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Bibliometric analysis of highly cited publications of health research in England, 2002-2006

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Preface

This paper describes a bibliometric analysis to support the selection of candidate National Institute of Health Research Biomedical Research Centres and Biomedical Research Units. It is intended to assist potential applicants in deciding whether to submit a pre-qualifying questionnaire as part of the procurement process and to inform the deliberations of the selection panel for the Biomedical Research Centres and Biomedical Research Units. The work presented in this paper is a collaboration between the Centre for Science and Technology Studies in The Netherlands and RAND Europe.

The Centre for Science and Technology Studies is an interdisciplinary research institute housed within the Faculty of Social Sciences of Leiden University, The Netherlands. It specialises in advanced quantitative analysis of science and technology performance and the cognitive and organisational structure of science and technology.

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Introduction

This paper presents the findings of a bibliometric analysis of biomedical and health research in England. The purpose of the exercise is to support the selection of Biomedical Research Centres (BRCs) and Biomedical Research Units (BRUs) for the National Institute for Health Research (NIHR). The work presented in this paper is a collaboration between the Centre for Science and Technology Studies in The Netherlands (CWTS) and RAND Europe. It is published alongside the Department of Health's *Invitation to Submit a Pre-qualifying Questionnaire* (PQQ), which sets out the aims, key characteristics and selection criteria of BRCs and BRUs. In the following sections, we describe the bibliometric approach adopted and the key results emerging from our analysis. We have used a similar, but not identical, approach to the one adopted for the original procurement of BRCs in 2006 and BRUs in 2007.[1] These analyses are therefore not directly comparable, due to changes in both the method of analysis and the underlying dataset used.[2] It should also be noted that the data for the NHS trusts reflect those trusts during the period 2002–2006. The structure of NHS organisations may have changed since the time used in the analysis for this report. NIHR will inform the International Selection Panel of all organisational changes – for example, as a result of mergers.

Caveats and limitations to bibliometric analysis

Although the evidence available suggests a clear correlation between performance assessments carried out on the basis of citation analysis and the results of peer-review

[1] van Leeuwen and Grant 2006; van Leeuwen *et al.* 2009; Nason *et al.* 2007.

[2] The dataset used by CWTS for the previous analysis was based on the CD-Rom version of the Citation Indexes, while the current study is based on the internet version, the Web of Science. We also undertook a number of new and different analyses for this paper.

processes,[3] there are some limitations to bibliometric analyses.[4] As a result, a number of important qualifications must be borne in mind when assessing the validity of bibliometric analysis. Citation analysis measures the impact of articles on other researchers in a given field (and/or outside it), which reflects only one dimension of research impact as a proxy for 'quality'. A robust definition of 'quality' in a research evaluation context has long eluded specialists in this area, and there is a growing consensus that any judgement of quality will need to be based on a combination of qualitative and quantitative analyses – in other words, bibliometrics should be viewed as one element of a wider process of review.[5]

Citation analysis is predicated on the notion that the reference practices of researchers can reveal high-performing scientists, papers and institutions, as well as popular and influential areas of research. Unfortunately, there is no theory evident to explain why authors cite in the way that they do.[6]

Differences between research fields exert important influences over the kind of analysis that can be performed. In certain fields – for example, the applied and engineering sciences – peer-reviewed journal publications are not the primary means for disseminating research findings and it is therefore very difficult to apply bibliometrics to this kind of research. Despite these limitations, citation analysis, when used in combination with other methods of assessment such as peer review, can be a very effective tool for performance and impact evaluations, and for informing funding decisions.

[3] Rinia *et al.* 1998.
[4] Moed 2005.
[5] Ibid.
[6] Vinkler 2002; Hanney *et al.* 2005.

Methodology

CWTS maintains a bibliometric database of all scientific publications (including those in biomedical and health research) for the period 1981 to 2009. The dataset is based on the journals and serials processed for the Web of Science (the Internet) version of the Citation Index(es) maintained and published by Thomson Reuters. This includes the Science Citation Index (SCI), the Social Science Citation Index (SSCI) and the Arts & Humanities Citation Index (A&HCI), and is extended with six so-called specialty Citation Indexes (Chemistry, CompuMath, Materials Science, Biotechnology, Biochemistry & Biophysics, and Neuroscience). The construction of this database, and the indicators derived from it, are described in various scientific publications.[7]

Box 1 summarises that data-collection process. To identify publications in the fields of biomedical and health research within the Citation Indexes of Thomson Reuters (the former ISI, which stands for the Institute for Scientific Information), we used the Journal Subject Categories (JSCs). We selected the 70 fields listed in Appendix A and identified all articles, letters and reviews (as is the norm in bibliometric analysis) with the country name 'ENGLAND'. In other words, we selected all biomedical and health research papers written by an author with an English address.

We then determined the citation distribution of all publications in those fields, irrespective of country of authorship, and selected those English publications that belong to the top 20% most highly cited publications (HCPs) in every selected field, excluding self-

[7] Moed *et al.* 1995; van Leeuwen *et al.* 2001; van Leeuwen *et al.* 2003.

citations.[8] In Appendix A, we list the number of citations needed for each field to appear in the top 20%. It should be noted that we are *not* focusing on the top 20% of England's publications in those fields, but on the contribution of England to the worldwide top 20% most highly cited publications per field. By taking this approach we are controlling for known differences in citation behaviour between fields. For example, as shown in Appendix A, in 2002 a paper would need more citations to get into the top 20% of papers in Allergy research (citation boundary is 12.5) than in Medical informatics (citation boundary is 3.8).

In the selection of the HCPs, we were restricted to the period 2002–2006 because we did not want to overlap with our previous analyses[9] and we wanted all publications to have the same citation window, which is set at a standard length of four years. This requirement means that the last year of publication that may be analysed is 2006; with 2006, 2007, 2008 and 2009 as citation years.

Box 1 Summary of data-collection process

- Delineate biomedical research and clinical medicine by selecting 70 fields (the so-called JSCs).
- Select all publications from England from the Citation Indexes.
- Focus on the top 20% most highly cited publications in their respective field(s) over the years 2002–2006.
- Select the addresses related to the top 20% most highly cited publications.
- Address information on the level of main organisations as well as the underlying 'departmental/institutional' level was used to identify the institutions and organisations that contribute to England's share of top biomedical research and clinical medicine worldwide.
- The final selection (40,330 publications) contained all NHS institutions (n=54) and universities (n=38) within the top 20% most highly cited publications.

[8] Self-citations occur if one of the authors of a citing paper also appears in the cited paper. Typically, between 20% and 40% of all citations are self-citations, depending on the field. Self-citations are removed from the analysis because otherwise they may inflate the assessment of an author's 'impact'.

[9] van Leeuwen and Grant. *Op. cit.* 1.

Once we identified 40,330 highly cited publications in the fields of biomedical and health research from NHS institutions and universities in England, we undertook four sets of analyses:

- The **number of HCPs** between 2002 and 2006 by institution as an indicator of critical mass and quality. This was based on whole counting of the contributions of each institution to a journal and, as it is attributed to the various JSCs, to each field equally.[10]
- **Co-publication** between institutions as an indicator of collaboration. We focused this analysis on the 25 NHS institutions with the highest number of HCPs. We then looked for co-publications with universities (identified through the address field of authors of the paper) and limited our analysis to the top 25 collaborating universities.
- The **concentration of HCP papers by JSCs** to identify world-class biomedical research in a specific research fields. To do this we examined each field and allocated the share of HCPs to the institutions. We then identified the top 20 areas of institutional concentration within a field.
- The **concentration of HCPs by the seven research themes** identified in the PQQ as requiring NIHR support for BRUs. To identify the relevant publications for each research theme, the Department of Health selected JSCs that corresponded to the specific research themes (Table 1). It should be noted that this analysis is dependent on the specificity of the theme definition in Table 1 and, for this reason, some themes are more tightly defined than others. Dementias, for example, is a necessarily broad theme because several subject categories are relevant to research into and treatment of this disease. To identify potential areas of institutional concentration within a field, we highlighted the top 20 values for both NHS institutions and universities.

[10] In bibliometrics two methods of counting articles are used: fractional and whole counts. For *fractional counting*, credit for the paper (or citation) is divided among the collaborating authors or institutions. For w*hole counting*, each author or institution receives one credit for its participation in the article.

Table 1 Research themes from matching JSCs

Research theme	JSCs associated
Cardiovascular disease	Cardiac and cardiovascular systems Critical care medicine
Deafness and hearing problems	Otorhinolaryngology
Gastrointestinal (including liver) disease	Gastroenterology and hepatology
Musculoskeletal disease	Orthopaedics Rheumatology
Respiratory disease	Respiratory system Allergy
Nutrition, diet and lifestyle (including obesity)	Nutrition and dietetics Endocrinology and metabolism Food science and technology
Dementias	Neurosciences Clinical neurology Biochemistry and molecular biology Geriatrics and gerontology Psychiatry

Results

Number of highly cited papers published between 2002 and 2006

In Figure 1, the volume of HCPs published between 2002 and 2006 is presented for institutions that have on average more than 30 highly cited papers per year. Table 2 and Table 3 present the annual number of HCPs per year for the NHS institutions and for universities and other organisations over the same period. The leading NHS institutions, in terms of number of HCPs, are, as shown in Table 2, Guy's and St Thomas', Royal Free, Oxford Radcliffe and St George's, accounting for 30% of all HCPs. Table 3 shows the dominance of University College London, Imperial College London, the University of Oxford, and the University of Cambridge, which together account for 45% of university HCPs.

Co-publication activity between institutions

Table 4 presents the level of collaboration between the 25 NHS institutions with the highest volume of HCPs and the 25 universities with the highest level of collaboration. The highlighted cells indicate the top 20 values in the matrix. For ease of reading, we have listed the top 20 collaborative partnerships between NHS institutions and universities in Table 5. As one might expect, there is a high level of collaboration between co-located institutions. For example, 42% of Addenbrooke's HCPs are jointly authored with researchers who have a University of Cambridge address.

Distribution of HCPs by JSC

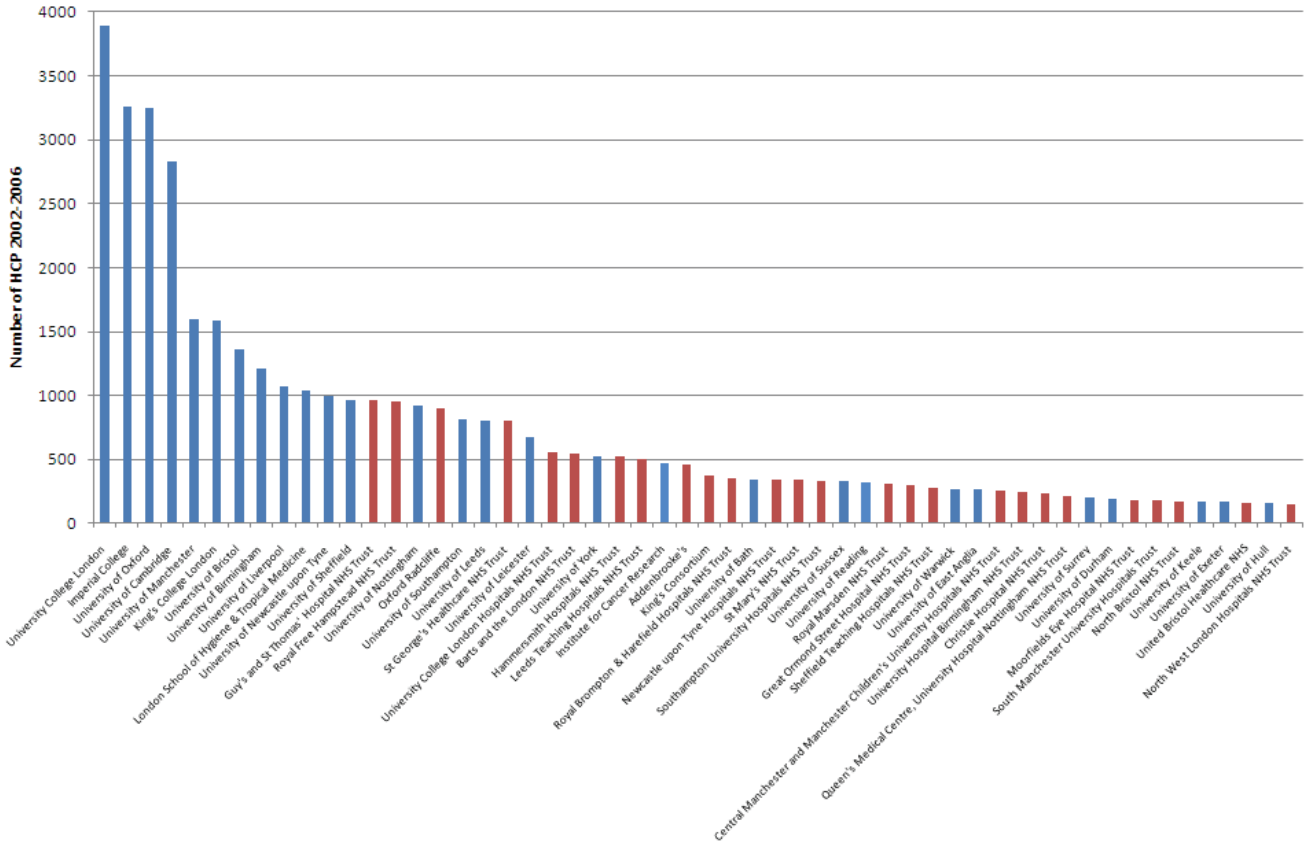
In Table 6 and Table 7, the share of HCPs by field of research (as determined by JSC) and institution, for NHS institutions and for universities respectively, is shown. In each matrix, the highlighted cells indicate the top 20 values – that is, where the share of the research field is highest for the given institution or university. By means of illustration, the cell for

Moorfields Eye Hospital NHS Trust and Ophthalmology is 19%. This means that 19% of HCPs classified within the Ophthalmology field have an address associated with Moorfields. To simplify reading Table 6 and Table 7, in Table 8 we have listed all those field/institution combinations that have more than a 10% share of papers published in a specific JSC. To limit the number of field/organisation combinations, and to ensure critical mass within a field, we have restricted this list to fields with more than 100 HCPs.

Distribution of HCPs by research theme

In Table 9 and Table 10, the share of HCPs by research theme and organisation is shown. As in Table 6 and Table 7, the highlighted cells indicate the top 20 shares of HCPs by research theme. By means of illustration, in Table 9, reading down the rows of NHS institutions, the first highlighted cell one comes to is under the research theme of Deafness and hearing problems, and the corresponding NHS institution is Central Manchester and Manchester Children's University Hospitals NHS Trust. The highlighted value is 5%, meaning that 5% of HCPs classified within the NIHR-defined research theme of Deafness and hearing problems have an address associated with Manchester University Hospitals. As before, to simplify reading Table 9 and Table 10, we have listed in Table 11 the top five institutions and/or universities within each research theme (based on percentage share of HCPs).

Figure 1 Total number of HCPs for selected[11] organisations, 2002–2006 (universities are shown in blue; NHS institutions are shown in red)



[11] Selected on the basis of more than an average of 30 HCPs per year. See Appendix A and methodology section for the reasons behind this selection.

Table 2 Annual numbers of HCPs for selected[12] NHS institutions, 2002–2006

	2002	2003	2004	2005	2006	Total
NHS organisations						
Guy's and St Thomas' Hospital NHS Trust	212	235	162	202	149	960
Royal Free Hampstead NHS Trust	203	198	196	182	174	953
Oxford Radcliffe	184	181	176	185	178	904
St George's Healthcare NHS Trust	201	189	177	152	85	804
University College London Hospitals NHS Trust	97	115	110	120	112	554
Barts and the London NHS Trust	119	98	107	110	113	547
Hammersmith Hospitals NHS Trust	106	117	99	105	95	522
Leeds Teaching Hospitals NHS Trust	96	105	99	108	93	501
Addenbrooke's	69	91	90	105	101	456
King's Consortium	74	77	75	63	84	373
Royal Brompton & Harefield Hospitals NHS Trust	73	70	67	69	75	354
Newcastle upon Tyne Hospitals NHS Trust	70	66	58	86	66	346
St Mary's NHS Trust	46	71	78	63	83	341
Southampton University Hospitals NHS Trust	62	80	68	69	56	335
Royal Marsden NHS Trust	54	55	58	83	65	315
Great Ormond Street Hospital NHS Trust	60	68	55	66	54	303
Sheffield Teaching Hospitals NHS Trust	49	45	67	70	51	282
Central Manchester and Manchester Children's University Hospitals NHS Trust	44	51	49	66	49	259
University Hospital Birmingham NHS Trust	58	32	39	53	66	248
Christie Hospital NHS Trust	48	44	40	55	43	230
Queen's Medical Centre, University Hospital Nottingham NHS Trust	52	51	41	36	33	213
Moorfields Eye Hospital NHS Trust	27	39	31	51	38	186
South Manchester University Hospitals Trust	46	42	20	28	43	179
North Bristol NHS Trust	34	38	30	35	34	171
United Bristol Healthcare NHS	27	41	22	37	35	162
North West London Hospitals NHS Trust	28	34	28	31	30	151

[12] Selected on the basis of more than an average of 30 HCPs per year.

Table 3 Annual numbers of HCPs for selected[13] universities and other organisations, 2002–2006

Higher education institutions						
University College London	709	754	726	880	818	3887
Imperial College London	535	661	633	654	772	3255
University of Oxford	609	595	623	710	709	3246
University of Cambridge	491	541	580	601	616	2829
University of Manchester	270	299	298	345	389	1601
King's College London	325	363	344	438	116	1586
University of Bristol	250	272	252	315	276	1365
University of Birmingham	231	209	246	262	267	1215
University of Liverpool	181	206	212	274	198	1071
London School of Hygiene & Tropical Medicine	146	166	209	250	269	1040
University of Newcastle upon Tyne	196	175	192	196	232	991
University of Sheffield	164	179	205	225	193	966
University of Nottingham	166	184	163	216	188	917
University of Southampton	138	153	142	191	191	815
University of Leeds	130	171	166	179	158	804
University of Leicester	117	141	150	139	132	679
University of York	86	91	111	112	126	526
Institute for Cancer Research	75	83	79	114	118	469
University of Bath	56	75	74	69	72	346
University of Sussex	48	67	62	87	64	328
University of Reading	67	59	79	61	57	323
University of Warwick	35	61	44	68	60	268
University of East Anglia	55	60	33	55	64	267
University of Surrey	45	41	36	49	34	205
University of Durham	31	22	45	44	48	190
University of Keele	29	31	36	25	48	169
University of Exeter	40	32	33	29	33	167
University of Hull	31	25	28	27	45	156

[13] Selected on the basis of more than an average of 30 HCPs per year.

Table 4 Collaboration between NHS organisations and universities on HCPs, 2002–2006 (top 20 cells are highlighted)

	Imperial College of Science, Technology & Medicine, London	King's College London	London School of Hygiene & Tropical Medicine	University College London	University of Bath	University of Birmingham	University of Bristol	University of Cambridge	University of Durham	University of East Anglia	University of Keele	University of Leeds	University of Leicester	University of Liverpool	University of Manchester	University of Newcastle upon Tyne	University of Nottingham	University of Oxford	University of Reading	University of Sheffield	University of Southampton	University of Surrey	University of Sussex	University of Warwick	University of York
Addenbrooke's	8%	4%	1%	12%	1%	6%	3%	42%		1%		2%	1%	2%	2%	2%	2%	7%	0%	3%	2%				1%
Barts and the London NHS Trust	15%	5%	5%	32%	2%	3%	3%	6%			2%	3%	2%	1%	3%	2%	2%	5%		5%	2%	1%	2%	1%	1%
Central Manchester and Manchester Children's University Hospitals' NHS Trust	6%	1%	4%	6%	1%	6%	4%	5%			3%	1%	3%	4%	46%	1%	4%	2%		2%	4%				
Christie Hospital NHS Trust	4%	1%	1%	6%		4%	2%	5%	1%		1%	3%	1%	6%	46%	3%	2%	3%		2%	3%		2%		3%
Great Ormond Street Hospital NHS Trust	7%	5%	1%	63%	0%	5%	2%	3%		0%		0%	2%	2%	1%	1%	0%	4%		2%	1%			0%	
Guy's and St Thomas' Hospital NHS Trust	11%	29%	5%	16%		2%	3%	5%	0%	0%	1%	2%	1%	1%	4%	2%	3%	7%	1%	2%	1%	1%	1%	0%	1%
Hammersmith Hospitals NHS Trust	43%	3%	3%	21%		1%	3%	4%			0%	2%		0%	2%	4%	3%	5%	0%	1%	2%	1%	1%		0%
King's Consortium	13%	28%	4%	20%		3%		6%				1%	1%	7%	2%	3%	2%	7%		2%			1%		
Leeds Teaching Hospitals NHS Trust	5%	2%	3%	8%		6%	1%	5%	0%	0%		38%	4%	1%	3%	2%	3%	7%		3%	2%	1%	0%		5%
Moorfields Eye Hospital NHS Trust	7%	2%	5%	70%	1%	1%		4%		1%	1%	1%	1%	1%	2%		1%	3%		1%					
Newcastle upon Tyne Hospitals NHS Trust	2%	7%	1%	6%	1%	2%	3%	5%				4%	3%	2%	3%	39%	5%	6%		4%	3%	1%	2%	1%	3%
North Bristol NHS Trust	4%	4%	3%	8%	9%		40%	4%		4%		3%	3%		1%	1%	4%	8%		1%	6%				
Oxford Radcliffe	10%	2%	3%	8%	1%	7%	2%	3%				1%	1%	2%	3%	2%	3%	48%	1%	2%	1%		0%	1%	0%
Queen's Medical Centre, University Hospital Nottingham NHS Trust	5%	3%	2%	11%	5%	8%	3%	5%		3%			5%	3%	3%	6%	29%	3%					5%	2%	2%
Royal Brompton & Harefield Hospitals NHS Trust	61%	4%	7%	11%		1%		2%	1%				1%	1%	2%	2%	2%	4%			1%				1%
Royal Free Hampstead NHS Trust	16%	7%	5%	31%	0%	5%	4%	4%		0%		1%	1%	2%	4%	2%	2%	7%	1%	2%	2%	2%	0%	1%	1%
Royal Marsden NHS Trust	10%	7%	1%	20%		7%	4%	6%		1%		2%	5%	5%	5%	1%	1%	4%		10%	4%	4%	1%		2%
Sheffield Teaching Hospitals NHS Trust	3%	2%	1%	3%		2%	1%	4%			1%	3%	5%	2%	1%	3%	5%	3%		58%	1%	1%	1%		1%
South Manchester University Hospitals Trust	5%	3%	1%	9%		4%	3%		1%		1%		3%	6%	55%	1%		5%	1%	1%					1%
Southampton University Hospitals NHS Trust	6%	4%	3%	13%	1%	1%	4%	12%			2%	1%	2%		4%	3%	6%	5%		1%	30%	1%	1%		1%
St George's Healthcare NHS Trust	15%	12%	5%	23%	0%	2%	7%	4%		0%		1%	2%	4%	4%	1%	2%	8%		1%	3%	1%	0%	0%	2%
St Mary's NHS Trust	29%	3%	3%	9%	4%	3%	1%	10%				2%	3%	3%	14%	1%	2%	6%		1%	4%		1%	1%	2%
United Bristol Healthcare NHS Trust	7%	3%	5%	4%	6%	5%	33%	1%		3%	1%	2%	5%	2%	2%		6%	5%		1%	3%			1%	2%
University College London Hospitals NHS Trust	9%	7%	6%	61%		3%	1%	1%		1%		1%	0%		1%	1%	0%	6%		0%	1%		0%	0%	1%
University Hospital Birmingham NHS Trust	5%	2%		9%		52%	3%	2%			2%		1%	3%	1%	2%	2%	7%		2%	4%	2%		2%	1%

Table 5 Summary of top 20 collaborative partnerships between an NHS institution and a university

NHS Institution	Universities	Proportion of NHS institution papers sharing a university address
Moorfields Eye Hospital NHS Trust	University College London	70%
Great Ormond Street Hospital NHS Trust	University College London	63%
Royal Brompton & Harefield Hospitals NHS Trust	Imperial College of Science, Technology & Medicine, London	61%
University College London Hospitals NHS Trust	University College London	61%
Sheffield Teaching Hospitals NHS Trust	University of Sheffield	58%
South Manchester University Hospitals Trust	University of Manchester	55%
University Hospital Birmingham NHS Trust	University of Birmingham	52%
Oxford Radcliffe	University of Oxford	48%
Central Manchester and Manchester Children's University Hospitals NHS Trust	University of Manchester	46%
Christie Hospital NHS Trust	University of Manchester	46%
Hammersmith Hospitals NHS Trust	Imperial College of Science, Technology & Medicine, London	43%
Addenbrooke's	University of Cambridge	42%
North Bristol NHS Trust	University of Bristol	40%
Newcastle upon Tyne Hospitals NHS Trust	University of Newcastle upon Tyne	39%
Leeds Teaching Hospitals NHS Trust	University of Leeds	38%
United Bristol Healthcare NHS	University of Bristol	33%
Barts and the London NHS Trust	University College London	32%
Royal Free Hampstead NHS Trust	University College London	31%
Southampton University Hospitals NHS Trust	University of Southampton	30%
Queen's Medical Centre, University Hospital Nottingham NHS Trust	University of Nottingham	29%

Table 6 Cross-tabulation of share of HCPs by field and NHS institution (top 20 cells are highlighted)

NHS institution	ALLERGY	ANATOMY & MORPHOLOGY	ANDROLOGY	ANESTHESIOLOGY	BIOCHEMICAL RESEARCH METHODS	BIOCHEMISTRY & MOLECULAR BIOLOGY	BIOPHYSICS	BIOTECHNOLOGY & APPLIED MICROBIOLOGY	CARDIAC & CARDIOVASCULAR SYSTEMS	CELL & TISSUE ENGINEERING	CELL BIOLOGY	CHEMISTRY, MEDICINAL	CLINICAL NEUROLOGY	CRITICAL CARE MEDICINE	DENTISTRY, ORAL SURGERY & MEDICINE	DERMATOLOGY	DEVELOPMENTAL BIOLOGY	EMERGENCY MEDICINE	ENDOCRINOLOGY & METABOLISM	ENGINEERING, BIOMEDICAL	FOOD SCIENCE & TECHNOLOGY	GASTROENTEROLOGY & HEPATOLOGY	GENETICS & HEREDITY	GERIATRICS & GERONTOLOGY	GERONTOLOGY	HEALTH CARE SCIENCES & SERVICES	HEALTH POLICY & SERVICES	HEMATOLOGY	IMMUNOLOGY	INFECTIOUS DISEASES	INTEGRATIVE & COMPLEMENTARY MEDICINE	MATERIALS SCIENCE, BIOMATERIALS	MEDICAL INFORMATICS	MEDICAL LABORATORY TECHNOLOGY	MEDICINE, GENERAL & INTERNAL
Addenbrooke's	1			2	0	1	0	0	1		1		2	1		2	0	1	2	1		1	1	1	1	0		1	1	1		1		1	1
Barts and the London NHS Trust	0			3	0	1	1	1	1	2	1	1	0	6	3	2		2	4	6	0	2	2			0		3	1	1		9		3	1
Birmingham Children's Hospital NHS Trust				1		0			0		0		0	0	0	1			0			1	1					1	0	0					0
Birmingham Heartlands & Solihull NHS Trust				0	0	0		0	0		0		0	1		0			1	0		0	0	0		0		1	0	1			1		1
Birmingham and Solihull Mental Health Trust																								0	1										0
Cardiothoracic Centre Liverpool NHS Trust				0					1																			0		0					0
Central Manchester and Manchester Children's University Hospitals NHS Trust	0			1	0	0	0	0	1	2	0		0	2	3	2	0	4	1			1	0	1	3	0		2	0	0				1	1
Chelsea & Westminster Healthcare NHS Trust				2		0		0	0		0		0	0		1		1	0			0	0	0		0		0	2	5				1	1
Christie Hospital NHS Trust				0	1	0	0	1		2	1		0			0	1		1	1		0	0			0	1	1	0				1	1	1
East London & the City Mental Health NHS Trust																																			
Epsom & St Helier NHS Trust				1		0										0			0			0		0	1				0					2	0
Great Ormond Street Hospital NHS Trust	1			2		0	0	0	2		0		1	3	1	2			0	0		0	1			0	1	2	1	0					1
Guy's and St Thomas' Hospital NHS Trust	5	4	11	2	0	1	0	1	3	2	1	0	2	2	8	14	2	4	1	3	0	3	3	3	1	2	3	3	2	2		1		7	3
Hammersmith Hospitals NHS Trust	0	1	11	2	1	1	0	1	3		1	0	2	2		1	0		2	1		1	1	0		1		4	1	1	2				1
Hampshire Partnership NHS Trust						0					0		0											1											0
King's Consortium		1		1		0		0	1	2	0		1	2	1	1		2	0	0		4	0	2	2	0		1	1	1		1		5	1
Leeds Teaching Hospitals NHS Trust				3	1	0	0	0	1		1		1	2	2	6	1	7	0	1		3	1	1		0		1	0	1		1		4	1
Lewisham Hospital NHS Trust	0			0					0				0	0		1			0				0	0					0	0					0
Mayday Healthcare NHS Trust									0				0									0						0		0					0
Moorfields Eye Hospital NHS Trust	0			0		0		0			0		0			0				0			0					0	0	0			1		0
Newcastle upon Tyne Hospitals NHS Trust	1			1		0	0	0	1		0		2	1		2		1	1	1		1	0	6	8	0		1	1	1			1		1
North Bristol NHS Trust				2		0	0		0		0		1	1		0		2	0		0	0	0			0		0	0	1				1	0
North Staffordshire Hospitals Consortium NHS Trust	0								0					0		0		1		0			0						0				1		0
North West London Hospitals NHS Trust	0			0		0			0		0		0				0					7	0			0		0	0	0					0
Nottingham City Hospitals NHS Trust				0	0	0		0	1				0	0			0		0				0			0		1	0	0			1	2	1
Oxford Mental Health																								0	1										
Oxford Radcliffe				5	1	1	0	1	2	4	1		3	2	1	3	1	3	4	1		2	2	3	5	0		3	4	2			1	2	3
Papworth	0			0	0	0			2		0		0	1				1		0						0		1	0	0					0
Plymouth Hospitals NHS Trust				1					0				0	0				1	0			0						0	0	0					0
Queen's Medical Centre, University Hospital Nottingham NHS Trust	0	1		0		0		0	0		0		1	0		1		1	0	0		4	0	1	1	0		1	0	0				1	1
Royal Berkshire & Battle NHS Trust				1					0				0	1								0						0	0	0	2				0
Royal Brompton & Harefield Hospitals NHS Trust	2			1	0	0		0	9		0		0	7	0	0			0	0		0	0	0		0		3	1	0				1	1
Royal Free Hampstead NHS Trust	1	4		2	0	1	0	1	2		1	0	2	3	1	3	1	1	3	2		6	1	3	5	1	2	5	4	8		2	1	2	3
Royal Liverpool & Broadgreen University Hospitals NHS Trust				1	0	0							0	0	0	1			0	0		1		1		0		1	0	0				1	0
Royal Liverpool Children's NHS Trust				2		0			0				0	1								0	0					0	0	0					0
Royal Marsden NHS Trust					0	0	0	0			0		0		1	1			1	1		0	0			1	1	1	0						1
Royal United Hospitals Bath NHS Trust															0																				
Salford Royal Hospitals NHS Trust				2		0					0		1	1		2		1	0			1	0					0	0	0				1	0
Sandwell & West Birmingham Hospital NHS Trust				0		0			1		0		0	0		0			0	1		0	0	1		0		0		1	2			2	1
Sheffield Children's Hospital NHS Trust	0					0							0			1			0			0	1			1		0	0						0
Sheffield Teaching Hospitals NHS Trust				2		0	0		0		0		1	1		3		5	2	0		2	0	1		0		1	0	0		1	1		1
South London and Maudsley NHS Trust													0					1						1	1	0	1								0
South Manchester University Hospitals Trust	3			2	0	0		0	1		0		0	3		1		2	0	0	0	2	0	0		0	1		1	1				5	1
South West London & St George's Mental Health NHS Trust																																			0
Southampton University Hospitals NHS Trust	11	1		1	0	0	0	0	1		0		1	1		1	0	2	1	0		1	1	2	2	0		1	2	0			1	1	1
St George's Healthcare NHS Trust	2	2		3	2	1	1	1	7		1		2	3	1	1	0	3	1	1		1	1	1	2	2	1	3	3	3			3	10	3
St Mary's NHS Trust	9			0	0	0	0	0	1		0	0	1	1	0	1	1		1	1		2	1			2		1	2	1			1	2	1
United Bristol Healthcare NHS	0			3		0	0	0	1		0		0	1	2	1		3	0	0		1	0			0		1	0	0					0
University College London Hospitals NHS Trust				3	0	0		0	3		0		6	1	3	1		1	1	0		2	1	0		0		2	0	1				6	1
University Hospital Birmingham NHS Trust				0		0	0		1				1	2	0	1		6	1	0		3	0	1		1		1	0	1				1	1
University Hospitals of Leicester NHS Trust	1			2		0		0	0		0		0	1		2		1	0			1	0	0	1			1	0	0					0
Walton Centre for Neurology & Neurosurgery NHS Trust				0									1											0		0				0					0
West Hertfordshire Hospitals NHS Trust						0	1	0			0		0			1			0	0		0	0			0		0							0
West Middlesex University Hospital NHS Trust									0													0						0							

NHS institution	MEDICINE, RESEARCH & EXPERIMENTAL	MICROBIOLOGY	MULTIDISCIPLINARY SCIENCES	NEUROIMAGING	NEUROSCIENCES	NURSING	NUTRITION & DIETETICS	OBSTETRICS & GYNECOLOGY	ONCOLOGY	OPHTHALMOLOGY	ORTHOPEDICS	OTORHINOLARYNGOLOGY	PARASITOLOGY	PATHOLOGY	PEDIATRICS	PERIPHERAL VASCULAR DISEASE	PHARMACOLOGY & PHARMACY	PHYSIOLOGY	PSYCHIATRY	PUBLIC, ENVIRONMENTAL & OCCUPATIONAL HEALTH	RADIOLOGY, NUCLEAR MEDICINE & MEDICAL IMAGING	REHABILITATION	REPRODUCTIVE BIOLOGY	RESPIRATORY SYSTEM	RHEUMATOLOGY	SOCIAL WORK	SPORT SCIENCES	SUBSTANCE ABUSE	SURGERY	TOXICOLOGY	TRANSPLANTATION	TROPICAL MEDICINE	UROLOGY & NEPHROLOGY	VETERINARY SCIENCES	VIROLOGY
Addenbrooke's	1	1	1	2	1		2	1	2	1	2	2	1	2	1	2	1	1	1	0	1	0		0	2		0		2	0	2		3	1	1
Barts and the London NHS Trust	1	0	0		0	0	1	1	3	1	2	1	0	2	1	2	2	1	0	1	1		1	3	2		1		2	0	2		1	0	0
Birmingham Children's Hospital NHS Trust	0				0		0		0	0	0	1		0	3	0			0	0					0				1		1		0		
Birmingham Heartlands & Solihull NHS Trust	0	1				1		0	0	1		2	0	0	0		0		0	0				2	0					0	1		1	0	1
Birmingham and Solihull Mental Health Trust					0														0																
Cardiothoracic Centre Liverpool NHS Trust															0	0								1	0				1						
Central Manchester and Manchester Children's University Hospitals NHS Trust	0	0		0	0			0	1	3	1	5		0	1	1	0	0	1		0	1	0	1	0				2		2		2	0	0
Chelsea & Westminster Healthcare NHS Trust	0	1		0	0			1	0	0	2				0		1	0		0	1		1	0	0		1		0				0		4
Christie Hospital NHS Trust	1	0	0	0	0			0	4		0			1	0		0	0		0	2		1	0	0				0	1	0		0		0
East London & the City Mental Health NHS Trust																			0																
Epsom & St Helier NHS Trust									0	0	0																		0		1		1		
Great Ormond Street Hospital NHS Trust	1	0	0	1	1	0	1	1	0	1	0	4		0	6	1	0	0	0	0	1		1	2	2				1	0	1		1		
Guy's and St Thomas' Hospital NHS Trust	2	1	1	1	1		1	5	2	6	0	2	0	2	2	3	1	0	2	1	3	4	6	2	9	5	1	1	4	1	6		5		1
Hammersmith Hospitals NHS Trust	2	0	1	2	1		1	3	2	0		1		1	1	2	1	1	1	0	3		3	2	1		0		2		1		2		
Hampshire Partnership NHS Trust	0																0		0										0						
King's Consortium	1	0			0	0		8	0	0				0	1	1	0		1	0	4	0	1	1	1			1	3	1	8	0	4		0
Leeds Teaching Hospitals NHS Trust	1	1	0		0	0	1	2	3	1	4	3		4	2	1	1		0	0	2		5	1	4				4	1	2		2	0	
Lewisham Hospital NHS Trust					0				0								0		0	0				0					0	0					
Mayday Healthcare NHS Trust						0		1	0	0	0	0			0	0				0													0		
Moorfields Eye Hospital NHS Trust	0		0	1	0				0	19				0					0	0	0								0		0				
Newcastle upon Tyne Hospitals NHS Trust	0	1			1		0	1	1	2	1	4	0	2	2	1	1	0	2	0	1			1	1		1		2		3	0	1	0	
North Bristol NHS Trust	0	1			0			1	0		5			0	0	0	1	0	0	0	0	1		0	0		0		2	0	1		5		
North Staffordshire Hospitals Consortium NHS Trust											0				0														0	0	0		1		
North West London Hospitals NHS Trust		0			0			0	1	0	0			0	0	0	1		0	0	1		0	0					2						0
Nottingham City Hospitals NHS Trust	0	0			0		0	0	2					2	0	0	0		0	0	0			1	1				1	1	1				
Oxford Mental Health					0	0											0		1																
Oxford Radcliffe	3	2	2	2	2	3	1	2	4	2	1	2	3	6	3	3	1	0	1	1	2		2	3	1				3	1	3	8	3	0	3
Papworth	1	0		0	0			0		0					0	1	0		0	0	0			2	0				1	0	2				
Plymouth Hospitals NHS Trust		0	0		0	0		1	0	0	0			1	0		0		0		0			0	0		0		1				1		
Queen's Medical Centre, University Hospital Nottingham NHS Trust	1	1	0	1	0		1		0	1	3	7		0	1	2	1	1	0	0	0		0	1	1				1		0				
Royal Berkshire & Battle NHS Trust									0	0	1				0									0			1		1						
Royal Brompton & Harefield Hospitals NHS Trust	0	0	0		0			0	0			0		2	1	3	0	1	0	0	2			10	0		1		1	0	4		1		
Royal Free Hampstead NHS Trust	3	2	1	0	2	1	2	3	1	0	2	2		3	1	3	2	2	2	2	1		4	3	4		1	4	3	1	5		4		9
Royal Liverpool & Broadgreen University Hospitals NHS Trust	0	0			0		0	0	0	3	1	0		1		1	0	0	0	0	0		0		0				2		0	1			
Royal Liverpool Children's NHS Trust			0		0	1			0	0	1	1			3		0		0	0		0		0	0				1		0	0			
Royal Marsden NHS Trust	0						0	1	7			0		4	0		0			0	4	1		0					1	0	0		0		
Royal United Hospitals Bath NHS Trust																																			
Salford Royal Hospitals NHS Trust		0	0	1	0			1	0		2	2	0	1	0		0	0	0	0	0	1	0	0	1				1	0	1		1	0	
Sandwell & West Birmingham Hospital NHS Trust	0	1			0				1	0				0	0	1	1			0	0	0		0	1				0	1				0	
Sheffield Children's Hospital NHS Trust	0	0						0	0			0			1		0							0					0	0					
Sheffield Teaching Hospitals NHS Trust	0	0		1	0	0		1	1	0	3	3		0	0	1	0		0	0	1	1	1	0	0				2		1		4		
South London and Maudsley NHS Trust					0				0						0		0		1	0								6	0						
South Manchester University Hospitals Trust	0	1			0		0	0	0		0		0	0	0	0	1	1	0	0	0			3			2	1	1	1	1		0	0	0
South West London & St George's Mental Health NHS Trust								0												0															
Southampton University Hospitals NHS Trust	1	0	0	0	0	1	1	1	1	1	1			0	2	1	0	1	0	0	0	0	0	2	2				1	0	1		1		
St George's Healthcare NHS Trust	2	2	0	1	1	2	1	5	3	1		1	1	1	2	7	2	2	1	2	3	1	2	3	0	5	3	3	2	1	3	1	3	1	2
St Mary's NHS Trust	1	0	0	0	0		0	4	1	1	2	2		0	1	2	0	0	0	0	0		5	1	0		3	2	3	0	2		2		1
United Bristol Healthcare NHS	0	0			0	1		1	1	2	1	0		0	0	0	0	0	0	0	0		0	1	1				1		1		0	0	
University College London Hospitals NHS Trust	1	1	0	2	2		0	3	1	0	2	2	1	2	2	2	1	2	2	0	3	0	3	1	1		1		3	1	1	2	6		1
University Hospital Birmingham NHS Trust	1	0			0			1	1		1	4		0	0	0	0	0	0	0	0			2	1		1		2		6		2		0
University Hospitals of Leicester NHS Trust	0			1	0			1	1	0	1	0		1	1	2	0		0	0	0		1	1	0				2	0			0		0
Walton Centre for Neurology & Neurosurgery NHS Trust				1	0				0						0	0			0	0	0	1							0						
West Hertfordshire Hospitals NHS Trust	0				0				1					0						0	3								0	1					
West Middlesex University Hospital NHS Trust									0										0										0						

Table 7 Cross-tabulation of share of HCPs by field and universities (top 20 cells are highlighted)

	ALLERGY	ANATOMY & MORPHOLOGY	ANDROLOGY	ANESTHESIOLOGY	BIOCHEMICAL RESEARCH METHODS	BIOCHEMISTRY & MOLECULAR BIOLOGY	BIOPHYSICS	BIOTECHNOLOGY & APPLIED MICROBIOLOGY	CARDIAC & CARDIOVASCULAR SYSTEMS	CELL & TISSUE ENGINEERING	CELL BIOLOGY	CHEMISTRY, MEDICINAL	CLINICAL NEUROLOGY	CRITICAL CARE MEDICINE	DENTISTRY, ORAL SURGERY & MEDICINE	DERMATOLOGY	DEVELOPMENTAL BIOLOGY	EMERGENCY MEDICINE	ENDOCRINOLOGY & METABOLISM	ENGINEERING, BIOMEDICAL	FOOD SCIENCE & TECHNOLOGY	GASTROENTEROLOGY & HEPATOLOGY	GENETICS & HEREDITY	GERIATRICS & GERONTOLOGY	GERONTOLOGY	HEALTH CARE SCIENCES & SERVICES	HEALTH POLICY & SERVICES	HEMATOLOGY	IMMUNOLOGY	INFECTIOUS DISEASES	INTEGRATIVE & COMPLEMENTARY MEDICINE	MATERIALS SCIENCE, BIOMATERIALS	MEDICAL INFORMATICS	MEDICAL LABORATORY TECHNOLOGY	MEDICINE, GENERAL & INTERNAL
Birckbeck College London					1	1	1	1			1		0	0			0			0			0			0		0	0	0		1			0
Brunel University		1			1	0	0	0	0		0		0							0		0	0	0		2	4		0				2		0
Imperial College London Science, Technology & Medic	18	6	11	3	12	10	11	11	11	13	11	12	6	16	4	3	2	1	8	10	4	6	7	3	3	5	2	9	12	10	9	11	8	4	7
Institute for Cancer Research		1			1	2	1	1		2	4	4	0		1	1	1		1	3		1	2			0		1	0					1	1
Kings College London	4	10		2	3	3	3	2	2		3	4	6	2	9	2	7		3	4	1	2	4	9	12	3	1	2	2	0	4	3	1	3	3
London School of Hygiene & Tropical Medicine	3		11	0		1	0	0	2		0	4	1	3		1		1	0		1	1	1	2	2	6	15	1	4	9	4		3		8
Oxford Brookes University						0		0			0		0				1		1							0	1						1		0
University College London	3	17		9	7	9	7	9	8		10	6	18	4	18	2	13	1	5	13	2	4	10	9	10	4	3	7	6	6	2	13	5	1	7
University of Bath	0	1		4	2	1	1	1	0		1	4	1		1	1	2	2	0	1	0	0	1	1		1	1	0	1	1	2	2	2		0
University of Birmingham	1			1	2	3	1	4	3		3	2	1	1	5	0	2	2	4	3	2	3	3	1		4	3	4	5	4	2	5	3	3	3
University of Bradford					1	0	1	0			0	3				3	0		0	0	0	0	0	0							7			1	0
University of Bristol	1	3	11	1	1	2	2	3	3	4	2	3	2	1	7	0	1	3	5	1	8	1	2	3	4	3	2	3	2	3	9	2	5		4
University of Cambridge	3	6		2	8	12	13	10	3	11	14	6	5	4		1	19	3	9	6	2	2	11	6	5	2	1	5	5	1		8	5		3
University of Durham		1			2	1	1	1	0	13	1	0	0			1				1	0	1	0			0		0	0			1			0
University of East Anglia		2		0	1	2	2	1	0		1	1	0		0	0	1		0		3	0	0	1		1	2	0	0	0					0
University of Exeter		1		1	1	0	0	0	0		0	0	0						0	1		0	0			2					11		1		0
University of Hull					1	0	0		3		0	0	0						0			0	0	0	1	0			0		2		1		0
University of Keele	1			2		0	1	0				0	0		0	1			0	1	0	0	0			1		0	0				5		1
University of Kent	0			0	0	0	0	1			0	1	0			0			0	0	0		0	1	2	0	1		0				1		0
University of Leeds		4		2	2	3	3	4	1	2	2		1	2	1	3	1	2	1	4	8	1	2	1		3	2	2	1	2		3	1	1	1
University of Leicester	1	1		2	0	3	1	1	2	2	3	1	1	1		2	2	1	0		2	1	3	1	1	2	1	2	1	0			4	2	1
University of Liverpool	1	4		2	3	2	1	2	1	2	2	7	2	1	4	0	1		1	4	2	3	1	1	2	2	4	1	2	6		7	5	5	2
University of London Institute for Education													0																	0					0
University of London Queen Mary						0	1	0	0		0		0		1	1			0	1			0	0	1			0	0	0		1			0
University of London School of Pharmacy						0						0	0		0								0								2				
University of Manchester	2	6	11	3	7	5	4	6	2	2	5	5	3	3	9	9	4	7	4	6	2	3	3	5	4	7	5	2	2	2	2	10	5	2	3
University of Newcastle upon Tyne		5		0	2	2	3	4	1	15	3	7	3	1	9	3	2		3	1	3	4	3	8	8	3	3	2	1	0	4	1	3		2
University of Nottingham	5	2		1	1	2	3	2	0		2	6	2	3		3	4	2	1	3	10	3	1	1	3	2	1	1	1	2		5	1		2
University of Oxford	1	6	11	5	11	11	14	10	5	7	8	8	7	2	1	2	6	2	6	7	1	3	12	4	4	6	7	5	13	7	2	4	7	7	7
University of Plymouth				1		0		0	0		0		0	0				1	0		3	0	0			2			0	0	11		1		0
University of Reading					1	1	1	2	0	2	0	1	0				2		1		19	0	1	1	2	0		1	0	0	2		1		0
University of Salford Manchester					0	0	0	0				1									1					0					4		1		0
University of Sheffield	1	2	22	2	3	3	3	2	1	9	2	1	1	2	5	2	4	7	5	2	1	2	2	2	1	8	11	1	2	1	4	5	2	1	2
University of Southampton	10	1		1	3	2	3	2	0		1	4	2	3		0	0	1	4	3	3	3	1	3	3	2	1	2	3	1	2	2	3	1	2
University of Surrey	0				1	0	1	1	0		0	2	1	1	0			2	1	1	7		0	1		0	1	0	0	0		1	2	5	0
University of Sussex		3		0	1	2	1	1	0		2	0	0	1		0	2		0	0			2	1		1	2	0	0	0		1	1		0
University of Warwick					1	1	2	1	0		1	0	0			0	1	1	1		3	0	0	1	2	1	1	0	0	0			2		0
University of York		1			7	2	4	3	0	4	2	1	0		0	0	2		1	1	10	0	1	2		9	19	0	0	0	7	1	7		2

	MEDICINE, RESEARCH & EXPERIMENTAL	MICROBIOLOGY	MULTIDISCIPLINARY SCIENCES	NEUROIMAGING	NEUROSCIENCES	NURSING	NUTRITION & DIETETICS	OBSTETRICS & GYNECOLOGY	ONCOLOGY	OPHTHALMOLOGY	ORTHOPEDICS	OTORHINOLARYNGOLOGY	PARASITOLOGY	PATHOLOGY	PEDIATRICS	PERIPHERAL VASCULAR DISEASE	PHARMACOLOGY & PHARMACY	PHYSIOLOGY	PSYCHIATRY	PUBLIC, ENVIRONMENTAL & OCCUPATIONAL HEALTH	RADIOLOGY, NUCLEAR MEDICINE & MEDICAL IMAGING	REHABILITATION	REPRODUCTIVE BIOLOGY	RESPIRATORY SYSTEM	RHEUMATOLOGY	SOCIAL WORK	SPORT SCIENCES	SUBSTANCE ABUSE	SURGERY	TOXICOLOGY	TRANSPLANTATION	TROPICAL MEDICINE	UROLOGY & NEPHROLOGY	VETERINARY SCIENCES	VIROLOGY
Birckbeck College London		0	0	1	1	0			0						0		0	1	0		0			0			0						0		
Brunel University	0		0		0	1		0	0		0		0		0		0	1	0	1	0	1	1	0			4	1	0	3	1				
Imperial College London Science, Technology & Medic	14	8	11	3	4	0	6	5	5	3	8	2	10	5	5	9	10	6	6	7	6	3	5	18	6		8	7	6	13	3	6	6	3	11
Institute for Cancer Research	1	0	1		0	0		0	7	0				3	0	0	1	0	0	0	3								0	1			1	0	
Kings College London	3	1	1	8	7	7	3	3	1	1	1	1		2	3	3	6	3	20	3	5	6	3	3	4		1	11	2	3	1		1	0	1
London School of Hygiene & Tropical Medicine	3	4	1		0	2	5	2	1	3	0	0	18		2	1	1	0	1	14	0		1	3	0		0	6	1	1	1	38	0	3	4
Oxford Brookes University		0	0		0	0	0	1	0	0	0			0	0		0		0	0		0	2		0			1	0						
University College London	8	2	10	34	24	1	9	4	4	18	1	6	1	9	10	8	6	13	8	10	15	5	6	3	7		3	16	5	1	2	2	8	1	11
University of Bath	0	2	2	0	1	2	0		0	0	1		1	0	1	0	2	1	0	1	0	1		0	1	9	3		0	1	1		0	0	1
University of Birmingham	4	6	2	1	2	5	1	3	3	2	1	1	0	3	2	3	3	5	2	2	1	2	4	1	4	5	10	4	2	5	4	0	3	1	4
University of Bradford		0			0	1		0	0	2	1			0		0	1	0	0	0			0				0		0	1					
University of Bristol	2	5	3	0	3	0	4	2	1	2	4	1	5	2	4	3	4	5	4	7	0	1	1	2	3	14	3	3	2	1	0	1	2	23	2
University of Cambridge	6	3	15	5	11	0	7	4	5	2	3	3	5	5	4	7	6	8	9	4	3	4	7	1	2		3	4	2	2	3	1	2	16	7
University of Durham	0		1	0	0	1		0	0	0			0	0	0	0	0	1	0	1	0	1								1	0	3		1	
University of East Anglia	0	2	1		0	1	2	0	0	1	1	0	0		0	0	0	0	0	1		1			2	5			1	0		0		0	0
University of Exeter		0	1		0		0	1			0	0	1		0		0	0	0	0	0	0	1	0			4		0	4			0	0	
University of Hull		0	0		0	6		1	0		1	0			0	0	0		0	0	0	1	1	1			1		1						
University of Keele	0	0	0		0	1	0	1	0	0	3		2		1		0	1	0	1	0	5		0	2		4	1	0	1	0		1	0	0
University of Kent		1	0		0	0	0		0	0		0		0		0	0	0	0	0	0	1					1	4		0					
University of Leeds	1	2	2		1	5	2	2	2	0	3	0	4	2	1	2	2	5	1	2	0	1	3	1	10		5	1	1	2			1	2	2
University of Leicester	2	2	2	1	1	0		2	3	1	1	2		2	2	4	3	1	1	1	1	2	1	1		5	2		2	5	2		2	1	0
University of Liverpool	3	3	2	2	1	5	5	2	1	1	1	3	15	2	3	1	4	4	2	4	1	2	3	2	0	5	12	4	2	9	0	17		19	6
University of London Institute for Education																			0	0				0					0						
University of London Queen Mary	0	0		0	0			0	0			0	0	0	0	0	0	0	0	0	0			0					0			0	0	0	0
University of London School of Pharmacy					0			0	0								0			0															
University of Manchester	2	4	4	4	3	6	1	2	2	4	3	5	3	4	2	3	5	5	5	3	4	10	3	1	9	18	2	3	2	4	2	0	2	2	1
University of Newcastle upon Tyne	2	3	2	2	2		2	1	2	1	1	8	0	1	2	1	3	3	3	3	1	6	2	1	3	5	1	2	2	3	4	0	2	3	0
University of Nottingham	1	4	2	3	2	3	3	2	1	3	2	5	4	2	2	1	4	3	2	2	2	6	6	2	3	5	4		1	1	1	1	1	2	2
University of Oxford	10	11	15	13	11	2	7	4	5	4	16		10	4	5	6	5	9	8	7	7	7	5	2	4		4	1	5	2	5	14	3	4	14
University of Plymouth		0	0		0	6	0	1	0	0			0		0		0	0	0	0	0	0		0			1		0	5			0	0	
University of Reading	0	2	1	0	0	0	9	0	0	0	0	0	1		0	0	1	0	0	0	0		2		0					3				3	2
University of Salford Manchester		0			0	2					1	0	6							1		1		0		5	1		0			2		1	
University of Sheffield	2	3	3	3	2	10	2	2	2	1	1		1	3	1	1	2	2	1	2	2	5	3	1	1	5	0	2	1	3	1		3	0	0
University of Southampton	2	1	2	1	2	6	11	1	1	0	1	1		3	3	2	2	1	3	2	0	8	1	3	1		3	3	1	3	1		2	1	1
University of Surrey	0	1			0	1	5	1	0					1	0	0	1	1	1	1	0	1	0	0			1	1	0	4			0	0	
University of Sussex	0	1	1		1	1	1	0	1	1	0					0	1	2	1	1	1	2		0			1	2	0	4	1		0	0	0
University of Warwick	0	3	1	0	0	1		1	0		1	0	0	0	1	0	0	0	0	1	0	0	1				0		0	0			0	3	0
University of York	1	1	1	1	1	5	0	1	1	0		1	4	0	0	0	1	1	1	2	0	3	3	0		14		1	0	4	0	1	0	2	1

Table 8 Institutions with more than 10% of HCPs by field with more than 100 HCPs

Thomson ISI field (JSC)	Organisation	Share of HCPs in 2002–2006
ALLERGY	Imperial College of Science, Technology & Medicine, London	18%
	Southampton University Hospitals NHS Trust	11%
BIOCHEMICAL RESEARCH METHODS	Imperial College of Science, Technology & Medicine, London	12%
	University of Oxford	11%
BIOCHEMISTRY & MOLECULAR BIOLOGY	University of Cambridge	12%
	University of Oxford	11%
BIOPHYSICS	University of Oxford	14%
	University of Cambridge	13%
	Imperial College of Science, Technology & Medicine, London	11%
BIOTECHNOLOGY & APPLIED MICROBIOLOGY	Imperial College of Science, Technology & Medicine, London	11%
	University of Cambridge	10%
CARDIAC & CARDIOVASCULAR SYSTEMS	Imperial College of Science, Technology & Medicine, London	11%
CELL BIOLOGY	University of Cambridge	14%
	Imperial College of Science, Technology & Medicine, London	11%
CHEMISTRY, MEDICINAL	Imperial College of Science, Technology & Medicine, London	12%
CLINICAL NEUROLOGY	University College London	18%
CRITICAL CARE MEDICINE	Imperial College of Science, Technology & Medicine, London	16%
DENTISTRY, ORAL SURGERY & MEDICINE	University College London	18%
DERMATOLOGY	Guy's and St Thomas' Hospital NHS Trust	14%
DEVELOPMENTAL BIOLOGY	University of Cambridge	19%
	University College London	13%
	National Institute for Medical Research	10%
ENGINEERING, BIOMEDICAL	University College London	13%
	Imperial College of Science, Technology & Medicine, London	10%
FOOD SCIENCE & TECHNOLOGY	University of Reading	19%
	University of York	10%
	University of Nottingham	10%
GENETICS & HEREDITY	University of Oxford	12%
	University of Cambridge	11%
GERONTOLOGY	King's College London	12%
HEALTH POLICY & SERVICES	University of York	19%
	London School of Hygiene & Tropical Medicine	15%
	University of Sheffield	11%
IMMUNOLOGY	University of Oxford	13%
	Imperial College of Science, Technology & Medicine, London	12%
MATERIALS SCIENCE, BIOMATERIALS	University College London	13%
	Imperial College of Science, Technology & Medicine, London	11%
MEDICINE, RESEARCH & EXPERIMENTAL	Imperial College of Science, Technology & Medicine, London	14%

Table 8 continued

Thomson ISI field (JSC)	Organisation	Share of HCPs in 2002–2006
MEDICINE, RESEARCH & EXPERIMENTAL (continued)	University of Oxford	10%
MICROBIOLOGY	University of Oxford	11%
MULTIDISCIPLINARY SCIENCES	University of Cambridge	15%
	University of Oxford	15%
	Imperial College of Science, Technology & Medicine, London	11%
	University College London	10%
NEUROIMAGING	University College London	34%
	University of Oxford	13%
NEUROSCIENCES	University College London	24%
	University of Oxford	11%
	University of Cambridge	11%
NURSING	University of Sheffield	10%
NUTRITION & DIETETICS	University of Southampton	11%
OPHTHALMOLOGY	Moorfields Eye Hospital NHS Trust	19%
	University College London	18%
ORTHOPEDICS	University of Oxford	16%
PARASITOLOGY	London School of Hygiene & Tropical Medicine	18%
	University of Liverpool	15%
PHARMACOLOGY & PHARMACY	Imperial College of Science, Technology & Medicine, London	10%
PHYSIOLOGY	University College London	13%
PSYCHIATRY	King's College London	20%
PUBLIC, ENVIRONMENTAL & OCCUPATIONAL HEALTH	London School of Hygiene & Tropical Medicine	14%
	University College London	10%
RADIOLOGY, NUCLEAR MEDICINE & MEDICAL IMAGING	University College London	15%
RESPIRATORY SYSTEM	Imperial College of Science, Technology & Medicine, London	18%
RHEUMATOLOGY	University of Leeds	10%
SPORT SCIENCES	University of Liverpool	12%
	University of Birmingham	10%
TOXICOLOGY	Imperial College of Science, Technology & Medicine, London	13%
TROPICAL MEDICINE	London School of Hygiene & Tropical Medicine	38%
	University of Liverpool	17%
	University of Oxford	14%
VETERINARY SCIENCES	University of Bristol	23%
	University of Liverpool	19%
	University of Cambridge	16%
VIROLOGY	University of Oxford	14%
	Imperial College of Science, Technology & Medicine, London	11%
	University College London	11%

Table 9 Cross-tabulation of share of HCPs by field and universities (top 20 cells are highlighted)

	Cardiovascular disease	Deafness and hearing problems	Dementias	Gastrointestinal (including liver) disease	Musculoskeletal disease	Nutrition, diet and lifestyle (incl obesity)	Respiratory disease
Addenbrooke's	1	2	1	1	2	2	1
Barts and the London NHS Trust	2	1	1	2	2	2	2
Birckbeck College London	0		1				0
Birmingham and Solihull Mental Health Trust			0				
Birmingham Children's Hospital NHS Trust	0	1	0	1	0	0	
Birmingham Heartlands & Solihull NHS Trust	0	2	0	0	0	1	1
Cardiothoracic Centre Liverpool NHS Trust	1				0		1
Central Manchester and Manchester Children's University Hospitals NHS Trust	1	5	0	1	0	1	1
Chelsea & Westminster Healthcare NHS Trust	0		0	0	1	0	0
Christie Hospital NHS Trust			0	0	0	1	0
East London & the City Mental Health NHS Trust			0				
Epsom & St Helier NHS Trust			0	0	0	0	
Great Ormond Street Hospital NHS Trust	2	4	0	0	1	0	2
Guy's and St Thomas' Hospital NHS Trust	3	2	1	3	6	1	2
Hammersmith Hospitals NHS Trust	3	1	1	1	0	1	2
Hampshire Partnership NHS Trust			0				
King's Consortium	1		1	4	0	0	1
Leeds Teaching Hospitals NHS Trust	1	3	0	3	4	0	1
Lewisham Hospital NHS Trust	0		0			0	0
Mayday Healthcare NHS Trust	0	0	0	0	0		
Moorfields Eye Hospital NHS Trust			0				0
Newcastle upon Tyne Hospitals NHS Trust	1	4	1	1	1	1	1
North Bristol NHS Trust	0		0	0	2	0	0
North Staffordshire Hospitals Consortium NHS Trust	0				0		0
North West London Hospitals NHS Trust	0		0	7	0		0
Nottingham City Hospitals NHS Trust	1		0		1	0	1
Oxford Mental Health			0				
Oxford Radcliffe	2	2	2	2	1	3	2
Papworth	2		0		0		2
Plymouth Hospitals NHS Trust	0		0	0	0	0	0
Queen's Medical Centre, University Hospital Nottingham NHS Trust	0	7	0	4	1	0	1
Royal Berkshire & Battle NHS Trust	0		0	0	0		0
Royal Brompton & Harefield Hospitals NHS Trust	8	0	0	0	0	0	8
Royal Free Hampstead NHS Trust	3	2	2	6	3	2	3
Royal Liverpool & Broadgreen University Hospitals NHS Trust	0	0	0	1	0	0	
Royal Liverpool Children's NHS Trust	0	1	0	0	0		0
Royal Marsden NHS Trust		0	0	0		0	0
Salford Royal Hospitals NHS Trust	0	2	0	1	1	0	0
Sandwell & West Birmingham Hospital NHS Trust	1		0	0	1	0	0
Sheffield Children's Hospital NHS Trust		0	0	0		0	0
Sheffield Teaching Hospitals NHS Trust	1	3	0	2	1	1	0
South London and Maudsley NHS Trust			0				
South Manchester University Hospitals Trust	1		0	2	0	0	3
Southampton University Hospitals NHS Trust	1		0	1	2	1	4
St George's Healthcare NHS Trust	7	1	1	1	0	1	3
St Mary's NHS Trust	1	2	0	2	1	0	2
United Bristol Healthcare NHS	1	0	0	1	0	0	1
University College London Hospitals NHS Trust	3	2	2	2	1	1	1
University Hospital Birmingham NHS Trust	1	4	0	3	1	1	2
University Hospitals of Leicester NHS Trust	0	0	0	1	1	0	1
Walton Centre for Neurology & Neurosurgery NHS Trust			0				
West Hertfordshire Hospitals NHS Trust			0	0		0	
West Middlesex University Hospital NHS Trust	0		0	0			

Table 10 Cross-tabulation of share of HCPs by field and universities and other organisations (top 20 cells are highlighted)

	Cardiovascular disease	Deafness and hearing problems	Dementias	Gastrointestinal (including liver) disease	Musculoskeletal disease	Nutrition, diet and lifestyle (incl obesity)	Respiriatory disease
Brunel University	0		0	0	0		0
Imperial College London Science, Technology & Medicine	12	2	7	6	7	7	18
Institute for Cancer Research			1	1		1	
King's College London	2	1	7	2	3	3	3
King's Consortium				4			
London School of Hygiene & Tropical Medicine	2	0	1	1	0	1	3
National Institute for Medical Research			1				
Oxford Brookes University			0		0	1	
University College London	7	6	15	4	5	5	3
University of Bath	0		1	0	1	0	0
University of Birmingham	3	1	2	3	3	3	1
University of Bradford			0	0	0	0	
University of Bristol	2	1	3	1	3	5	2
University of Cambridge	3	3	10	2	2	7	2
University of Durham	0		1	1		0	
University of East Anglia	0	0	1	0	2	1	
University of Exeter	0	0	0	0	0	0	0
University of Hull	2	0	0	0	0	0	1
University of Keele			0	0	2	0	0
University of Kent		0	0			0	0
University of Leeds	1	0	2	1	8	2	0
University of Leicester	2	2	2	1	0	1	1
University of Liverpool	1	3	2	3	1	2	1
University of London Institute for Education			0				0
University of London Queen Mary	0	0	0			0	0
University of London School of Pharmacy			0				
University of Manchester	2	5	4	3	7	3	1
University of Newcastle upon Tyne	1	8	2	4	2	3	1
University of Nottingham	1	5	2	3	3	3	3
University of Oxford	4		10	3	8	6	2
University of Plymouth	0		0	0		1	0
University of Reading	0	0	0	0	0	5	
University of Salford		0	0		0	0	0
University of Sheffield	1		2	2	1	4	1
University of Southampton	1	1	2	3	1	5	4
University of Surrey	0		0			3	0
University of Sussex	0		1		0	0	0
University of Warwick	0	0	1	0	0	1	
University of York	0	1	1	0		2	0

Table 11 Top five institutions within a research area by HCPs

Research theme	Organisation	Share of HCPs in 2002–2006
Cardiovascular disease	Imperial College of Science, Technology & Medicine, London	12.38
	Royal Brompton & Harefield Hospitals NHS Trust	8.34
	University College London	7.20
	St George's Healthcare NHS Trust	6.60
	University of Oxford	4.09
Deafness and hearing problems	University of Newcastle upon Tyne	7.73
	Queen's Medical Centre, University Hospital Nottingham NHS Trust	7.25
	University College London	6.28
	Central Manchester and Manchester Children's University Hospitals NHS Trust	4.83
	University of Manchester	4.83
Dementias	University College London	14.73
	University of Cambridge	10.17
	University of Oxford	10.08
	King's College London	7.15
	Imperial College of Science, Technology & Medicine, London	6.86
Gastrointestinal (including liver) disease	North West London Hospitals NHS Trust	6.82
	Imperial College of Science, Technology & Medicine, London	5.80
	Royal Free Hampstead NHS Trust	5.70
	King's Consortium	4.07
	Queen's Medical Centre, University Hospital Nottingham NHS Trust	4.07
Musculoskeletal disease	University of Oxford	8.18
	University of Leeds	7.60
	Imperial College of Science, Technology & Medicine, London	7.03
	University of Manchester	6.68
	Guy's and St Thomas' Hospital NHS Trust	5.88
Nutrition, diet and lifestyle (inc. obesity)	University of Cambridge	7.34
	Imperial College of Science, Technology & Medicine, London	6.64
	University of Oxford	5.56
	University of Bristol	5.33
	University of Southampton	5.24
Respiratory disease	Imperial College of Science, Technology & Medicine, London	17.98
	Royal Brompton & Harefield Hospitals NHS Trust	8.34
	University of Southampton	4.43
	Southampton University Hospitals NHS Trust	4.17

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APPENDICES

Appendix A: Fields of analysis and number of citations needed to be in the top 20% of cited papers, excluding self-citations

Fields of analysis and number of citations needed to be in the top 20% of cited papers, excluding self-citations

	2002	2003	2004	2005	2006
ALLERGY	12.5	13.5	13.5	13.0	12.0
ANATOMY & MORPHOLOGY	4.0	12.0	13.5	7.0	6.0
ANDROLOGY	6.0	6.0	6.0	7.0	9.0
ANESTHESIOLOGY	7.0	8.0	8.0	8.0	11.0
BIOCHEMICAL RESEARCH METHODS	9.3	9.0	10.3	11.5	11.5
BIOCHEMISTRY & MOLECULAR BIOLOGY	16.0	15.3	10.3	15.3	15.0
BIOPHYSICS	7.7	13.0	10.3	12.5	13.0
BIOTECHNOLOGY & APPLIED MICROBIOLOGY	10.3	12.5	10.0	9.8	12.3
CARDIAC & CARDIOVASCULAR SYSTEMS	13.0	9.7	14.3	14.3	14.7
CELL & TISSUE ENGINEERING	13.2	10.7	12.3	15.4	14.0
CELL BIOLOGY	17.5	15.3	17.5	15.3	19.0
CHEMISTRY, MEDICINAL	8.0	12.5	9.7	11.3	10.7
CLINICAL NEUROLOGY	11.5	8.5	12.5	12.5	12.5
CRITICAL CARE MEDICINE	11.5	12.0	14.0	10.3	14.5
DENTISTRY, ORAL SURGERY & MEDICINE	7.7	6.0	7.0	7.0	7.0
DERMATOLOGY	7.0	7.0	7.0	8.0	8.0
DEVELOPMENTAL BIOLOGY	19.0	18.0	21.0	19.0	18.0
EMERGENCY MEDICINE	7.8	6.0	6.0	6.0	6.0
ENDOCRINOLOGY & METABOLISM	14.0	14.0	14.0	15.0	15.0
ENGINEERING, BIOMEDICAL	8.0	9.0	10.5	11.0	8.3
FOOD SCIENCE & TECHNOLOGY	5.7	5.0	6.0	6.0	7.0
GASTROENTEROLOGY & HEPATOLOGY	10.0	11.0	13.0	11.3	13.0
GENETICS & HEREDITY	17.7	11.3	15.0	16.5	12.3
GERIATRICS & GERONTOLOGY	9.0	10.0	9.0	10.0	11.0
GERONTOLOGY	8.7	9.0	8.8	9.5	10.0
HEALTH CARE SCIENCES & SERVICES	5.0	5.5	7.5	5.0	5.3
HEALTH POLICY & SERVICES	6.3	5.7	7.5	8.0	8.0
HEMATOLOGY	15.0	17.0	14.3	14.3	14.7
IMMUNOLOGY	13.7	13.5	13.0	14.5	14.0
INFECTIOUS DISEASES	13.7	10.3	13.0	13.0	14.0
INTEGRATIVE & COMPLEMENTARY MEDICINE	7.0	5.0	5.0	7.0	6.0
MATERIALS SCIENCE, BIOMATERIALS	8.7	9.0	10.5	11.0	11.5
MEDICAL INFORMATICS	3.8	5.3	7.0	7.7	7.8
MEDICAL LABORATORY TECHNOLOGY	6.0	7.0	8.0	8.0	8.0

MEDICINE, GENERAL & INTERNAL	9.0	9.0	9.0	10.0	10.0
MEDICINE, RESEARCH & EXPERIMENTAL	9.0	9.0	9.0	10.0	12.3
MICROBIOLOGY	11.5	11.0	10.0	10.5	11.0
MULTIDISCIPLINARY SCIENCES	35.0	36.0	35.0	33.0	35.0
NEUROIMAGING	11.7	11.7	11.7	11.3	13.3
NEUROSCIENCES	11.5	11.5	11.5	12.5	13.0
NURSING	4.0	4.0	5.0	6.0	5.0
NUTRITION & DIETETICS	9.0	10.0	11.0	11.3	10.0
OBSTETRICS & GYNECOLOGY	8.0	9.0	11.0	9.0	9.0
ONCOLOGY	17.5	15.0	16.0	13.0	13.0
OPHTHALMOLOGY	7.0	8.0	8.0	8.0	8.0
ORTHOPEDICS	6.5	10.0	9.0	8.0	8.3
OTORHINOLARYNGOLOGY	5.0	5.0	5.0	5.0	6.0
PARASITOLOGY	6.0	6.0	6.0	6.0	7.0
PATHOLOGY	7.7	9.0	10.0	13.5	10.0
PEDIATRICS	7.0	7.0	8.0	11.3	8.0
PERIPHERAL VASCULAR DISEASE	13.0	14.0	14.3	14.3	14.7
PHARMACOLOGY & PHARMACY	10.0	9.0	9.0	10.5	10.0
PHYSIOLOGY	10.5	10.5	15.0	11.0	9.5
PSYCHIATRY	7.3	11.0	10.5	12.0	13.0
PUBLIC, ENVIRONMENTAL & OCCUPATIONAL HEALTH	5.5	8.0	6.0	13.0	9.0
RADIOLOGY, NUCLEAR MEDICINE & MEDICAL IMAGING	7.7	9.0	11.7	10.0	10.0
REHABILITATION	5.0	4.5	5.0	5.0	5.5
REPRODUCTIVE BIOLOGY	14.5	9.0	9.0	11.0	10.0
RESPIRATORY SYSTEM	11.5	10.5	12.0	15.3	14.5
RHEUMATOLOGY	12.0	13.0	13.0	14.0	14.0
SOCIAL WORK	5.5	5.5	6.0	6.5	5.7
SPORT SCIENCES	5.5	6.0	7.0	7.0	8.3
SUBSTANCE ABUSE	12.0	8.0	10.5	10.5	9.0
SURGERY	6.5	9.7	9.0	9.0	8.0
TOXICOLOGY	7.0	8.0	10.3	8.0	9.0
TRANSPLANTATION	13.0	10.0	9.0	9.0	9.0
TROPICAL MEDICINE	6.5	7.0	8.0	8.0	8.0
UROLOGY & NEPHROLOGY	10.0	11.0	11.0	11.0	11.0
VETERINARY SCIENCES	4.7	3.0	3.0	4.0	4.0
VIROLOGY	13.7	14.0	14.0	14.0	14.0

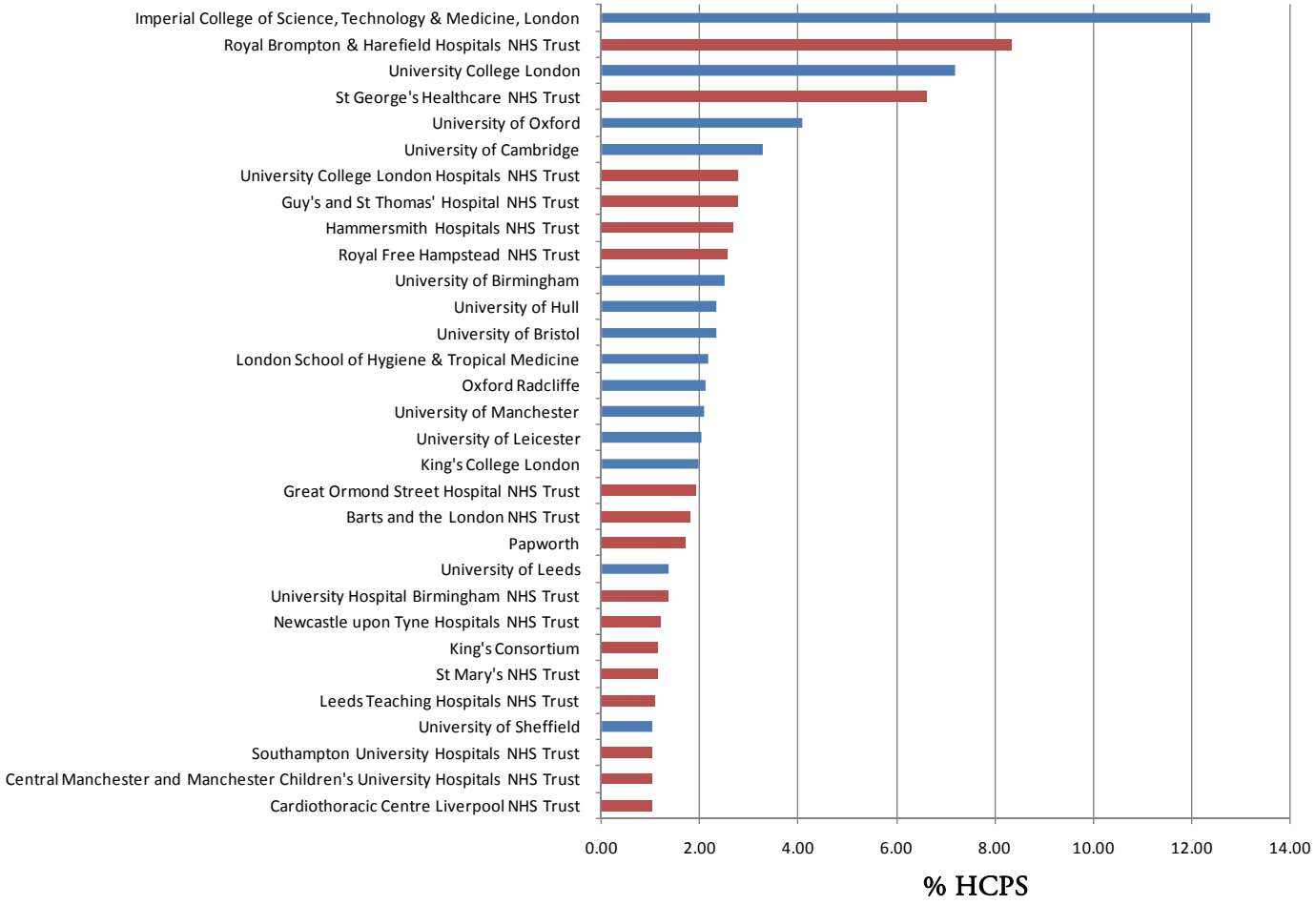
Appendix B: Profiles of HCP share in subject categories

This appendix shows the distribution of HCPs across research organisations (where those organisations had at least one HCP (if the organisation is not represented by publications, it will not appear within the distribution). Each subject category is shown (see Box A1 below). Within each distribution, red blocks are NHS institutions and blue blocks are universities.

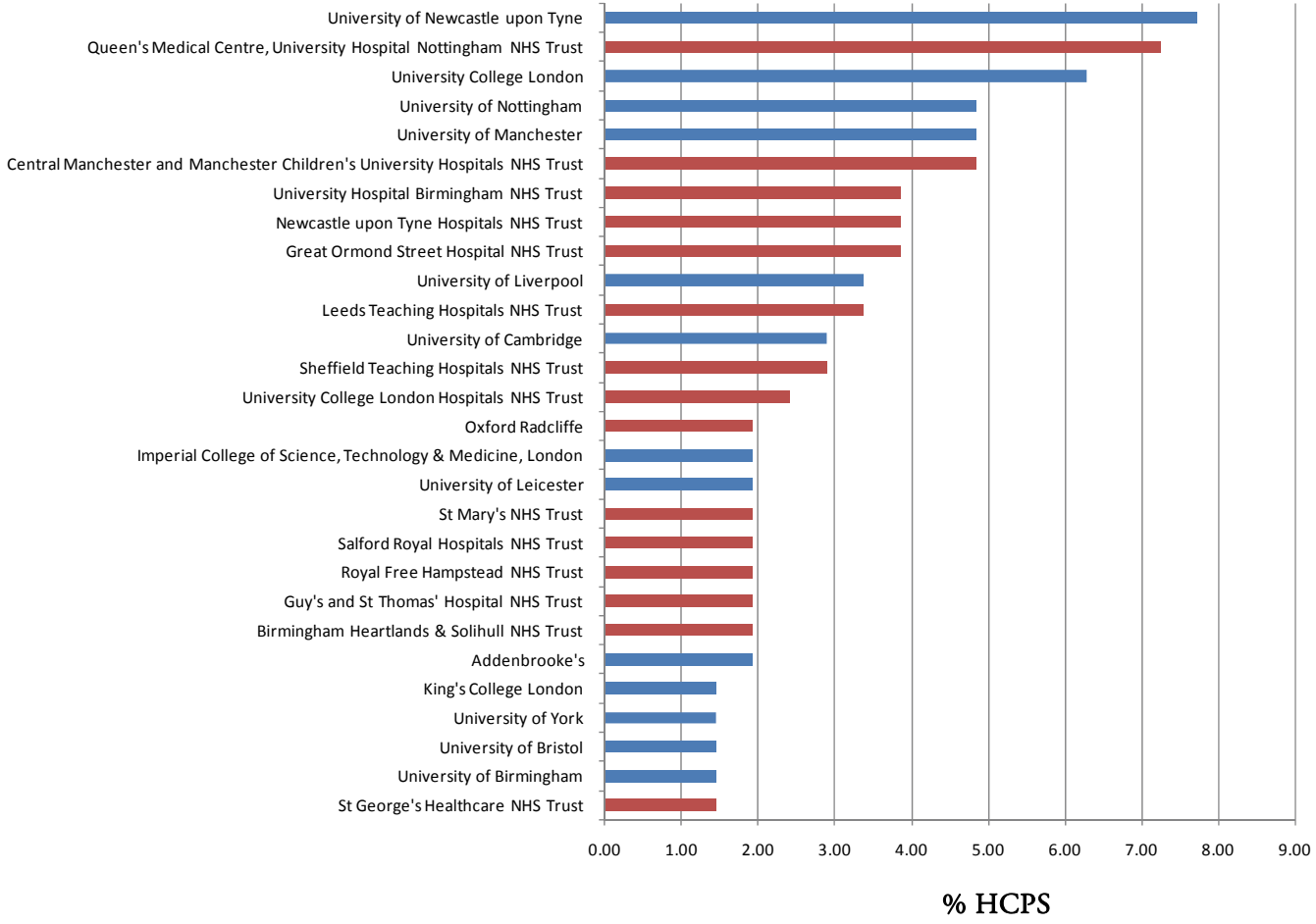
Box A1 Research subject themes

- Cardiovascular disease
- Deafness and hearing problems
- Dementias
- Gastrointestinal (including liver) disease
- Musculoskeletal disease
- Nutrition, diet and lifestyle (including obesity)
- Respiratory disease

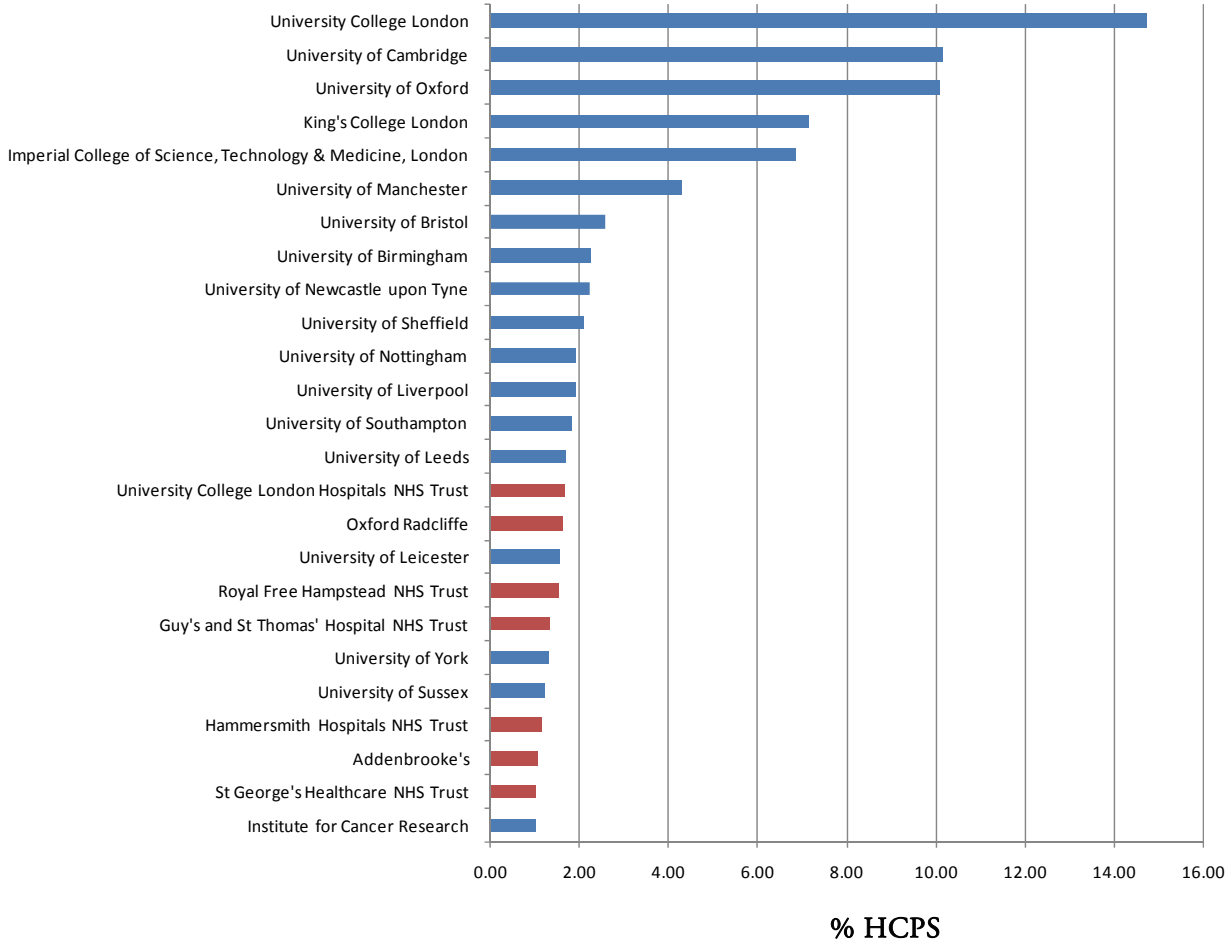
Cardiovascular disease: proportion of HCPs by institution



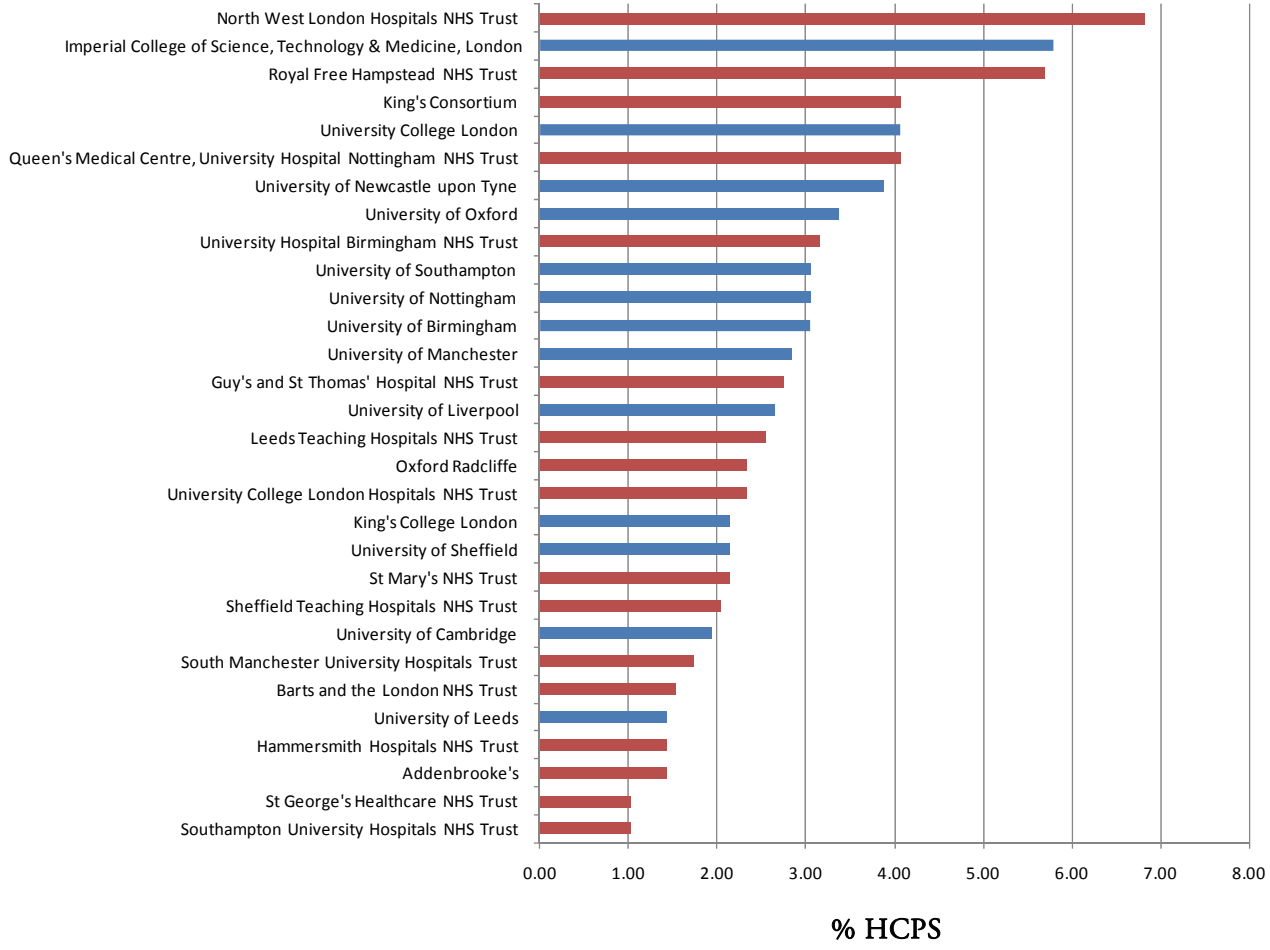
Deafness and hearing problems: proportion of HCPs by institution



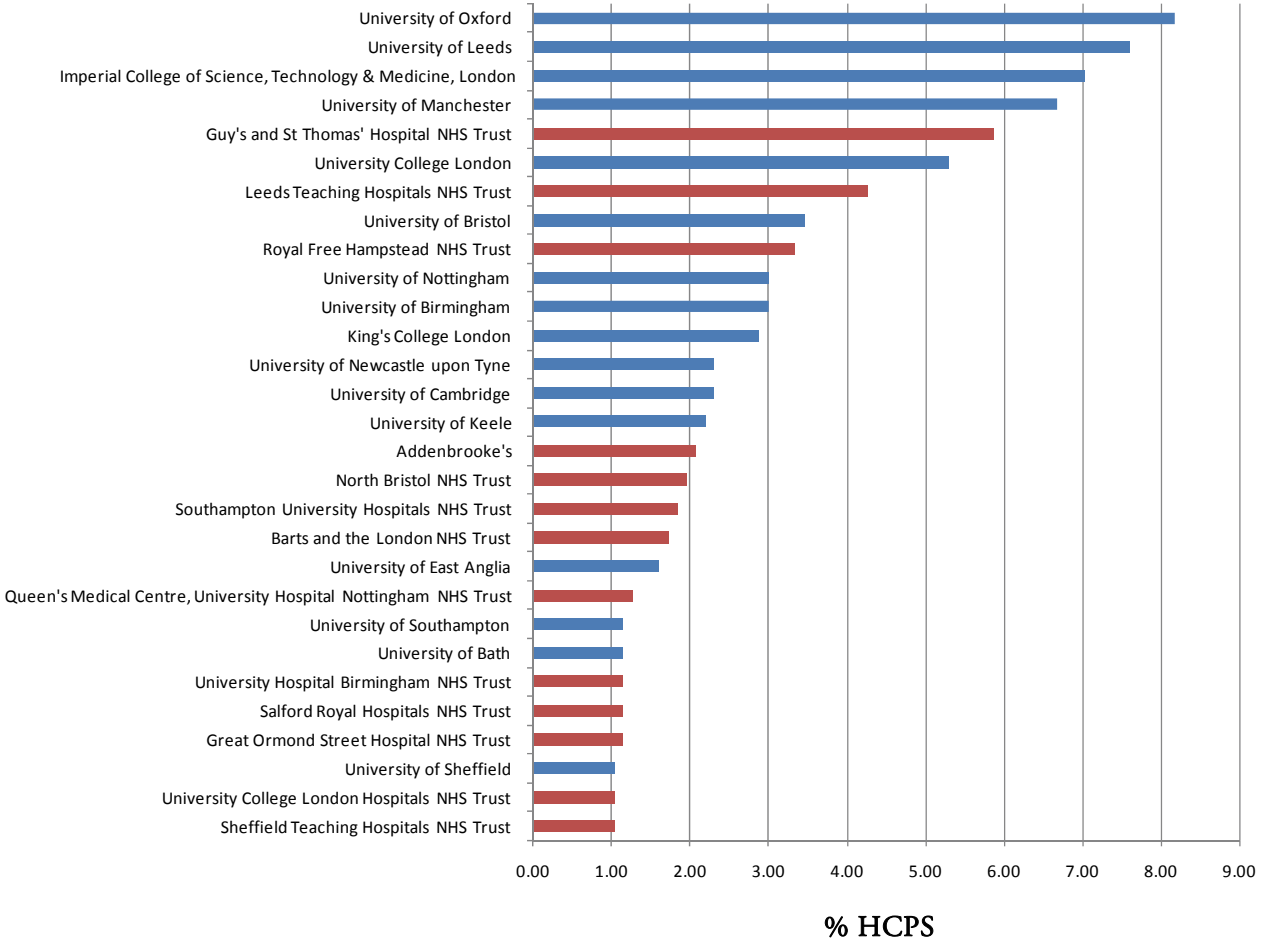
Dementias: proportion of HCPs by institution



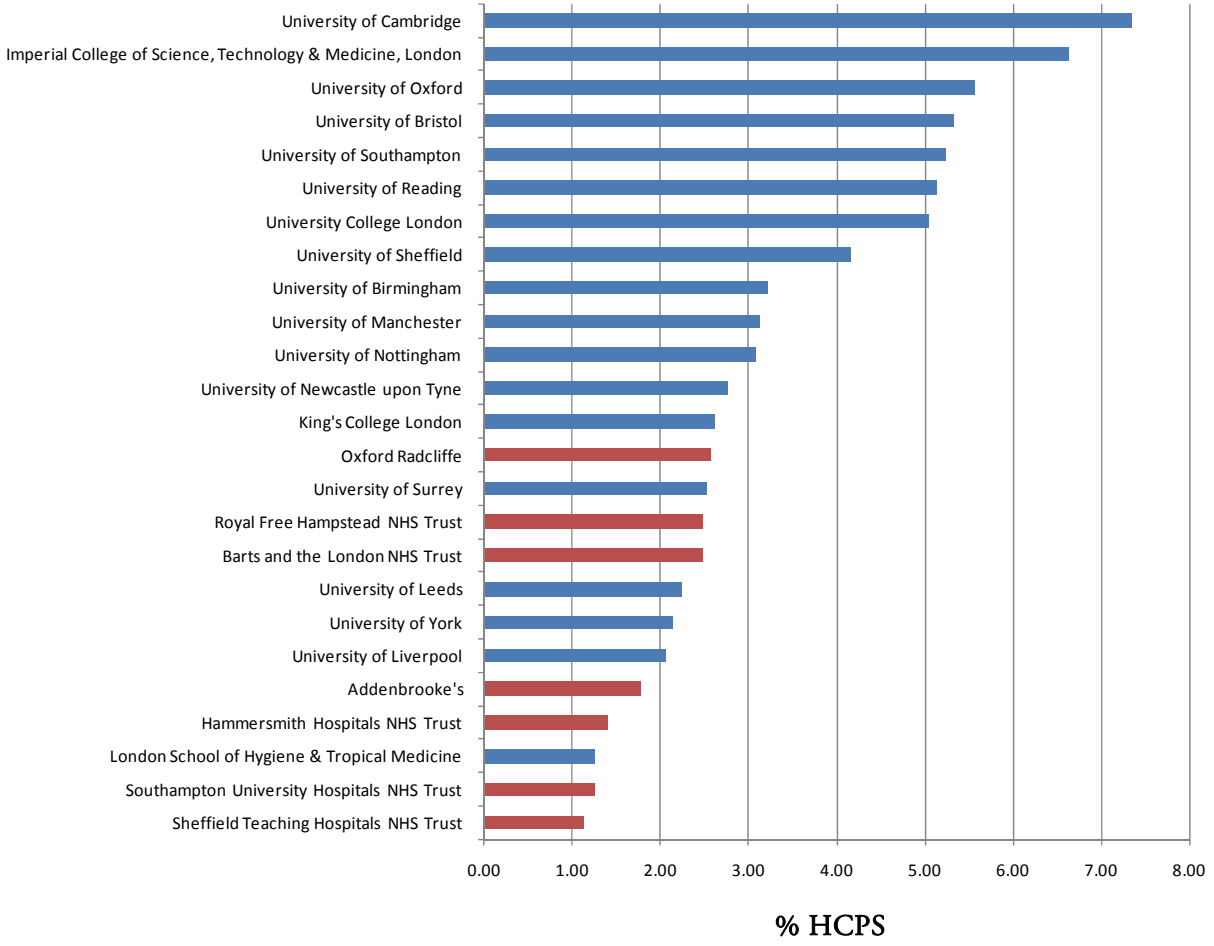
Gastrointestinal (including liver) Disease: proportion of HCPs by institution



Musculoskeletal disease: proportion of HCPs by institution



Nutrition, Diet and Lifestyle (including obesity): proportion of HCPs by institution



Respiratory disease: proportion of HCPs by institution