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

3

4

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20

21 **Declaration of interest**

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

24

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25 **Ethical permissions and consent**

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

27 Information requests.

28

29 **Trial registration**

30 Not applicable.

31 **Abstract**

32 **Background**

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

36 **Aims**

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

39 **Methods**

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

45 **Results**

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

49 **Conclusions**

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

52

53 **Keywords**

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

56 **Introduction**

57 ***Definition of healthcare professions***

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

64

65 ***The value of clinical academics***

66 There is international quantitative and qualitative evidence that healthcare organisations that
67 are more research-active provide higher quality and safer care, superior patient outcomes,
68 better patient experience, and beneficial impacts for the workforce, including better service
69 culture and employee recruitment and retention (Majumdar et al., 2008; Clarke & Loudon,
70 2011; Boaz et al, 2015; Newington et al., 2021).

71

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

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

82

83 ***Recent clinical academic career developments for healthcare professionals in the UK***

84 *'The Finch Report'* (UKCRC, 2007), with its recommendations for clinical academic research
85 training and career progression for nurses, may be considered a watershed for presenting a
86 vision for HCPs' clinical academic careers in the United Kingdom (UK). Since its publication,
87 various models of clinical academic engagement and infrastructure funding have been
88 established in the UK to support capacity building in the wider group of HCPs. Even so, it has
89 been reported quite recently that NMAHPs are likely to be further on in their career before
90 embarking on a clinical academic pathway and do not benefit from the same time or financial
91 support compared to their medical clinical academic colleagues (Trusson et al., 2021).

92 Having said that, in recent times, there have been concerns about the longer term
93 sustainability of the clinical academic workforce in the medical profession in the UK, including
94 a 30% drop in readers and senior lecturers between 2024 and 2021 (Medical Schools
95 Council, 2024)

96

97 Although there is no lack of professional ambition in relation to clinical academic careers, as
98 indicated by many professional societies in the UK having published strategies or statements
99 of intent subsequent to *'The Finch Report'* (e.g. Royal College of Occupational Therapists,
100 2019; The Chartered Society of Physiotherapy, 2020; The College of Radiographers, 2021),
101 it is true to say that the various professions have moved at differing paces in this area. For
102 instance, in 2011, the 'Modernising Pharmacy Careers Programme' highlighted the need for
103 an urgent review of the pharmacy academic workforce in the UK, including opportunities for
104 pharmacists to undertake PhD and postdoctoral research and access to grants specifically

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

117

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

121

122 ***Devolved government in the UK***

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

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

131

132 ***Differing approaches to clinical academic careers across the four nations***

133 In England, personal development research awards for HCPs have been available, from pre-
134 doctoral through doctoral studies and postdoctoral career establishment, for more than 20
135 years via Department of Health funding. The administration of these awards has been under
136 the auspices of the National Institute for Health Research² (NIHR) since its inception in 2006
137 and the range of awards has undergone various iterations; the most significant of these is the
138 establishment of the Integrated Clinical Academic Programme (ICA) (HEE/NIHR, no date). In
139 August 2023, NIHR announced a further expansion of both the number and types of awards
140 available to HCPs across the career span in England that forms one element of a broader
141 range of research support initiatives for HCPs (NIHR, 2023a). This represents a massive
142 increase in infrastructure investment of £30 million per annum.

143

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

152

² Later renamed National Institute for Health and Care Research

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153 Recent research strategies or strategic plans for nursing (NHS England & NHS Improvement,
154 2021), midwifery (NHS England, 2023) and allied health professions (Health Education
155 England, 2022) emphasise the commitment to clinical academic careers in England. Key
156 strategic appointments have been made, including a Director for Nursing and Midwifery
157 Research at NIHR. NIHR also established ‘incubators’ (NIHR, 2023b), such as the Nursing
158 and Midwifery Incubator, which offered a network of mentors and promoted opportunities for
159 research development at all career stages. Since 2023, a national network of Senior
160 Research Leaders has also been established in England for nursing and midwifery (NIHR,
161 2023c), building on the former 70@70: NIHR Senior Nurse and Midwife Research Leader
162 (SNMRL) Programme that had been established in 2018 as part of the celebrations of the 70
163 year anniversary of the NHS (Menzies et al., 2023). The role of both programmes has been
164 to promote an integrated research culture, be a local champion for clinical academic careers
165 and nursing and midwifery research, encourage research collaborations and expand
166 networks. For the Allied Health Professions (AHPs) in England, there have been several
167 recent initiatives seeking to achieve this strategic ambition (NIHR, 2019), and the NIHR
168 Clinical Research Network has an appointed Head of Allied Health Professionals. NIHR has
169 recently appointed to a new post of Associate Director for AHPs. The approach in England is
170 characterised by quite comprehensive and sustained national investment.

171

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

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

201

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

213

214 In Northern Ireland, the Health and Social Care Research and Development Division of the
215 Public Health Agency has funded fellowship awards for all healthcare professionals since
216 1998, and at various times, these have included doctoral, postdoctoral, career development
217 and clinician scientist fellowships. The Chief Nursing Officer for Northern Ireland has initiated
218 a renewed focus on clinical academic careers for nurses and midwives, although concrete
219 proposals have yet to emerge.

220

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

224

225 **Objectives**

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

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

235

236 **Methodology**

237 ***Study design***

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

240

241 ***Setting***

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

247

248 ***Participants***

249 The participating agencies were as follows:

- 250 • England: National Institute for Health and Care Research and Health Education
251 England (HEE)³

³ Subsequently re-branded as 'NHS England'

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

256

257 **Variables**

258 FOI requests sought information on the number of clinical academic⁴ training awards made to
259 nurses, midwives, allied health professionals⁵, pharmacists, psychologists, healthcare
260 scientists or paramedics during the five financial years April 2017-March 2022. For each
261 award made, the agencies were asked to provide information on the duration of the award
262 and, where applicable, the whole time equivalent (WTE) salary supported (or value of stipend
263 where relevant). Furthermore, the agencies were asked to give a breakdown of the data by
264 the following categories of award:

- 265 • Internship⁶
- 266 • Pre-doctoral (including master's level)
- 267 • Doctoral level (including PhD, Clinical Doctorate, Professional Doctorate)
- 268 • Post-doctoral level (including Clinical Lectureships, Senior Lectureships, Clinical
- 269 Professorships)
- 270 • Bridging awards⁷ (pre-doctoral)
- 271 • Bridging awards (post-doctoral)

272 The FOI requests also sought information on the total expenditure made on these awards by
273 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.

274

275 Population data for the four nations were sourced from the UK's Office for National Statistics
276 (2022). Population estimates for mid-2020 were used as the closest approximation to the
277 midpoint of our sampling timeframe.

278

279 ***Minimising bias***

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

284

285 ***Study size***

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

290

291 ***Quantitative variables***

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

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

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- 299 • Mean expenditure per annum per million capita

300

301 **Statistical methods**

302 All data were stored in an Excel 2007 (Microsoft Corp., USA) spreadsheet, and cross-

303 tabulation analyses were performed using pivot tables by Author1. Both the

304 transcription/collation of the source data and the analyses were performed a second time,

305 independently and masked to the original method, by Author7 for validation purposes.

306

307 **Results**

308 **Missing data**

309 The information requested was provided in full in almost every regard by all the agencies in

310 Scotland, Wales, and Northern Ireland and by NIHR in England. HEE was able to provide

311 expenditure information for the whole of England but only part of the information relating to

312 awards made. While NIHR held responsibility in England for the provision and management

313 of pre-doctoral, doctoral and post-doctoral clinical academic training awards during this

314 period, HEE held similar responsibilities for internship and bridging awards. HEE did this via

315 a network of seven regional offices across England. The awards data were not held centrally

316 by HEE but by each of these regions. Three of the regions (East, North West, and North East

317 and Yorkshire) were unable to provide any of the requested awards information. These

318 regions accounted for approximately 39% of the population of England based on the Office of

319 National Statistics' (2022) mid-2020 estimates. The South West region was unable to provide

320 information on the duration of their awards. All regions were unable to provide information on

321 the WTE salary of each of their awards since this was at the discretion of awardees'

322 employers who received a fixed sum grant (fixed sum contributions were also provided to

323 universities for tuition fees). Similarly, WTE information could not be provided by PHA for pre-

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

326

327 ***Representativeness***

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

330

331 ***Outcome data***

332 Table 1 shows that England was the only nation to provide awards across all six categories
333 during the recent five-year reference period, from internships through to postdoctoral level.

334 Wales provided awards in four of the categories, Scotland three, and Northern Ireland two.

335

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

	England ^a	Scotland	Wales	Northern Ireland
Award category				
<i>Internship</i>	232	0	31	0
<i>Predoctoral</i>	181	6	9	0
<i>Predoctoral bridging</i>	132	0	0	5
<i>Doctoral</i>	119	1	4	5
<i>Postdoctoral bridging</i>	52	0	0	0
<i>Postdoctoral</i>	96	15	8	0
<i>All awards</i>	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

337

338 Table 2 shows that when standardised by population size, Wales made the most awards
339 (3.28 awards per annum per million capita), followed closely by England (2.87). However,

340 60% of awards made in Wales during this period were at internship level (awards that are

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

343

344 **Table 2. Populations (mid-2020) and mean number of awards per annum per million**
 345 **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				
<i>Internship</i>	0.82	0.00	1.96	0.00
<i>Pre-doctoral</i>	0.64	0.22	0.57	0.00
<i>Pre-doctoral bridging</i>	0.47	0.00	0.00	0.53
<i>Doctoral</i>	0.42	0.04	0.25	0.53
<i>Post-doctoral bridging</i>	0.18	0.00	0.00	0.00
<i>Post-doctoral</i>	0.34	0.55	0.50	0.00
<i>All awards</i>	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

346

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

352

$$353 \quad = \frac{\text{Number of awards} \times \text{Mean WTE salary of awards} \times \text{Mean duration (years) of awards}}{5 \times \text{Population (millions)}}$$

354

355

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

359

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

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

^aData 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.

362

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

369

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

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

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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
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National mean expenditure per annum per million capita	272250		42940		96937		109725
--	--------	--	-------	--	-------	--	--------

371

372

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

380

381 **Table 5. Ratio comparisons between the nations on the key standardised metrics 2017-**
 382 **2022 using Scotland as the reference nation**

383

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

384

385

386 **Discussion**

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

389

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

400

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

407

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

413

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

427

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

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

435

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

442

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

450

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

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

465

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

468

469 What might underlie these inequalities? We suggest that investment in this area (including
470 training programmes, leadership posts, and supportive networks and infrastructure) has been
471 more plentiful in those nations that have published research strategies for these HCPs.

472 Establishment of the HEE/NIHR ICA approach in England, whilst not a panacea, is a good
473 example of the results of such strategic intent. Sustained funding over an extended period,
474 informed by clear strategic intent and a focus on the whole clinical academic career pathway,
475 rather than relatively brief, piecemeal initiatives, is probably the key to creating a critical mass
476 of clinical academic HCPs for the future in all four nations of the UK. This is supported by a
477 systematised review of the literature on clinical academic pathway development for nurses in
478 the UK (Henshall et al, 2021), which placed emphasis on the *pathway*, stressing the need for
479 planned progressive development through undergraduate, master's, doctoral and
480 postdoctoral levels.

481

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

493

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

502

503 **Conclusions**

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

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

509

510 **Key points**

- 511 1. Stark inequalities of provision of nationally funded clinical academic training awards
512 and associated investment across the four nations of the UK during the period 2017-
513 2022 were found.
- 514 2. Scotland fared worst on all standardised metrics. On a per capita basis, England
515 provided more than 3.5 times as many awards, more than 7.5 times as many WTE
516 award years, and invested more than 6 times as much, compared to Scotland.
- 517 3. The relative disadvantages experienced by healthcare professionals working in the
518 UK's devolved nations regarding access to training opportunities endangers the longer
519 term prospects for clinical academic activity in these nations.
- 520 4. Policy makers in the devolved nations need urgently to redress these national
521 inequalities through strategic and sustained investment. This will benefit not just the
522 healthcare workforce but also safeguard the future robustness of the healthcare and
523 university sectors in those nations.
- 524 5. The data indicate that developing a range of clinical academic training opportunities
525 across the career development span in the devolved nations would be an important
526 initial step in addressing these inequalities.

527

528 **Declarations**

529 ***Availability of data and materials***

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

532

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712 **Supplementary Material**

713 File name: Additional File 1.docx.

714 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.