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Mapping UK mental health research funding and its contribution to global funding

A refined analysis for the UK context

Gavin Cochrane, Alexandra Pollitt, Steven Wooding

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Mapping UK mental health research funding and its contribution to global funding

A refined analysis for the UK context

Gavin Cochrane, Alex Pollitt, Steven Wooding

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This briefing provides an analysis of government support for mental health research across the UK, with a particular emphasis on the UK Department of Health. This analysis builds on data collected for the project – *Mapping the global mental health research system* – which aimed to map the global funding of mental health research between 2009 and 2014, using bibliometric data to develop a picture of who the major funders were, what kinds of research they supported and how their strategies related to one another.

This is an independent report by the Policy Research in Science and Medicine (PRiSM) unit, commissioned and funded by the Policy Research Programme in the Department of Health. The views expressed are not necessarily those of the Department of Health.

The PRiSM unit brings together research expertise from RAND Europe and the Policy Institute at King's College London.

The PRiSM unit delivers research-based evidence to the UK's National Institute for Health Research (NIHR) to support the NIHR's research strategy, *Best Research for Best Health*, and contributes to the science of science policy field in the UK, Europe and internationally.

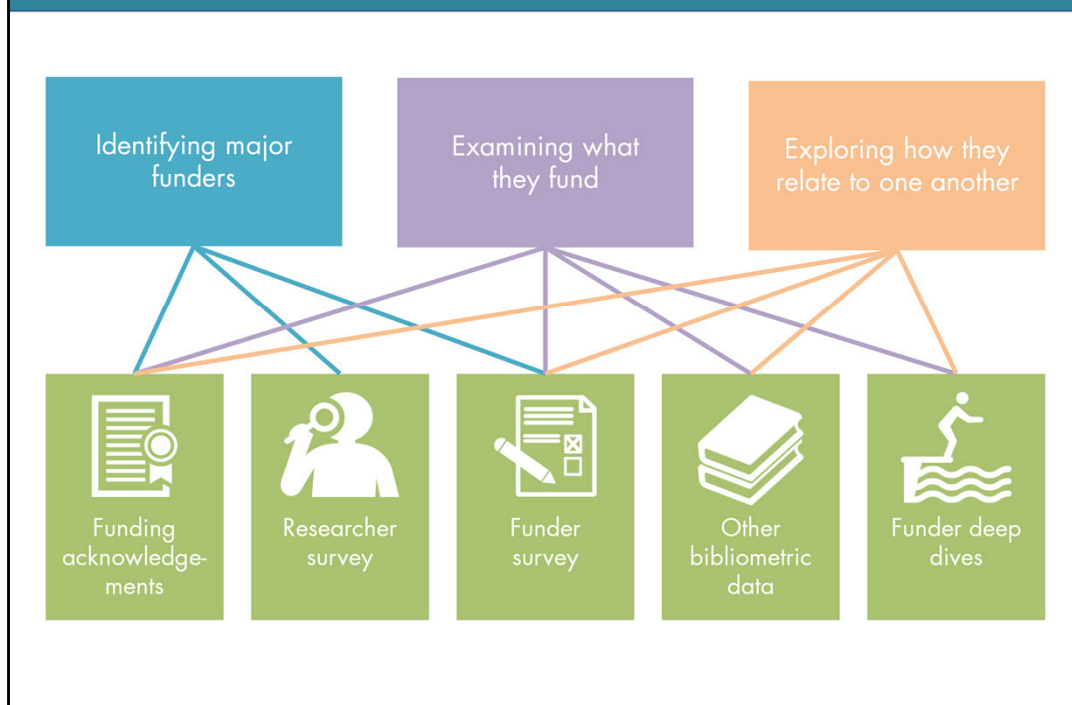
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Methodological approach



Our original study used a bottom-up approach, in that we took individual journal papers – the outputs of the research process – as a starting point for defining the mental health field, identifying funders and constructing a data set for the subsequent analyses. This data was complemented by a survey of researchers to explore acknowledgement behaviour and validate the list of funders; a telephone survey of the major funders identified in Canada, the UK and a set of 32 ‘deep dive’ profiles of funders, looking in depth at their current practices and future plans.

In this briefing we built on the bibliometric dataset extracted for the original project, examining the acknowledgement data and Medical Subject Headings (MeSH) on UK government funded papers, using the associated data to build a series of networks, describing the ecosystem of mental health research funding in the UK. Using bibliometric funding acknowledgements as the initial data source for the analysis has several important advantages:

- It allows us to draw on a single data source for the vast majority of our data, helping ensure consistency.
- The Web of Science consistently covers the most visible and important journals across fields, affording a comprehensive overview of the entire mental health research field during our time period.
- Unlike in top-down approaches, we can identify funders who, despite having no explicit mission or intention to support mental health research, are nonetheless contributing to the research landscape.
- We can identify industry funders, a sector often not included in previous analyses.
- Crucially, the funding acknowledgements in the database are linked to a range of other key variables, including topic, country, co-authors and number of citations at the level of individual papers.

Limitations of the approach

While our approach has many advantages, we also recognise that funding acknowledgement data is a relatively new tool for addressing the kinds of questions that form the basis of this study and that our understanding of strengths and flaws in the data is still evolving (e.g. Costas & van Leeuwen 2012).

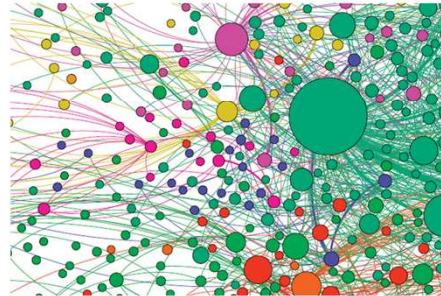
Additions to the main report

- Using administrative hierarchies to aggregate funding
- Small amount of additional data cleaning of funding acknowledgements

For a full discussion of the strengths and limitations of this approach, see main report, available at:

http://www.rand.org/pubs/research_reports/RR1271.html

Mapping the global mental health research funding system



Alexandra Pollitt, Gavin Cochrane, Anne Kirtley, Joachim Krapels, Vincent Larivière, Catherine Lichten, Sarah Parks, Steven Wooding

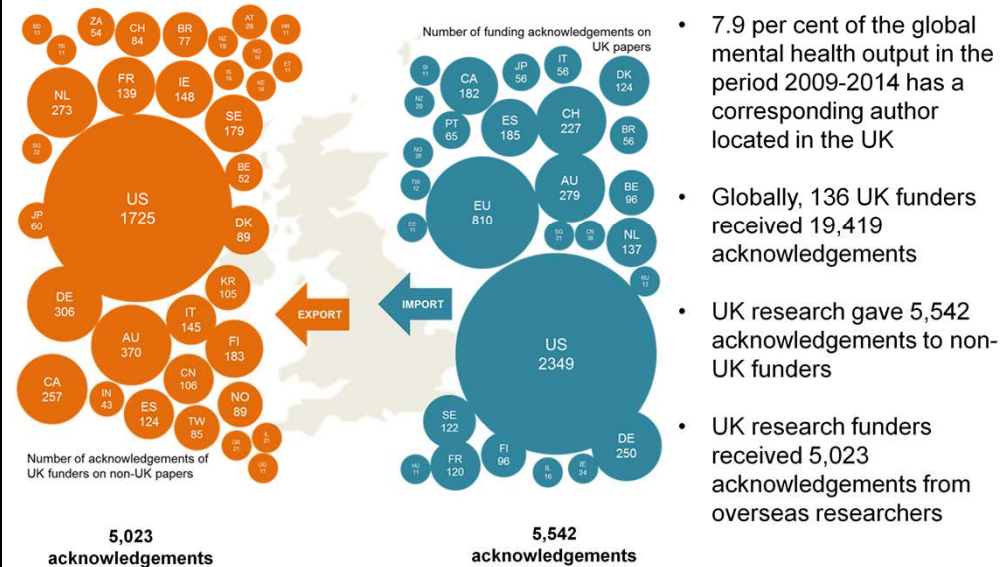


While our approach has many advantages, we also recognise that funding acknowledgement data is a relatively new tool for addressing the kinds of questions that form the basis of this study and that our understanding of strengths and flaws in the data is still evolving (e.g. Costas & van Leeuwen 2012). As a result, there remain uncertainties about the extent to which this data can provide a reliable basis for this kind of exploration. In our global study we collated funding acknowledgements at the most specific funding agency level that the data allowed and combined funding acknowledgements for organisations that were directly renamed. However, we did not combine organisations where renaming occurred as one aspect of a reorganisation that split or combined an organisation's role. We worked like this because it was not feasible for us to understand all the administrative hierarchies and re-organisations that occurred globally in health research organisations.

For this analysis we have used the administrative hierarchy of the UK research organisations and our knowledge of the UK health research system to construct an organisational hierarchy that allows us to aggregate up funding. When aggregating two (or more) organisations a paper may acknowledge both (or all) of the organisations – so the number of acknowledgements will be higher than the number of papers supported. We have opted to use number of papers supported as the principal measure in this report. In the process of carrying out the analysis for this report we have also carried out a small amount of additional data cleaning, producing v1.01 of the dataset. Hence some of the data presented in this report differs slightly from that presented in the previous global report.

For a full discussion of the strengths and limitations of this approach, as well as a detailed overview of the methodology underpinning this briefing, please refer to the main report – Mapping the global mental health research system – which is available at: http://www.rand.org/pubs/research_reports/RR1271.html

UK mental health research funding in the global context

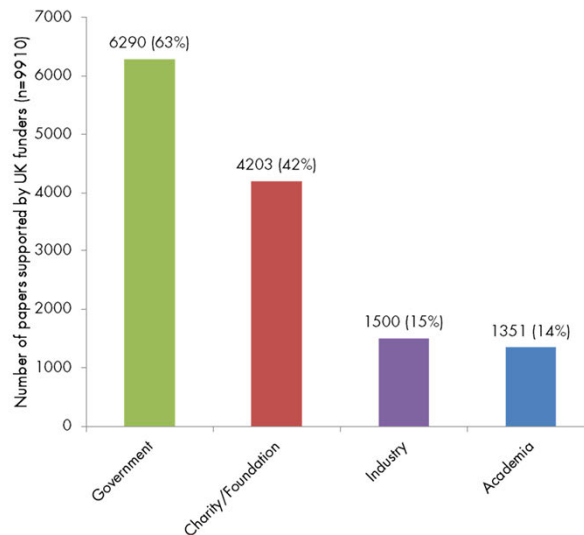


We carried out an analysis of the flows of research funding into and out of the UK. In this analysis we used each paper's funding acknowledgements and corresponding author address as proxies for the source and destination of research funds respectively. Papers with UK corresponding addresses made 5,542 acknowledgements to overseas funders. This compares with 5,023 acknowledgements of UK funders on papers with an overseas corresponding address. Funding acknowledgements indicate a varying amount of funding so this does not provide an accurate estimate of financial transfers.

For papers with UK corresponding addresses the largest portion of overseas acknowledgements relate to US funding organisations, alongside a substantial volume of papers acknowledging EU support. For papers acknowledging UK funders the largest portion are on papers with a US address.

UK mental health research funders (2009 – 2014)

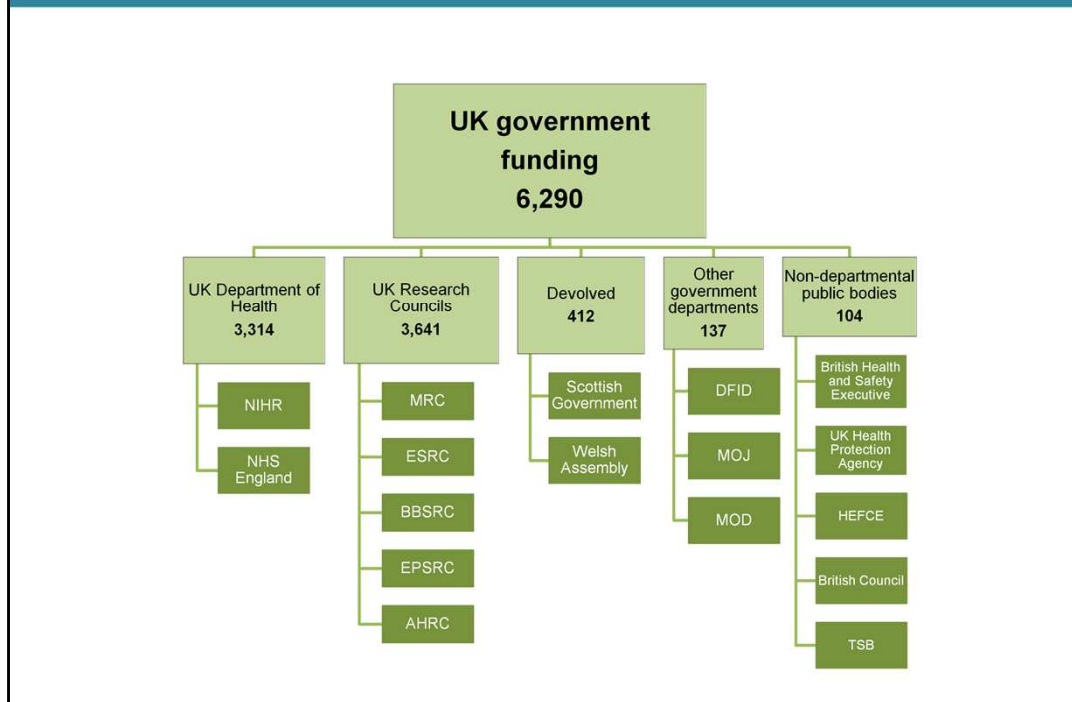
- 9,910 papers contributed to by UK funders
- 63% of papers supported by UK funders receive contributions from UK government funders
- There is an average of 341 acknowledgements per government funder, compared with 86 per charity, foundation or non-profit.
- 53% of papers supported by UK government acknowledge UK Department of Health



The UK funders identified in the dataset are acknowledged on 9,910 papers. Of these papers, the majority contain acknowledgements for either government funding (63%) or charities, foundations and non-profit (42%). Similarly to the global data set, on average each government funder funds more mental health research than charities, foundations and non-profits – with an average of 341 acknowledgements per government funder, compared with 86 per charity, foundation or non-profit. Both these averages are substantially higher than the corresponding averages across the whole (global) data set.

Of the 6290 papers supported by UK government funders, 53% contain an acknowledgment of funding from the UK Department of Health. It is important to note that the number of papers presented in the figure are not mutually exclusive, given that more than one type of funder can be on each paper.

Hierarchy of UK government funders of mental health research and the number of papers supported (2009 – 2014)

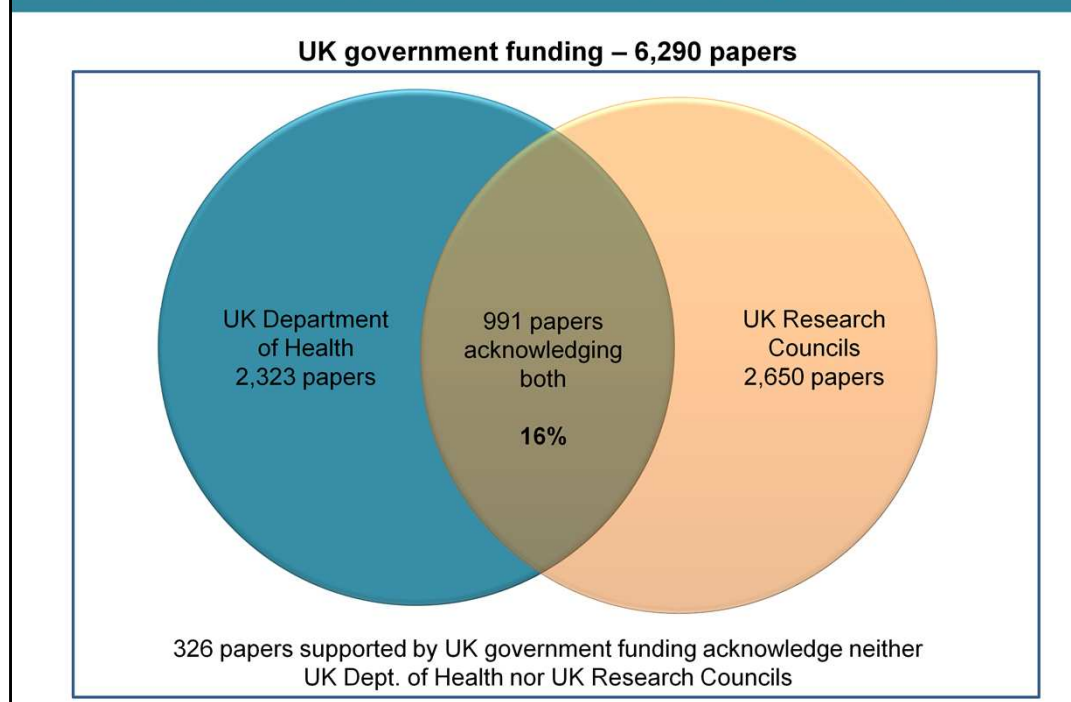


We have split UK government funding into five funder groups.

- The “UK Department of Health”, which includes both National Institute for Health Research (NIHR) and NHS England;
- Research Councils, primarily the UK Medical Research Council (MRC), make up the majority of funding acknowledgements in mental health research. Additional research councils in the data set includes: Economic and Social Research Council (ESRC), Biotechnology and Biological Sciences Research Council (BBSRC), Engineering and Physical Sciences Research Council (EPSRC), and Arts and Humanities Research Council (AHRC);
- Devolved government departments, in Scotland and Wales;
- Non-health focussed central government departments, such as the Department for International Development (DFID), the Ministry of Justice (MOJ) and the Ministry of Defence (MOD);
- Non-departmental public bodies, both with a health focus (e.g. British Health and Safety Executive, UK Health Protection Agency) and non-health focus (e.g. British Council, Higher Education Funding Council for England (HEFCE), Technology Strategy Board (TSB) [now known as Innovate UK]).

It is important to note that the number of papers presented in the figure are not mutually exclusive, given that more than one funder can be on each paper.

16% of papers supported by UK government funding acknowledge both UK Department of Health and UK Research Councils (2009 – 2014)



Of all the papers in our dataset which include a UK government funding acknowledgements, 95% acknowledge funding from the UK Department of Health or the Research Councils. 16% of papers acknowledge both UK Department of Health and Research Councils. When aggregated the Research Councils (n=3,641) have supported slightly more papers than the UK Department of Health (n=3,314).

UK Department of Health is the most acknowledged funder of mental health research in the UK

Rank	Row Labels	No. of papers	Sector	Proportion of total UK
1	UK Department of Health (DH)	3,314	Government	33%
2	UK Medical Research Council (MRC UK)	3,107	Government	31%
3	Wellcome Trust	2,296	Charity/Foundation	23%
4	Economic and Social Research Council (ESRC), UK	714	Government	7%
5	GlaxoSmithKline	631	Industry	6%
6	Kings College London (KCL)	557	Academia	6%
7	AstraZeneca	549	Industry	6%
8	Alzheimers Research UK	487	Charity/Foundation	5%
9	Biotechnology and Biological Sciences Research Council (BBSRC)	335	Government	3%
10	British Heart Foundation UK	288	Charity/Foundation	3%

Along with the UK Department of Health, the Medical Research Council and the Wellcome Trust are the most prominent UK funders in the dataset.

In addition to government funders, we see two industry funders and one academic institution in the top ten, along with a broad range of charity/foundation/non-profit funders spanning large research charities (Wellcome Trust), charities focussed on specific mental health disorders (Alzheimer's Research UK) and organisations whose primary remit does not include mental health (British Heart Foundation). This illustrates an advantage of basing our analysis on funding acknowledgements rather than collated datasets of research funding.

UK Department of Health is 8th most acknowledged funder of mental health research in the world

Rank	Funder	No. of papers	Location	Proportion of total
1	US National Institutes of Health (NIH)	15,316	USA	14%
2	National Institute of Mental Health (NIMH)	9,363	USA	8%
3	National Institute on Drug Abuse (NIDA)	5,802	USA	5%
4	National Institute on Aging (NIA)	4,628	USA	4%
5	Canadian Institutes of Health Research (CIHR)	4,025	Canada	4%
6	European Commission	3,682	EU	3%
7	Department of Veterans Affairs (VA)	3,360	USA	3%
8	UK Department of Health (DH)	3,314	UK	3%
9	National Health and Medical Research Council of Australia (NHMRC)	3,276	Australia	3%
10	National Natural Science Foundation of China (NSFC)	3,175	China	3%
11	Brain and Behavior Research Foundation (NARSAD)	3,112	USA	3%
12	UK Medical Research Council (MRC UK)	3,107	UK	3%
13	National Institute on Alcohol Abuse and Alcoholism (NIAAA)	2,685	USA	2%
14	Netherlands Organization of Scientific Research (NWO)	2,339	Netherlands	2%
15	Wellcome Trust	2,296	UK	2%

The UK Department of Health is also a prominent funder in the global landscape of mental health research, ranking 8th in the world and being acknowledged on around 3% of all mental health research papers with funding acknowledgements between 2009 and 2014.

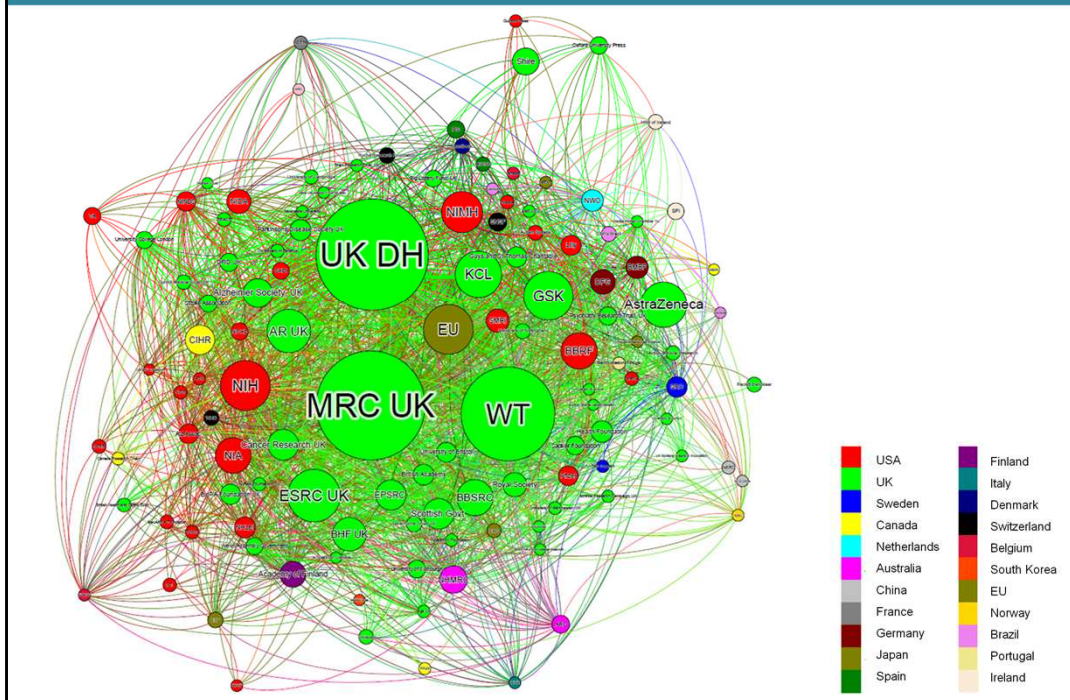
Ten most frequent institutions in the corresponding addresses on papers supported by UK Department of Health

Academic institution	Number of papers
King's College London	763
UCL	376
University of Manchester	122
University of Oxford	119
Newcastle University	118
University of Cambridge	110
University of Nottingham	86
University of Bristol	83
Imperial College London	47
University of Exeter	43



The table above shows the ten most frequent institutions in the corresponding address on papers supported the UK Department of Health. Kings College London and UCL are the most frequently associated institutions with mental health research papers supported by the UK Department of Health, with 23% and 11% of all UK DH papers respectively.

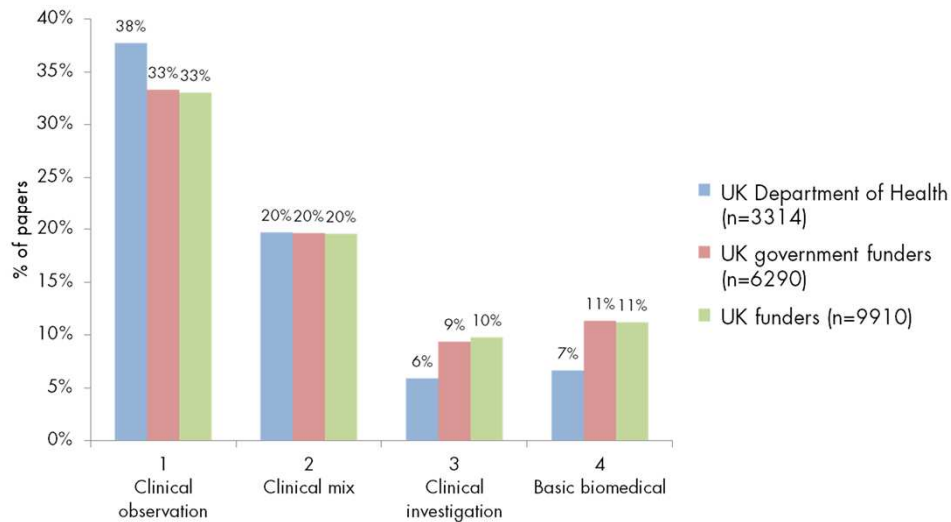
Co-acknowledgement network – Funders acknowledged on papers with a UK address (n=6,711)



The figure above outlines the network of funders acknowledged on papers with a UK address. In the network, each node represents a funder and the connecting lines indicate these funders' co-acknowledgement on papers (a thicker line indicates a greater number of co-acknowledgements). The size of a node is proportional to the number of papers with a UK corresponding address acknowledging the funding. Funders with fewer than 30 papers with an associated UK address are not included in the network. Nodes are coloured by the location of the funder.

The most prominent funders in the network are the most frequently-acknowledged UK funders (see table on slide 6). There is also a relatively large contingent from the EU, as well as a number of US government agencies and the US charity the Brain and Behavior Research Foundation. Government funders in Canada, Australia, Finland, Germany, Sweden and the Netherlands are also visible.

Research level of papers by UK funder

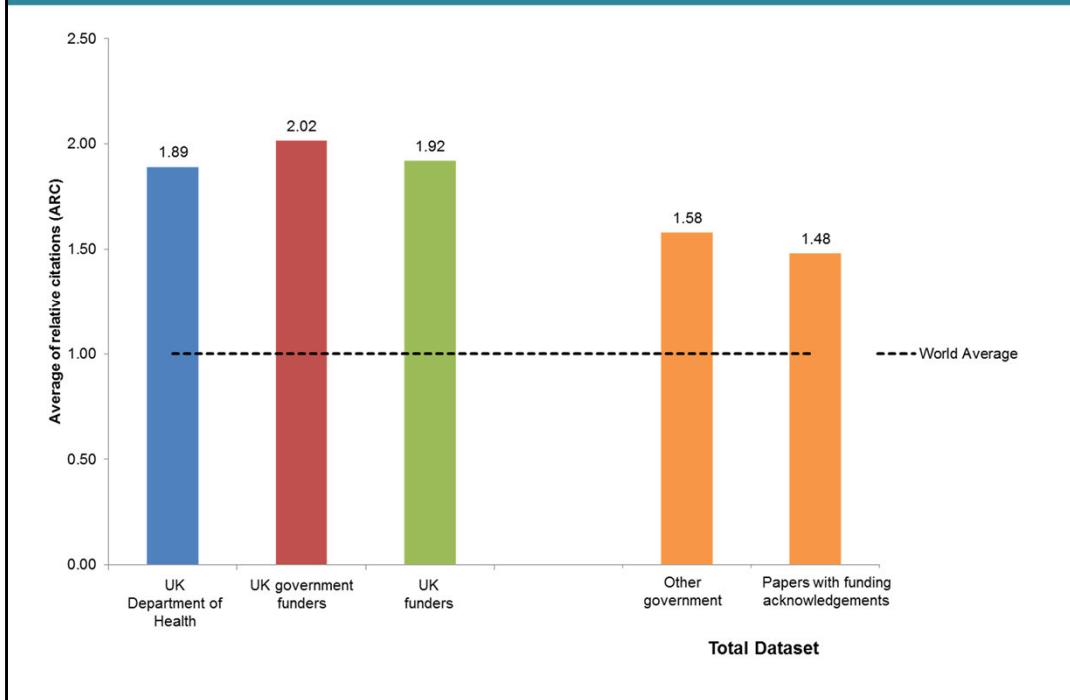


The research level assigned to a journal provides an indication of the type of research it publishes (as defined by the Patent Board, formerly CHI Research[1]). There are four levels, which form a scale from applied to basic research: (1) clinical observation (e.g. *Schizophrenia Bulletin*); (2) clinical mix (e.g. *Journal of Psychiatric Research*); (3) clinical investigation (e.g. *Neuropsychopharmacology*); and (4) basic biomedical (e.g. *Neuroscience*). It should be noted that research levels are a fairly crude measure, since it is applied at the journal level, rather than to individual papers and not all journals have been classified. However, it is the best approximation available and when used at the aggregate level can provide an overview of how basic or applied a body of research is.

Compared with other UK government and other UK funders generally, Department of Health supported research in our dataset is more clinically-focused and less basic. Note that the four levels sum to less than 100, as some papers were published in journals not classified by research level.

[1] Hamilton, K. (2003) Subfield and Level Classification of Journals (CHI Report No. 2012-R). Cherry Hill, NJ: CHI Research

Comparison of average relative citation rate by funder type (World average = 1.0)



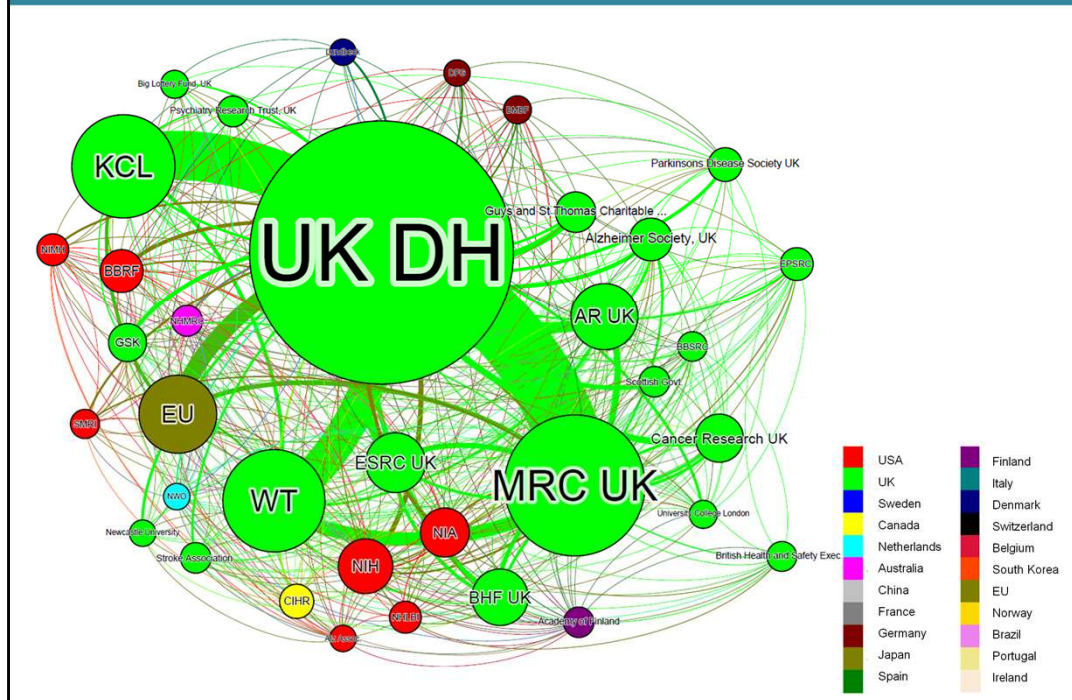
Measures of citation can be used as an indicator of the scientific impact that a particular piece of research has in the academic world. Here we use the citation rate normalised by publication year and field to account for the age of the paper and variation in citation practices between fields. Papers with funding acknowledgements are, on average, cited more than the global average. There is little variation among UK funders, but taken as a group, the papers they support are more highly cited than the average for the global dataset as a whole.

UK Department of Health – ten most frequent co-acknowledged funders (2009 – 2014)

Rank	Top collaborators	Country	Number of papers with co-acknowledgment
1	UK Medical Research Council (MRC UK)	UK	939
2	Kings College London (KCL)	UK	504
3	Wellcome Trust	UK	494
4	European Commission	EU	286
5	Alzheimer's Research UK	UK	211
6	Economic and Social Research Council (ESRC)	UK	167
7	British Heart Foundation UK	UK	149
8	US National Institutes of Health (NIH)	USA	140
9	National Institute on Aging (NIA)	USA	112
10	Cancer Research UK	UK	108

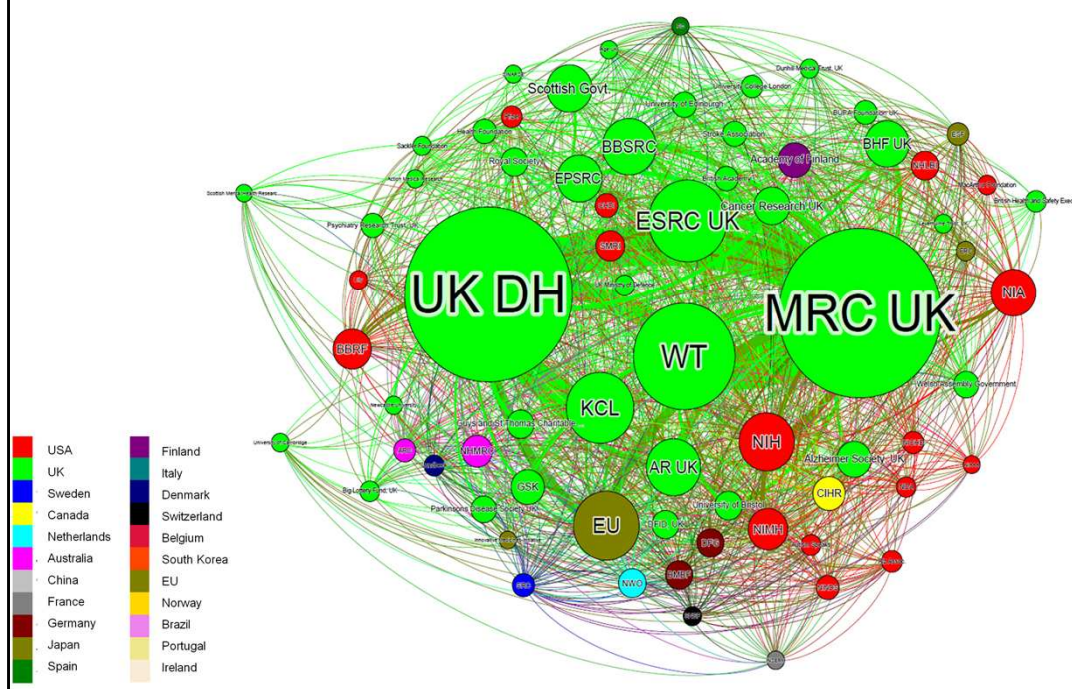
The table above shows the most frequent co-acknowledged global funders alongside the UK Department of Health. The UK Department of Health is generally most frequently co-acknowledged alongside other UK funders, although EU institutions and the US government agencies National Institutes of Health (NIH) and National Institute on Aging (NIA) are also present in the top ten co-acknowledged funders. The British Heart Foundation and Cancer Research UK are notable as funders not specifically funding research in the area of mental health. The relationships of co-acknowledged funders to the DH are shown on the next slide.

Funder co-acknowledgement network: Papers supported by UK Department of Health (n=3314)



The figure above outlines the network of funders on papers which acknowledge funding from the UK Department of Health (where $n=3314$). Similar to the network on slide 11, each node represents a funder and the connecting lines indicate these funders' co-acknowledgements on papers (a thicker line indicates a greater number of co-acknowledgements). The size of a node is proportional to the number of papers on which that funder is acknowledged in the network. Funders with fewer than 30 papers co-acknowledging the UK Department of Health are omitted. Nodes are coloured by the location of the funder. Since only papers acknowledging UK DH funders are included, other funders, such as MRC UK have a smaller relative size.

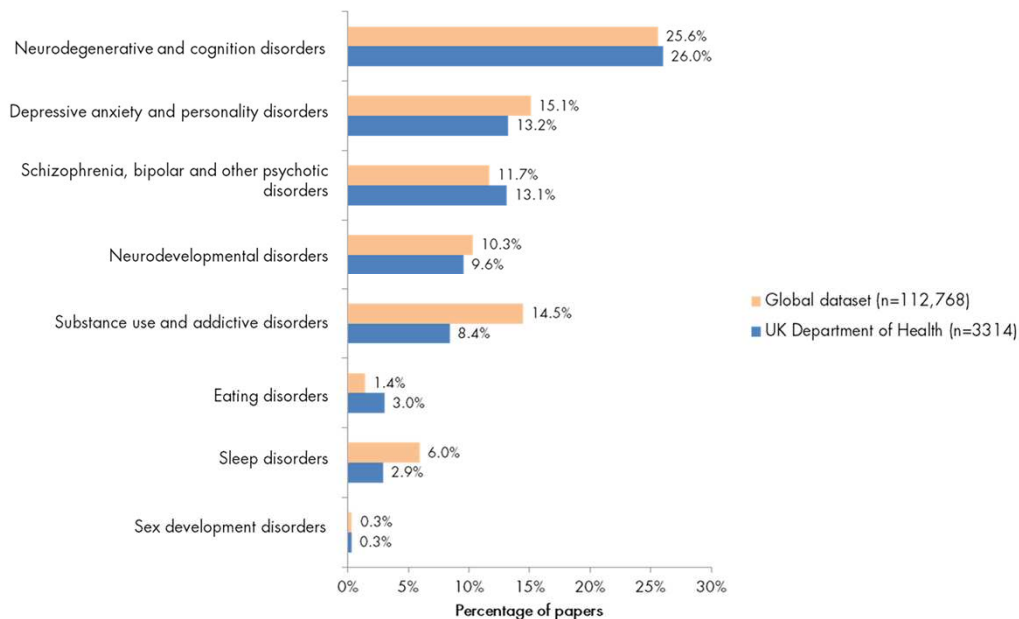
Funder co-acknowledgement network: papers supported by UK government (n=6290)



The figure above shows the network of funders on papers which acknowledge funding from UK government (where $n=6290$). In the network, each node represents a funder and the connecting lines indicate these funders' co-acknowledgements on papers (a thicker line indicating a greater number of co-acknowledgements). The size of a node is proportional to the number of papers on which that funder is acknowledged in the network. Funders with less than 30 papers acknowledging UK government funding are omitted. Nodes are coloured by the location of the funder.

As in previous networks, EU institutions and US government agencies are prominent, along with government funders in Australia, Canada and several EU member states. As all UK government acknowledgements are included, the UK DH and MRC UK are a similar size.

Percentage of papers acknowledging UK DH by MeSH disease sub-category versus entire dataset



This chart shows the mental health conditions mentioned in DH-funded papers in comparison to the global data set. Our categories are derived from Medical Subject Headings (MeSH terms), a controlled vocabulary of terms applied to journal papers to indicate the subject material. They can be used to understand the topics of the papers in our data set and how these topics relate to one another. We looked at terms within the MeSH subset 'Mental Disorders' to explore the various mental health conditions that the research in our data set focuses on. Terms within this subset occur on 69 per cent of all papers (76 per cent of papers with acknowledgments). As each paper can be assigned a number of terms within the Mental Disorders subset, we built a network of the co-occurrence of terms in the global dataset. This network identified clusters corresponding to the eight broad groups indicated above, representing terms which tend to occur together on papers.

In comparison to the global data set as a whole, papers acknowledging UK Department of Health support were slightly more likely to focus on schizophrenia, bipolar and other psychotic disorders, and substantially less likely to look at substance use or addictive disorders. It should be noted that there were relatively small numbers of papers focusing on eating disorders, sleep disorders and sex development disorders, so caution should be exercised in interpreting differences in these categories.

Ten most frequent journals for papers supported by the UK Department of Health

Journal	Number of papers
PSYCHOLOGICAL MEDICINE	160
BRITISH JOURNAL OF PSYCHIATRY	156
JOURNAL OF NEUROLOGY NEUROSURGERY AND PSYCHIATRY	113
BMC PSYCHIATRY	93
JOURNAL OF AFFECTIVE DISORDERS	84
PLOS ONE	71
ADDICTION	68
SOCIAL PSYCHIATRY AND PSYCHIATRIC EPIDEMIOLOGY	63
SCHIZOPHRENIA RESEARCH	61
BRAIN	56

This table shows the journals in which DH-funded papers were most commonly published during our study time period (2009 – 2014). Most are well known journals specific to psychiatry, psychology and neuroscience, the exception being PLOS ONE, which is a large, multidisciplinary, open access journal.

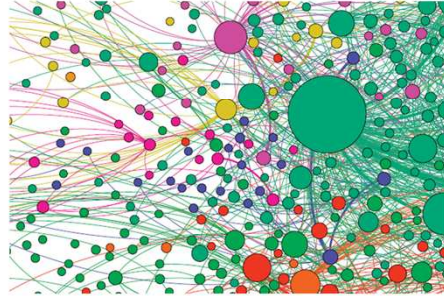
Further information

This briefing provides an analysis across the UK of government support for mental health research, with a particular emphasis on the UK Department of Health.

For a full discussion of the global landscape, as well as further details on the strengths and limitations of this approach, see the full report, available at:

http://www.rand.org/pubs/research_reports/RR1271.html

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