr.ac.uk/news/cqc-inspections-to-give-more-exposure-to-clinical-research-taking-place-in-nhs-trusts/20352.
42. Harris J, Cooke J, Grafton K. Shaping Better Practice Through Research A Practitioner Framework. Council for Allied Health Professions Research; 2019.
43. Harris J, Grafton K, Cooke J. Developing a consolidated research framework for clinical allied health professionals practising in the UK. BMC Health Serv Res. 2020;20(1):852.
44. Radiographers SaCo. Society and College of Radiographers Research Strategy 2016-2021. 2016.