Inequalities of provision of nationally funded clinical academic training awards for healthcare professionals: quantitative comparisons across the four nations of the UK.

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2024

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Declaration of interest

The authors report no declarations of interest. This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

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Ethical permissions and consent

Not applicable. Anonymised data were obtained from government agencies via Freedom of Information requests.

Trial registration

Not applicable.

Abstract

Background

There is a common perception that investment in clinical academic training awards for healthcare professions (not medicine and dentistry) in England outweighs that in the devolved nations (Scotland, Wales, and Northern Ireland) of the United Kingdom.

Aims

We aimed to evaluate this perception by gathering data on the number of such awards made and the level of associated expenditure by each of the nations during 2017-2022.

Methods

Freedom of Information requests were sent to government agencies that provide nationally funded clinical academic training awards in each UK nation. Data on the number of awards provided, the whole time equivalent salaries and durations applicable, and the expenditures entailed in the period 2017-2022 were broken down into six levels of training; from internship through to post-doctoral. Standardised per capita comparisons were made between nations.

Results

Large differences were found between nations. Only England provided awards in all categories. Wales made the most awards per capita. Scotland invested less than a sixth of that spent by England per capita and under half of that spent by Wales or Northern Ireland.

Conclusions

Strategic approaches focusing on opportunities across the whole career pathway, particularly in the devolved nations, are recommended to achieve cross-national parity.

Keywords

Health Personnel; Health Services Research; Training Support; Fellowships and Scholarships; Career Mobility; United Kingdom

Introduction

Definition of healthcare professions

The definition of healthcare professions (HCPs) used in this study included nursing, midwifery, arts therapies, dietetics, healthcare science, occupational therapy, orthoptics, orthotics, paramedicine, pharmacy, physiotherapy, podiatry, prosthetics, psychology, radiography, and speech and language therapy. These professions align, broadly speaking, with the eligibility criteria for such awards across the four nations. Medicine and dentistry were excluded.

The value of clinical academics

There is international quantitative and qualitative evidence that healthcare organisations that are more research-active provide higher quality and safer care, superior patient outcomes, better patient experience, and beneficial impacts for the workforce, including better service culture and employee recruitment and retention (Majumdar et al., 2008; Clarke & Loudon, 2011; Boaz et al, 2015; Newington et al., 2021).

A ‘clinical academic’ can be defined as a healthcare professional who works within and across both clinical and academic environments (Carrick-Sen et al., 2016). This could be in the form of jointly funded posts, externally funded fellowships, or any of a complex set of different arrangements which can exist in practice. These can exist across the career pathway from internships for early career professionals to clinical professors in leadership roles. Clinical academics can generate research that not only addresses service priorities but also has the clinical credibility to lead the translation of evidence into routine practice (Coombs, 2012). Among nurses, midwives and allied health professionals (NMAHPs), the

previous awarding of a fellowship is associated with a higher likelihood of being research-active subsequently (Avery et al., 2022).

Recent clinical academic career developments for healthcare professionals in the UK

'The Finch Report' (UKCRC, 2007), with its recommendations for clinical academic research training and career progression for nurses, may be considered a watershed for presenting a vision for HCPs' clinical academic careers in the United Kingdom (UK). Since its publication, various models of clinical academic engagement and infrastructure funding have been established in the UK to support capacity building in the wider group of HCPs. Even so, it has been reported quite recently that NMAHPs are likely to be further on in their career before embarking on a clinical academic pathway and do not benefit from the same time or financial support compared to their medical clinical academic colleagues (Trusson et al., 2021). Having said that, in recent times, there have been concerns about the longer term sustainability of the clinical academic workforce in the medical profession in the UK, including a 30% drop in readers and senior lecturers between 2024 and 2021 (Medical Schools Council, 2024)

Although there is no lack of professional ambition in relation to clinical academic careers, as indicated by many professional societies in the UK having published strategies or statements of intent subsequent to *'The Finch Report'* (e.g. Royal College of Occupational Therapists, 2019; The Chartered Society of Physiotherapy, 2020; The College of Radiographers, 2021), it is true to say that the various professions have moved at differing paces in this area. For instance, in 2011, the 'Modernising Pharmacy Careers Programme' highlighted the need for an urgent review of the pharmacy academic workforce in the UK, including opportunities for pharmacists to undertake PhD and postdoctoral research and access to grants specifically

for pharmacists (Smith & Darracott, 2011). The subsequent picture of the pharmacy academic workforce and, in particular, the inclusion of clinical academics is unclear. In 2022, there was a UK-wide 'call for evidence' by a collaboration of national organisations (Pharmacy Schools Council, 2022) to determine the extent of commitment to the development of a new generation of research active pharmacy professionals who combine clinical and research responsibilities within their role. The findings have yet to be reported. Paramedic professional training only became all-graduate in the UK in 2018 (College of Paramedics, 2023a), so unsurprisingly, the number who have obtained clinical academic training awards is small (College of Paramedics, 2023b). In 2017 a clinical academic career pathway for healthcare scientists was described as 'currently under development' (AHCS, 2017) but, other than that, we found nothing in the literature commenting on the development of clinical academic careers for either healthcare scientists or psychologists.

Hence, despite encouraging developments over the past 15 years, there remains the need to grow both capacity and capability for research substantially across the range of HCPs in the UK.

Devolved government in the UK

Over the past 25 years, the UK has implemented a partially devolved system of government. Through Acts of the UK Parliament, legislative parliaments or assemblies have been established for each of the nations of Scotland, Wales and Northern Ireland (e.g., Scotland Act 1998; Government of Wales Act 1998; Northern Ireland Act 1998). The balance between devolved powers and those reserved by the UK parliament varies across the three nations. However, within the overall limits of the annual budgetary settlements determined by the UK

parliament, each devolved nation has the power to determine healthcare spending in their national jurisdiction.

Differing approaches to clinical academic careers across the four nations

In England, personal development research awards for HCPs have been available, from pre-doctoral through doctoral studies and postdoctoral career establishment, for more than 20 years via Department of Health funding. The administration of these awards has been under the auspices of the National Institute for Health Research[2] (NIHR) since its inception in 2006 and the range of awards has undergone various iterations; the most significant of these is the establishment of the Integrated Clinical Academic Programme (ICA) (HEE/NIHR, no date). In August 2023, NIHR announced a further expansion of both the number and types of awards available to HCPs across the career span in England that forms one element of a broader range of research support initiatives for HCPs (NIHR, 2023a). This represents a massive increase in infrastructure investment of £30 million per annum.

National investment in England saw the establishment of Collaborations for Leadership in Applied Health Research and Care (CLAHRC) from 2008 (Gerrish, 2010), which were regional infrastructure partnerships between the National Health Service (NHS) and academia based around health themes. A restructuring took place in 2019 with the NIHR awarding £135 million over five years to establish 15 Applied Research Collaborations (ARCs) across England. Each NIHR ARC is made up of local providers of NHS and care services, NHS commissioners, local authorities, universities, private companies and charities, with a focus on seven areas of national priority (NIHR, 2024).

[2] Later renamed National Institute for Health and Care Research

Recent research strategies or strategic plans for nursing (NHS England & NHS Improvement, 2021), midwifery (NHS England, 2023) and allied health professions (Health Education England, 2022) emphasise the commitment to clinical academic careers in England. Key strategic appointments have been made, including a Director for Nursing and Midwifery Research at NIHR. NIHR also established 'incubators' (NIHR, 2023b), such as the Nursing and Midwifery Incubator, which offered a network of mentors and promoted opportunities for research development at all career stages. Since 2023, a national network of Senior Research Leaders has also been established in England for nursing and midwifery (NIHR, 2023c), building on the former 70@70: NIHR Senior Nurse and Midwife Research Leader (SNMRL) Programme that had been established in 2018 as part of the celebrations of the 70 year anniversary of the NHS (Menzies et al., 2023). The role of both programmes has been to promote an integrated research culture, be a local champion for clinical academic careers and nursing and midwifery research, encourage research collaborations and expand networks. For the Allied Health Professions (AHPs) in England, there have been several recent initiatives seeking to achieve this strategic ambition (NIHR, 2019), and the NIHR Clinical Research Network has an appointed Head of Allied Health Professionals. NIHR has recently appointed to a new post of Associate Director for AHPs. The approach in England is characterised by quite comprehensive and sustained national investment.

Scotland's investment in clinical academic opportunities for HCPs over the past two decades has involved separate major initiatives without sustained focus on the whole career pathway. The last research strategy for nursing, midwifery and the allied health professions, *Choices and Challenges,* was published in 2002 (Scottish Executive Health Department, 2002) and led to two separate 5-year investments: an NMAHP Research Training Scheme at the doctoral training level followed by the establishment of three regional academic/NHS

research consortia that also included investment in capacity building at doctoral and postdoctoral levels. The NMAHP Research Unit, funded by the Scottish Government's Chief Scientist Office (CSO), was established in 1994 (and subsequently disbanded in 2023) and led a Clinical Academic Careers Programme 2014-2018 that included two separate capacity building programmes for nurses at master's level and postdoctoral level, although the number of awards made was relatively modest (twelve at master's and three at postdoctoral level). Since then there has been little coherent national strategic intent, although doctoral and early postdoctoral fellowships for all professions have been introduced over the past couple of years by CSO. In 2021, the Scottish Government, through NHS Education for Scotland, funded six pharmacist clinical academic fellowships at master's degree level to focus on research priorities linked to the national plan for the development of pharmacy services (Scottish Government, 2017). In September 2023, the CSO reconfigured its fellowship offerings further by introducing the CSO NHS Researcher Development Fellowships (Chief Scientist Office, 2023), which can be used either as an internship-type placement or as a pre-doctoral bridging award. However, this does not represent a new investment but rather a redistribution of the same level of investment across different fellowships. A National Research Advisory Group was established in Scotland by the Chief Nursing Officer in 2022 that extends its focus across HCPs; membership also includes the chief officers for allied health professions, pharmacy, and healthcare science, the chair of the Council of Deans for Health Scotland, representatives of the Chief Scientist Office and NHS Education for Scotland, and several senior HCP leaders in Scotland's health boards and university schools. However, it remains unclear at this stage whether this group's remit includes the aim of developing a national strategy in this area.

Health and Care Research Wales (HCRW) has offered clinical academic awards for HCPs since the early 2010s, and the Welsh Government has funded the Research Capacity Building Collaboration Wales (RCBCW) since 2005 to take a national approach to HCP capacity building and the development of clinical academic roles. The collaboration involves six academic departments that provide a shared infrastructure and funded support for research fellowships across much of the career framework. It has also established a 'Community of Scholars' involving mentorship and master classes and includes an annual two-day residential meeting. Despite this prolonged investment, the 'Research Career Pathways Project' recently proposed 17 recommendations to improve opportunities for research career pathways for health and social care researchers in Wales (Health and Care Research Wales, 2022).

In Northern Ireland, the Health and Social Care Research and Development Division of the Public Health Agency has funded fellowship awards for all healthcare professionals since 1998, and at various times, these have included doctoral, postdoctoral, career development and clinician scientist fellowships. The Chief Nursing Officer for Northern Ireland has initiated a renewed focus on clinical academic careers for nurses and midwives, although concrete proposals have yet to emerge.

Both Wales and Northern Ireland invest in the NIHR fellowship programmes such that HCPs in those nations can apply for these awards if they wish; Scotland does not currently offer this provision.

Objectives

The purpose of this study was to test the veracity of the perception that the level of investment in nationally funded clinical academic training for HCPs in England has

outweighed that in the devolved nations by quantifying and comparing the national-level provision of funded clinical academic training opportunities for HCPs in each of the four nations of the UK during a recent five-year period. Our overriding aim was to obtain data that could inform national policy discussions in this area of provision. Although we report on the data for all four nations our natural focus is on the implications of these comparisons for Scotland. Comparisons of provision between the different HCPs across the four nations were out of scope, as were comparisons with medicine and dentistry.

Methodology

Study design

This was a retrospective, cross-sectional research design involving Freedom of Information (FOI) requests (Freedom of Information Act 2000).

Setting

Between April and November 2022 FOI requests [see Additional File 1] were sent to, and responses received from, the government agencies of the four nations of the UK that offer nationally available clinical academic training awards for HCPs. These requests were delivered using the procedures and formats needed and as described on the agencies' public websites.

Participants

The participating agencies were as follows:

- England: National Institute for Health and Care Research and Health Education England (HEE)[3]

[3] Subsequently re-branded as 'NHS England'

- Scotland: Chief Scientist Office and NHS Education for Scotland (NES)
- Wales: Health and Care Research Wales and Research Capacity Building Collaboration Wales
- Northern Ireland: Public Health Agency of Northern Ireland (PHA).

Variables

FOI requests sought information on the number of clinical academic[4] training awards made to nurses, midwives, allied health professionals[5], pharmacists, psychologists, healthcare scientists or paramedics during the five financial years April 2017-March 2022. For each award made, the agencies were asked to provide information on the duration of the award and, where applicable, the whole time equivalent (WTE) salary supported (or value of stipend where relevant). Furthermore, the agencies were asked to give a breakdown of the data by the following categories of award:

- Internship[6]
- Pre-doctoral (including master's level)
- Doctoral level (including PhD, Clinical Doctorate, Professional Doctorate)
- Post-doctoral level (including Clinical Lectureships, Senior Lectureships, Clinical Professorships)
- Bridging awards[7] (pre-doctoral)
- Bridging awards (post-doctoral)

The FOI requests also sought information on the total expenditure made on these awards by these agencies for each of the five financial years.

[4] The requests sought information on awards for healthcare professionals which were explicitly and primarily for *research* training and skills development only. In England this included awards both within and outwith the ICA programme.
[5] Physiotherapy, Occupational Therapy, Dietetics, Speech & Language Therapy, Podiatry, Diagnostic and Therapeutic Radiography, Arts Therapies, Prosthetics, Orthotics and Orthoptics
[6] Internships and bridging awards are fairly broad categories that in practice can vary considerably in terms of, for instance, their duration, WTE provided, and hosting arrangements
[7] Bridging awards provide support to clinical academics to build on their previous academic training and develop proposals for a doctoral or postdoctoral award, and take the next step on their clinical academic training.

Population data for the four nations were sourced from the UK's Office for National Statistics (2022). Population estimates for mid-2020 were used as the closest approximation to the midpoint of our sampling timeframe.

Minimising bias

On the occasions where the first response to an FOI request had missing data follow-up emails were sent to seek to rectify this. The FOI requests also asked respondents to provide information on any other agencies in their nation that provided such national level awards, where applicable.

Study size

Pilot work had identified year-on-year variations in the number and types of awards made in some nations, especially in Wales, where decisions about award offerings each year were subject to a five-year rather than annual funding cycle. Hence, the most recent five-year sampling timeframe was adopted to limit these effects.

Quantitative variables

Data received in response to the FOI requests were in spreadsheet or (a variety of) document formats. Data were transcribed and collated into a single spreadsheet by Author1. The primary outcome variables for comparative purposes across the four nations were as follows:

- Number of categories of award provided over the five-year period
- Mean number of awards provided per annum per million capita
- Mean WTE award years provided per annum per million capita

- Mean expenditure per annum per million capita

Statistical methods

All data were stored in an Excel 2007 (Microsoft Corp., USA) spreadsheet, and cross-tabulation analyses were performed using pivot tables by Author1. Both the transcription/collation of the source data and the analyses were performed a second time, independently and masked to the original method, by Author7 for validation purposes.

Results

Missing data

The information requested was provided in full in almost every regard by all the agencies in Scotland, Wales, and Northern Ireland and by NIHR in England. HEE was able to provide expenditure information for the whole of England but only part of the information relating to awards made. While NIHR held responsibility in England for the provision and management of pre-doctoral, doctoral and post-doctoral clinical academic training awards during this period, HEE held similar responsibilities for internship and bridging awards. HEE did this via a network of seven regional offices across England. The awards data were not held centrally by HEE but by each of these regions. Three of the regions (East, North West, and North East and Yorkshire) were unable to provide any of the requested awards information. These regions accounted for approximately 39% of the population of England based on the Office of National Statistics' (2022) mid-2020 estimates. The South West region was unable to provide information on the duration of their awards. All regions were unable to provide information on the WTE salary of each of their awards since this was at the discretion of awardees' employers who received a fixed sum grant (fixed sum contributions were also provided to universities for tuition fees). Similarly, WTE information could not be provided by PHA for pre-

doctoral bridging awards in Northern Ireland where a fixed sum stipend was granted to the awardee's employer.

Representativeness

None of the agencies contacted indicated that they knew of other agencies providing clinical academic training awards at national level beyond those sent FOI requests.

Outcome data

Table 1 shows that England was the only nation to provide awards across all six categories during the recent five-year reference period, from internships through to postdoctoral level. Wales provided awards in four of the categories, Scotland three, and Northern Ireland two.

Table 1. Number of awards 2017-2022 by nation and category of award

	England[a]	Scotland	Wales	Northern Ireland
Award category				
Internship	232	0	31	0
Predoctoral	181	6	9	0
Predoctoral bridging	132	0	0	5
Doctoral	119	1	4	5
Postdoctoral bridging	52	0	0	0
Postdoctoral	96	15	8	0
All awards	812	22	52	10

[a] Data on internships and bridging awards provided by only four (London, South East, South West, Midlands) of the seven HEE regions

Table 2 shows that when standardised by population size, Wales made the most awards (3.28 awards per annum per million capita), followed closely by England (2.87). However, 60% of awards made in Wales during this period were at internship level (awards that are

generally of shorter duration and less expensive than the average), which was, for instance, more than double the proportion found among awards made in England.

Table 2. Populations (mid-2020) and mean number of awards per annum per million capita 2017-2022 by nation and category of award

	England[a]	Scotland	Wales	Northern Ireland
Population (millions)	56.55	5.47	3.17	1.90
Award category				
Internship	0.82	0.00	1.96	0.00
Pre-doctoral	0.64	0.22	0.57	0.00
Pre-doctoral bridging	0.47	0.00	0.00	0.53
Doctoral	0.42	0.04	0.25	0.53
Post-doctoral bridging	0.18	0.00	0.00	0.00
Post-doctoral	0.34	0.55	0.50	0.00
All awards	2.87	0.80	3.28	1.06

[a] Data on internships and bridging awards provided by only four (London, South East, South West, Midlands) of the seven HEE regions

Since there were variations in both the WTE salary and duration granted by the awards across nations and categories of award we calculated a compound metric for fairer comparisons of national provision: the mean WTE award years per annum per million capita. This metric is a weighted mean and, within any nation or category of award within a nation, was calculated using the following formula:

$$= \frac{\text{Number of awards} \times \text{Mean WTE salary of awards} \times \text{Mean duration (years) of awards}}{5 \times \text{Population (millions)}}$$

Table 3 shows that, on this compound metric, provision in England during this period was well above double that of any other nation, awarding a mean of 4.79 WTE award years per annum per million capita.

Table 3. Mean WTE award years per annum per million capita 2017-2022 by nation and category of award

	England[a]	Scotland	Wales	Northern Ireland
Award category				
Internship	‡	0.00	0.39	0.00
Pre-doctoral	0.85	0.18	0.32	0.00
Pre-doctoral bridging	‡	0.00	0.00	‡
Doctoral	1.41	0.11	0.76	1.58
Post-doctoral bridging	‡	0.00	0.00	0.00
Post-doctoral	0.93	0.33	0.76	0.00
All awards	4.79	0.64	1.77	1.85

[a] Data on internships and bridging awards provided by only four (London, South East, South West, Midlands) of the seven HEE regions. ‡ WTE salary specification not applicable.

Table 4 shows expenditures on these awards for each of the financial years by provider, overall expenditures by provider and nation, and mean expenditures per annum per million capita for each of the four nations. Standardised expenditure differences between nations broadly reflect the differences shown in Table 3, i.e., spending in England on these awards, which was £272,250 per annum per million capita, was more than double that of any other nation over the five-year period.

Table 4. Expenditure (£) on awards 2017-2022 by provider and nation

	England		Scotland		Wales		Northern Ireland
	NIHR	HEE	CSO	NES	HCRW	RCBCW	PHA
Financial year							
2017-18	12183469	1533000	66299	0	48752	200000	159375

2018-19	11296256	1450000	112849	0	120630	200000	222471
2019-20	14740538	1500000	201111	0	154773	199996	0
2020-21	14294053	1000000	165343	250000	134222	200000	20000
2021-22	17981639	1000000	177936	200000	77883	200000	638080
National total	76978955		1173538		1536256		1039926
National mean expenditure per annum per million capita	272250		42940		96937		109725

Ratio comparisons across the nations on the key measures, standardised by population and using Scotland as the reference, are shown in Table 5. These ratios show large differences in the levels of provision of awards and associated expenditures across the four nations. In every respect, Scotland fared worst. On a per capita standardised basis, the number of awards made was 1.3 to 4.1 times greater in England, Wales, and Northern Ireland than in Scotland, the number of WTE award years provided was 2.8 to 7.5 times greater, and the level of investment was 2.3 to 6.3 times greater.

Table 5. Ratio comparisons between the nations on the key standardised metrics 2017-2022 using Scotland as the reference nation

Metric	England	Scotland	Wales	Northern Ireland
Mean number of awards per annum per million capita	3.57	1.00	4.08	1.31
Mean WTE award years per annum per million capita	7.51	1.00	2.76	2.89
Mean expenditure per annum per million capita	6.34	1.00	2.26	2.56

Discussion

To the best of our knowledge, this is the first time that standardised quantitative national comparisons in this area of provision in the UK have been published.

We found large differences across the four nations in terms of the breadth of awards made across the career pathway and, when standardised for population size, the number of awards made, the number of WTE award years provided, and the investment made in these awards. England was the only nation to make awards in all categories, from internships to postdoctoral awards. Wales made the most awards per capita, but many of these were internships; this was reflected by England providing more than double the WTE award years per capita of any other nation. Scotland's provision was the lowest of the four nations on all standardised metrics. Most notably, Scotland invested less than a sixth of that spent by England per capita on these awards during this five-year period, and under half of that spent per capita by Wales or Northern Ireland.

We believe that our data are sufficiently representative to conclude that during the five-year reference period, there were substantial inequalities in the national-level provision of funded clinical academic training opportunities for HCPs across the four nations of the UK. HCPs employed in Scotland have been particularly disadvantaged in this regard. These differences will have been amplified further by NIHR's new investment, which occurred after our data collection window (NIHR, 2023a).

Missing data on internship and bridging awards from three of the seven HEE regions means that our award (but not expenditure) data for England will be significant underestimates of the true figures during this period. By implication the standardised differences observed between England (largely the best served) and the other nations on the number of awards and mean WTE award years metrics will also be significant underestimates.

On the other hand, WTE salary information was either not applicable (e.g., where a fixed sum grant was issued to the employer) or missing for 541 (60%) of all awards. All but five of these were awards made in England – the remainder being in Northern Ireland. This type of missing data was 3.4 times more prevalent for internship and bridging awards than for other categories of awards. Since internships and bridging awards are typically of shorter duration, these missing data, through their exclusion from calculations, may have led to overestimates of the *overall* mean WTE award years per annum per million capita for England and Northern Ireland. However, when comparing nations on this metric on a like-for-like basis *within individual categories of award*, where missing data is less of an issue, considerable differences remain. For instance, the England to Scotland ratios on this metric are 4.8 to 1 for pre-doctoral awards, 12.9 to 1 for doctoral awards, and 2.8 to 1 for postdoctoral awards. Hence, the missing WTE salary data do not seem to affect the general pattern of differences observed on this metric.

There is an argument that a more informative denominator for our standardisation calculations would have been the number of HCPs eligible to apply for these awards in each nation rather than the total population. We agree that this would have been a more precise approach, but we found that accurate workforce data were not accessible in every nation. We doubt, however, that any between-nation differences in the number of eligible professionals

per capita would have been of an order capable of accounting for the differences observed on our main measures.

We chose to gather data on nationally-funded training opportunities and related investments only, in order to evaluate national policy differences across the four nations. We are aware that there are many alternative training routes at more local level across the UK but did not attempt to quantify these; although such alternatives are important for HCPs on the ground we do not believe that quantifying these would have been relevant to our primary objective of comparing the four nations' policy differences.

Our main finding of inequalities of provision across the four nations has multiple implications. For those working in the NHS in the devolved nations, it represents a barrier to HCP research capacity building. In these nations, it also risks creating a relative dearth of future research leaders in NHS practice who identify real-world research questions and generate evidence that can influence practice. This will likely hinder the growth of a truly multidisciplinary research culture employing the whole spectrum of research methodologies to improve the quality and effectiveness of patient care.

There are also implications for the higher education sector. Whilst there is a range of factors which contribute, in combination, to the establishment and viability of clinical academic posts for HCPs, not just the availability of suitably trained practitioners, universities in the devolved nations will be at a disadvantage if starved of an adequate pipeline of clinical academics. Opportunities for research of particular interest to the devolved nations (for instance, in Scotland, issues such as health inequalities linked to social deprivation and drug use-related mortality rates) could be missed. Furthermore, if these training investment differences

ultimately constrain the scope for impacts of research on practice, future funding streams will be at risk for universities in the devolved nations. This is evidenced by, for instance, the paucity of career development and personal award schemes to support postdoctoral nurses, the low number of eligible nursing staff returned by submitting institutions, and the reduction in early career researchers in Unit of Assessment A3 within the Research Excellence Framework (UKRI, 2022) system for assessing the quality of research in UK higher education institutions (Thompson & McKenna, 2022).

In both sectors, fewer opportunities to access clinical academic training could contribute to staff recruitment and retention problems (Avery et al., 2021) in the devolved nations.

What might underlie these inequalities? We suggest that investment in this area (including training programmes, leadership posts, and supportive networks and infrastructure) has been more plentiful in those nations that have published research strategies for these HCPs. Establishment of the HEE/NIHR ICA approach in England, whilst not a panacea, is a good example of the results of such strategic intent. Sustained funding over an extended period, informed by clear strategic intent and a focus on the whole clinical academic career pathway, rather than relatively brief, piecemeal initiatives, is probably the key to creating a critical mass of clinical academic HCPs for the future in all four nations of the UK. This is supported by a systematised review of the literature on clinical academic pathway development for nurses in the UK (Henshall et al, 2021), which placed emphasis on the *pathway*, stressing the need for planned progressive development through undergraduate, master's, doctoral and postdoctoral levels.

The level of national investment in clinical academic training is, of course, just one element among many contributing to the success or otherwise of clinical academic pathways and impactful research activity among HCPs. Larger numbers of clinical academic posts, especially at more senior levels, would provide greater career incentive for HCPs to pursue this pathway, but these can be difficult to establish. The existence of a supportive and experienced clinical research environment offering multidisciplinary mentorship and collaboration opportunities is another factor contributing to the success of such roles. Further longer term research is required to determine the return on investment in clinical academic training for HCPs; by evaluating, for instance, the extent to which clinical research with positive impacts for patients and healthcare services is generated subsequently by the recipients of such awards.

Given the timeframe of our data collection (2017-2022), follow-up work to track any progress in these between-nations differences over the subsequent five year period is recommended. Future research on more granular inter-profession comparisons between HCPs and, indeed, with medicine and dentistry, in terms of clinical academic training awards might be of interest also. However, this would require more complex methodology than adopted here. Accurate estimates of the number of eligible practitioners in each profession would be required as the denominators for standardised comparisons, and we found that obtaining such information for all relevant employers in all nations is close to impossible.

Conclusions

We have demonstrated, for a recent five-year period, large inequalities in the levels of nationally funded clinical academic training opportunities for HCPs across the four nations of the UK. We hope that policy makers in the four nations reflect on the data presented here,

consider the implications, and develop strategic approaches to bring parity in this area of provision.

Key points

1. Stark inequalities of provision of nationally funded clinical academic training awards and associated investment across the four nations of the UK during the period 2017-2022 were found.
2. Scotland fared worst on all standardised metrics. On a per capita basis, England provided more than 3.5 times as many awards, more than 7.5 times as many WTE award years, and invested more than 6 times as much, compared to Scotland.
3. The relative disadvantages experienced by healthcare professionals working in the UK's devolved nations regarding access to training opportunities endangers the longer term prospects for clinical academic activity in these nations.
4. Policy makers in the devolved nations need urgently to redress these national inequalities through strategic and sustained investment. This will benefit not just the healthcare workforce but also safeguard the future robustness of the healthcare and university sectors in those nations.
5. The data indicate that developing a range of clinical academic training opportunities across the career development span in the devolved nations would be an important initial step in addressing these inequalities.

Declarations

Availability of data and materials

The datasets used and analysed in this study are freely available via Freedom of Information request from the government agencies listed in the Methodology section of the article.

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Supplementary Material

File name: Additional File 1.docx.

Description: Pro-forma Freedom of Information request used to gather data.

This is a Freedom of Information request for the purpose of healthcare policy research.

My request relates to clinical academic training awards (comprising provision for salary or stipend and/or tuition fees costs) made by [name of provider] (or agencies funded by [name of provider]) in each of the five financial years 2017/18, 2018/19, 2019/20, 2020/21, 2021/22 to registered healthcare professionals delivering NHS care (these may be directly NHS-employed or by other health and care providers) in the following professions only:

- Nursing
- Midwifery
- Allied Health Professions (i.e. Physiotherapy, Occupational Therapy, Dietetics, Speech & Language Therapy, Podiatry, Diagnostic and Therapeutic Radiography, Arts Therapies, Prosthetics, Orthotics, Orthoptics)
- Pharmacy
- Psychology
- Healthcare Sciences
- Paramedics.

I am interested in receiving information on awards made in the following award categories:

- Internship (or First into Research award or similar)
- Pre-doctoral level (including Master's)
- Doctoral level (i.e. PhD, Clinical Doctorate, Professional Doctorate)
- Post-doctoral level (including Clinical Lectureships/Senior Lectureships/Clinical Professorship)
- Bridging awards* (pre-doctoral)
- Bridging awards* (post-doctoral)

*Bridging awards provide support to clinical academics to build on their previous academic training and develop proposals for a pre or post-doctoral award, and take the next step on their clinical academic training.

My six specific requests are:

i. The number of awards made in each of these award categories by [name of provider] (or agencies funded by [name of provider]) in each of these five financial years, broken down by profession.
ii. The whole time equivalent supported for each individual award made (or value of stipend where relevant)
iii. The duration of each individual award made
iv. The value of any additional costs (e.g. for research costs) provided for each individual award made

v. Please indicate if there were any awards available which were not actually allocated (because, for example, there were insufficient numbers of applications or an insufficient number of those received met the required standard): the number of unallocated awards by type of award and each of the five financial years.

vi. The total annual spend made by [name of provider] (or agencies funded by [name of provider]) to provide all the awards described above, for each of these five financial years.

It would be helpful if the information requested in i-iv could be laid out as follows with each row representing an individual award recipient:

Financial year in which award was made	Category of award	Profession of recipient	Duration of award (months)	WTE salary provided for by the award (or £ value of stipend where relevant)	£ value of any additional costs provided (e.g. research costs)
EXAMPLE					
2017-18	Doctoral	Nursing	72	0.5	£0

Finally, if you are aware that these types of award are also provided by other national bodies in [name of nation] I would be interested to know which other organisation(s).

I would prefer to receive this information electronically please. Many thanks.