researchfish

MRC Medical Research Council

Outputs, outcomes and impact of MRC research: 2013/14 report

SECTION 03: Quantitative analysis

3.1: Publications

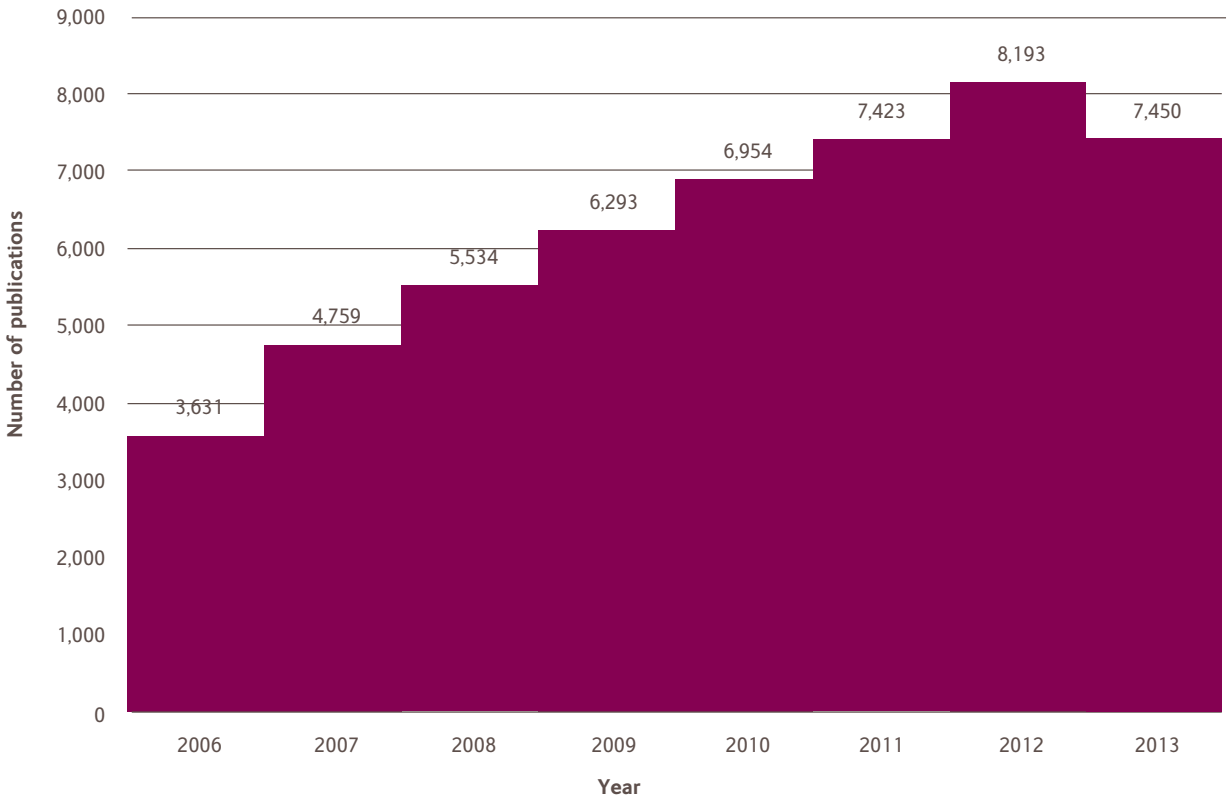
Summary

- MRC researchers reported publications[1] resulting, either wholly or in part, from MRC funding in 82 per cent of awards[2].
- There were 71,786 reports of publications, of which 51,520 are unique publications. Table 1 and figure 1 show the number of publications for each year since 2006. Please note that data for 2013 is partial.
- The average number of publications per award reporting at least one publication was 16 (15.81).
- A fifth of all awards (20 per cent) reported the generation of more than 16 publications.

Table 1: *Number of publications for each year since 2006*

2006	2007	2008	2009	2010	2011	2012	2013
3,631	4,759	5,534	6,293	6,954	7,423	8,193	7,450

Figure 1: *Number of publications for each year since 2006*



Publications by year

- 90 per cent of awards starting in 2006 or earlier have yielded at least one publication. Publications take time to produce and recent awards will naturally be less likely to have resulted in a publication. However, almost two

thirds (60 per cent) of awards starting in 2012 and one third (33 per cent) of awards starting in 2013 have still resulted in at least one publication so far. Table 2 and figure 2 show the distribution of publications by award start year.

» Recipients of 25 per cent of awards reported their first publication within one year of the start of the award. This had increased to 82 per cent after five years. The time between the start of the award and report of first publication is shown in table 3 and figure 3.

Table 2: *Distribution of publications by award start year*

Start year	Number of awards	Number with at least one publication	Number with no publications	Percentage with at least one publication
2006 or earlier	2,076	1,864	212	90%
2007	466	425	41	91%
2008	569	517	52	91%
2009	565	505	60	89%
2010	470	418	52	89%
2011	410	340	70	83%
2012	525	316	209	60%
2013	481	156	325	32%

Figure 2: *Distribution of publications by award start year*

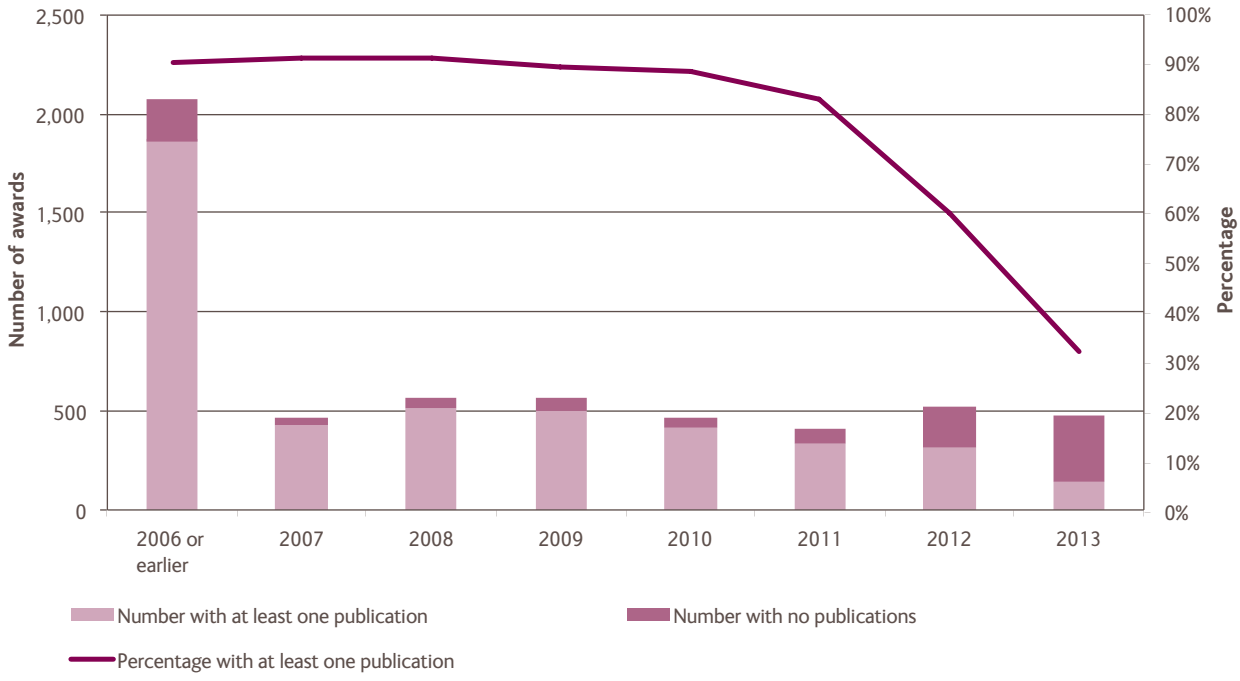


Table 3: *Time to report first publication by number of awards*

First publication	Number reporting	Cumulative number	Cumulative percentage
Within 1 year	1,378	1,378	25%
Within 2 years	1,150	2,528	45%
Within 3 years	758	3,286	59%
Within 4 years	461	3,747	67%
After 5 years	794	4,541	82%

Figure 3: *Time to report first publication by number of awards*

Publications by co-author

Co-authorship of publications provides an insight into the patterns of research collaboration; it can indicate the variety and even duration of collaborations. Thompson Reuters returns bibliographic information on MRC papers, including the names and addresses of all co-authors on a paper. The address data includes country information and this is used for basic geographic analysis. The address data however does not include information on the sector of the co-author. Further analysis on this is not currently available; however, a supplementary report on this will be published at a later date.

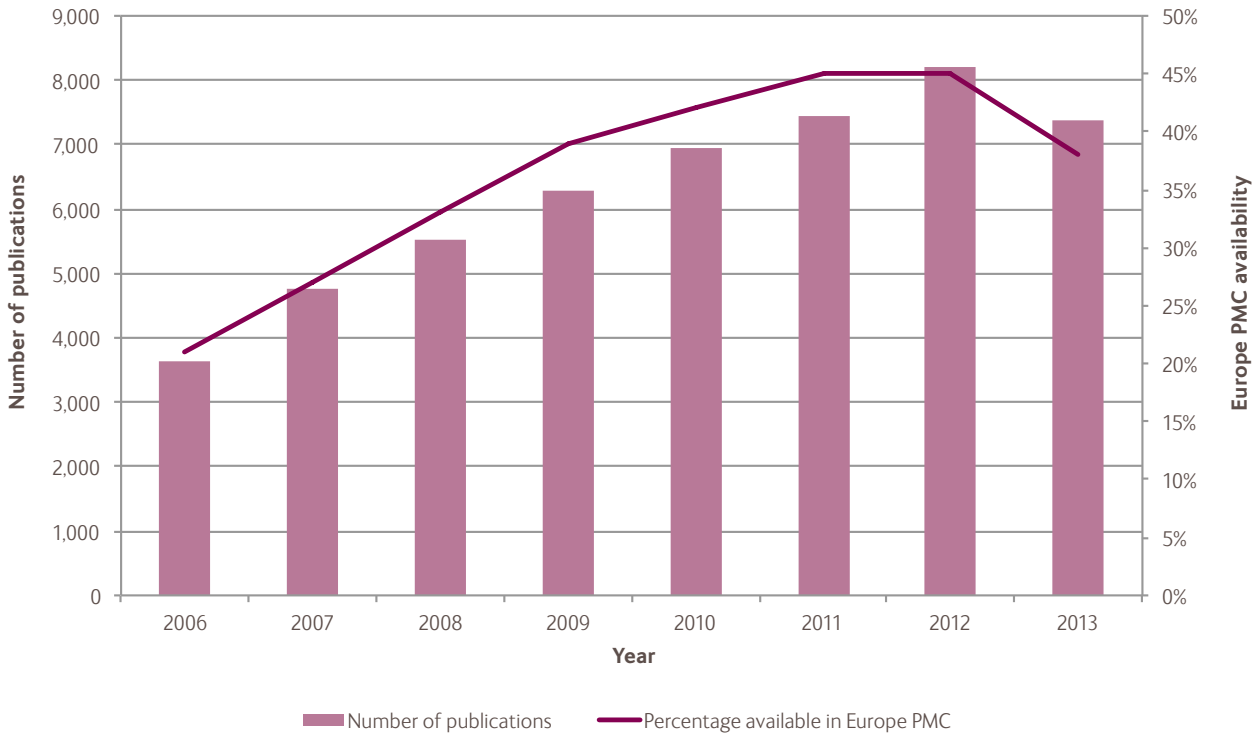
Open Access

Figure 4 shows the proportion of unique MRC publications produced each year that are currently available in Europe PMC (as at July 2014). The proportion of papers reported via Researchfish, published in 2013, that are openly accessible in Europe PMC is 38 per cent. It should be noted that this will include publications that are not subject to the Open Access policy (for example, books).

Due to time lags in publishing, ID assignment and Europe PMC processing, one would expect lower absolute numbers of publications and proportional compliance in the most recent year, and that these would increase with the next data gathering period.

We will work with Europe PMC to obtain further information about whether these papers were openly accessible within six months of publication, and to filter our results with respect to publication types that have to comply with the Open Access policy.

Figure 4: *Europe PMC availability by publication year*



3.2: Collaborations

Summary

- Recipients of 52 per cent (2,917) of awards reported that they had established a collaboration which they could evidence, for example with co-publications, co-funding or exchange of materials and expertise.
- The average number of collaborators[3] linked to awards reporting at least one collaboration was 5 (5.42), a slight increase on last year's figure (5.28).
- Six per cent (339) of awards were highly collaborative, with these recipients reporting at least 10 different collaborators.

Collaborators by year

- It takes time for researchers to set up collaborations and so there will naturally be fewer collaborations resulting from more recent awards. Recipients of 62 per cent of awards starting in 2006 or earlier had collaborations linked to them compared to 17 per cent of awards starting in 2013. The number of collaborators per award by starting year of the award is shown in table 1 and figure 1.
- 22 per cent of awards reported at least one collaboration within one year of the award starting, compared to 52 per cent after five years. The time between the award start date and collaboration starting is shown in table 2 and figure 2.

Table 1: *Number of collaborators by award start date*

Start year	Number of awards	Number with at least one collaborator	Number with no collaborators	Percentage with at least one collaborator
2006 or earlier	2,076	1,291	785	62%
2007	466	256	210	55%
2008	569	348	221	61%
2009	565	346	219	61%
2010	470	256	214	54%
2011	410	168	242	41%
2012	525	173	352	33%
2013	478	79	399	17%

Figure 1: *Number of collaborators by award start date*

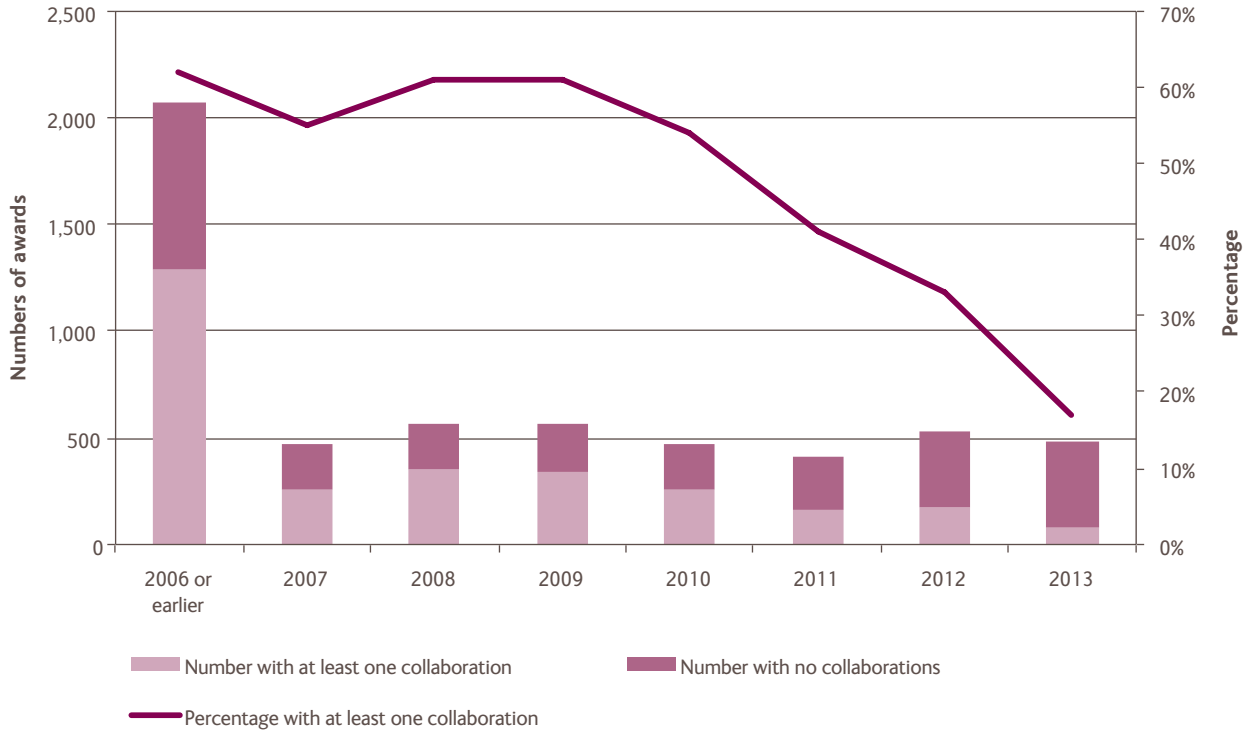
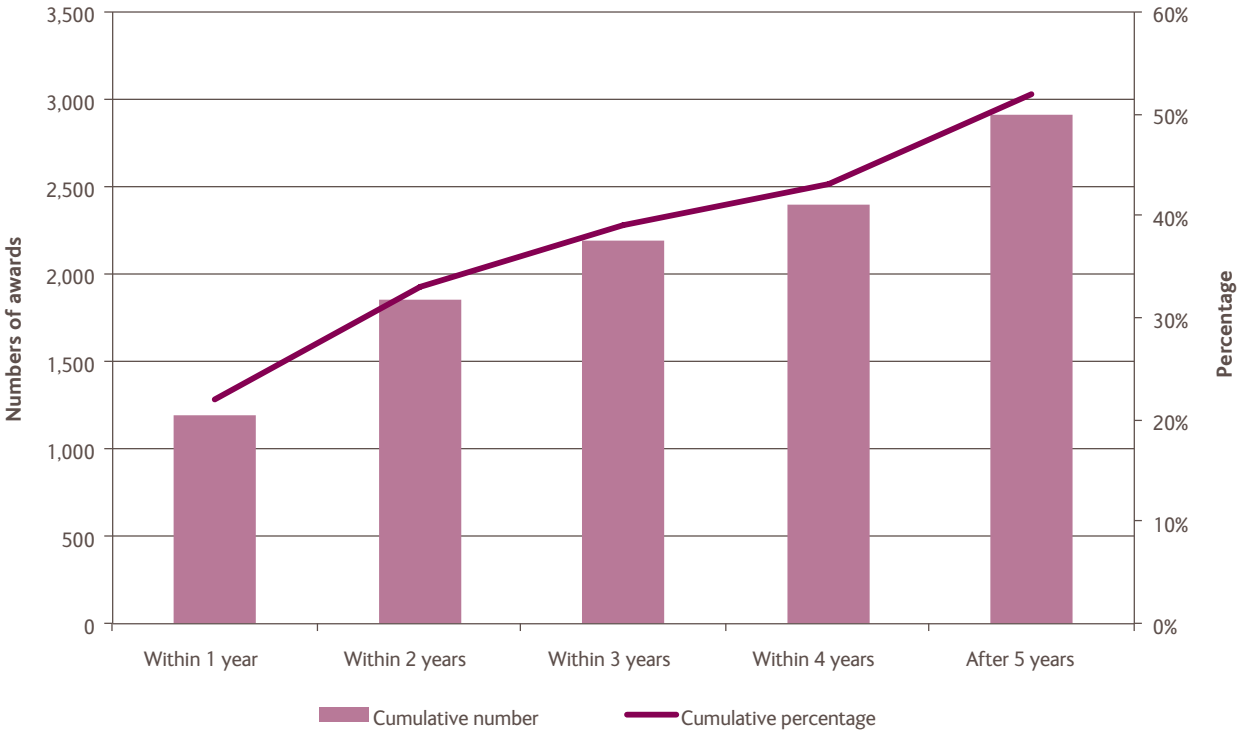


Table 2: *Time between award start date and collaboration*

First collaboration	Number reporting	Cumulative number	Cumulative percentage
Within 1 year	1,197	1,197	22%
Within 2 years	652	1,849	33%
Within 3 years	341	2,190	39%
Within 4 years	211	2,401	43%
After 5 years	516	2,917	52%

Figure 2: *Time between award start date and start of first collaboration*



Collaborators by location

- The majority of collaborators were from the United Kingdom (55 per cent), followed by the rest of Europe (17 per cent) and North America (12 per cent)[4].
- Table 3 shows the numbers of collaborators by location. Figures 3 and 4 illustrate the distribution of international (excluding Europe) and European (excluding UK) collaborators respectively[5].
- Figure 5 shows the top 25 location countries (excluding the UK) for collaborators. There is very little change from last year with just Italy and Canada swapping places, and Switzerland and Denmark swapping places within the top 15.

Table 3: *Number of collaborators by location*

Location of collaborator	Number of collaborators	Percentage of total
United Kingdom	8,162	55%
Europe	2,595	17%
North America	1,728	12%
South America	67	0%
Asia	408	3%
Africa	261	2%
Oceania	318	2%
Global	633	4%
Unknown	735	5%
Total	14,907	100%

Figure 3: *Distribution of international (excluding Europe) collaborators*

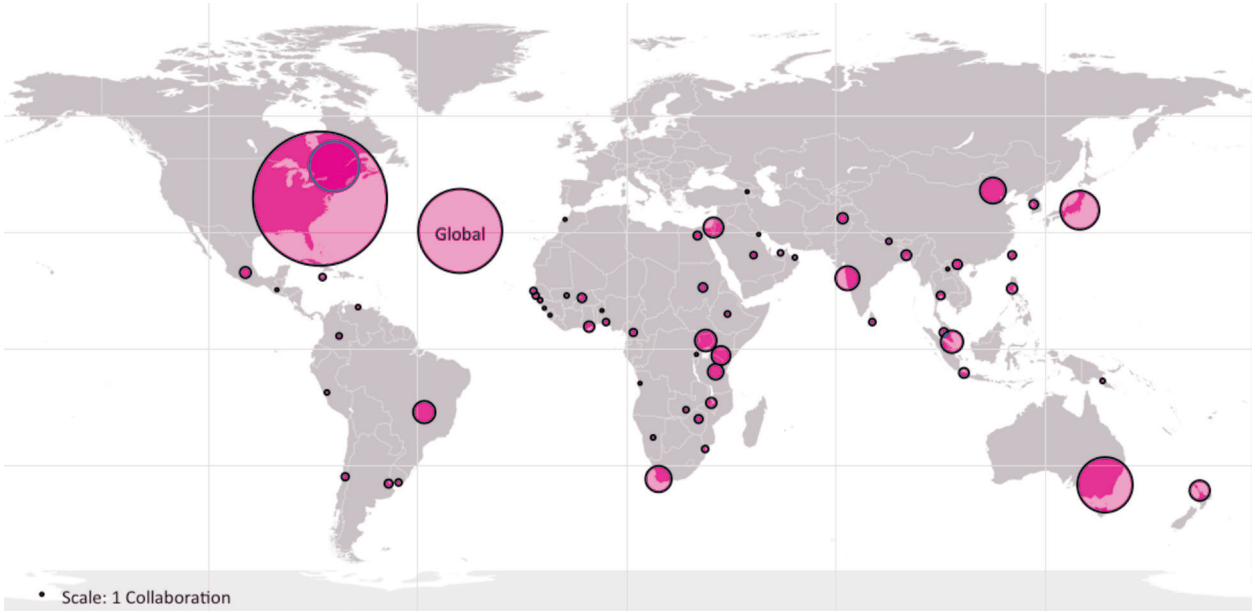


Figure 4: *Distribution of European (excluding UK) collaborators*

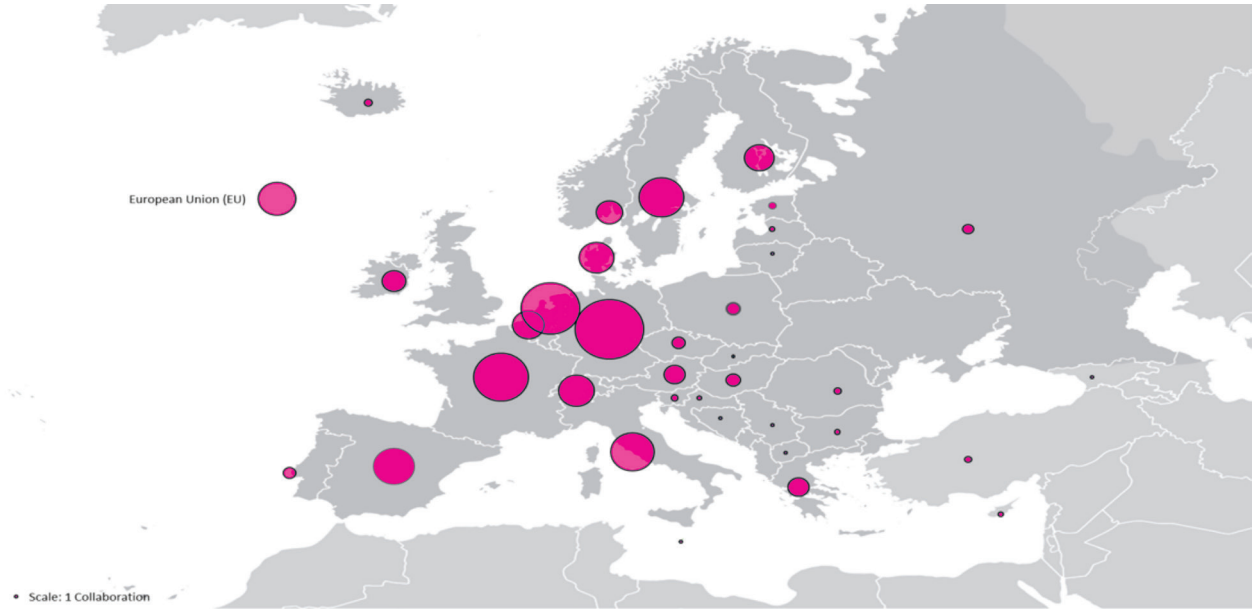
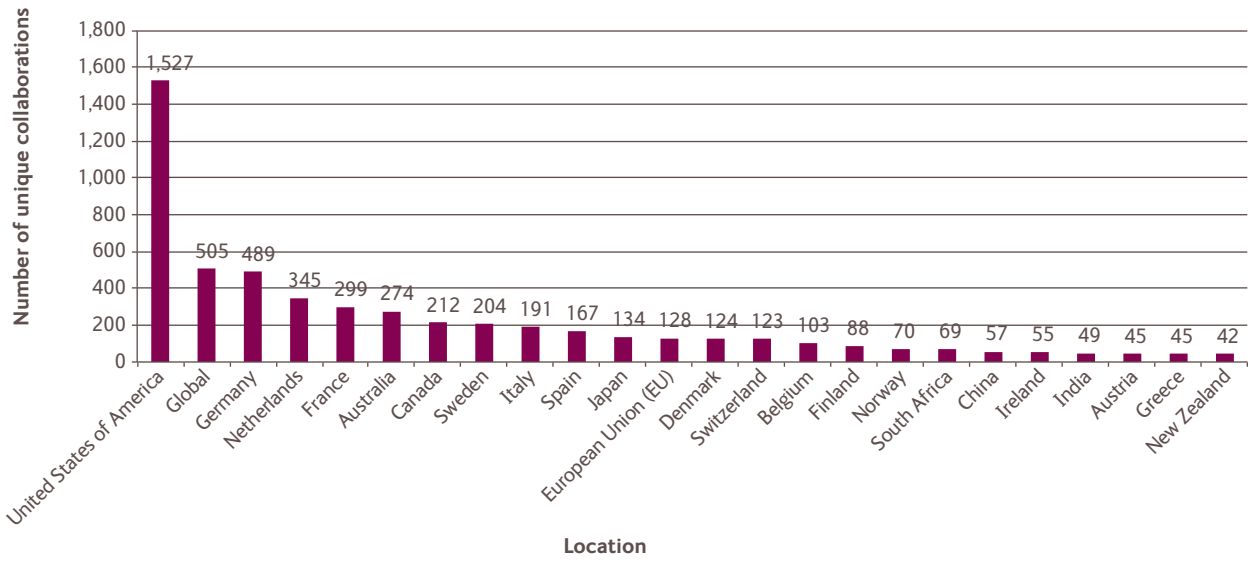


Figure 5: *Top 25 countries (excluding the UK) for collaborators*



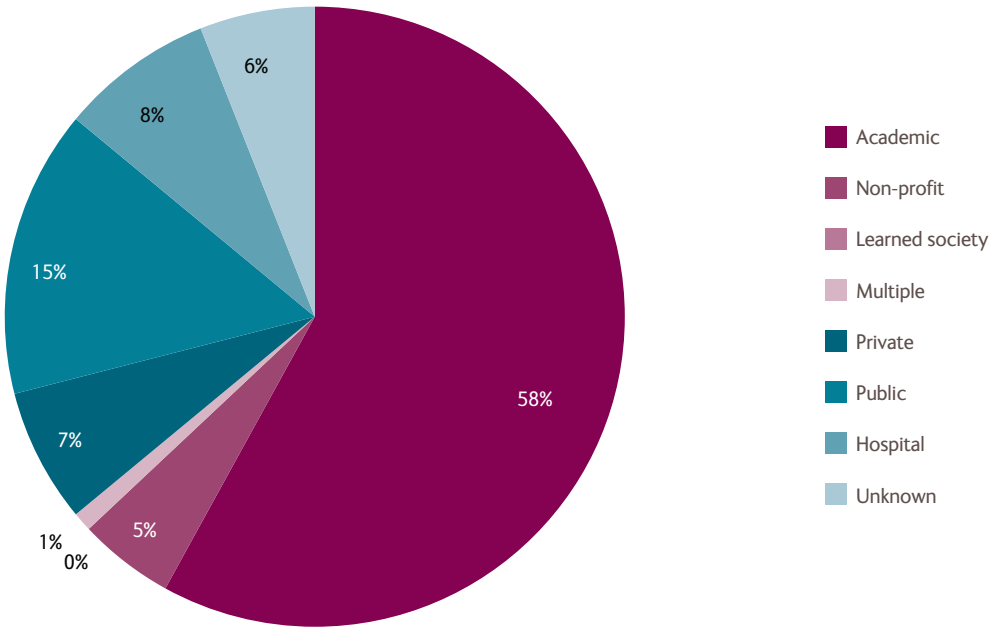
Collaborators by sector

- Researchfish data allows us to see the extent to which MRC researchers are engaging with collaborators from different sectors, including from the private sector.
- The majority of collaborators were from academia (58 per cent), followed by the public sector (15 per cent), hospitals (eight per cent) and the private sector (seven per cent). This is similar to the ratios reported last year. Table 4 and figure 6 show the number of collaborators by sector.

Table 4: *Collaborators by sector*

	Number of collaborators	Percentage of collaborators
Academic	8,599	58%
Non-profit	767	5%
Learned society	40	0%
Multiple	163	1%
Private	1,106	7%
Public	2,213	15%
Hospital	1,186	8%
Unknown	833	6%
Total	14,907	100%

Figure 6: *Collaborators by sector*



3.3: Further funding

Summary

- Researchers reported instances of further funding in 46 per cent of awards.
- 9,355 instances of further funding were reported.
- The average number of instances of further funding for those who had reported further funding was four (3.65).
- Recipients of 161 awards reported more than 10 instances of further funding.

Further funding by year

- As with other output types, it takes time to apply for, obtain and initiate new grants and so recent awards will be naturally less likely to result in instances of further funding. Recipients of 65 per cent of grants starting in 2006 or earlier had reported further funding, compared to 16 per cent of grants starting in 2013. The number of awards reporting at least one instance of further funding by the year the award started is shown in table 1 and figure 1.
- 11 per cent of awards reported instances of further funding within one year, compared to 54 per cent after five years. Table 2 and figure 2 show the time between the start of the award and when the further funding started by award.

Table 1: *Number of awards reporting further funding by award start date*

Start year	Number of awards	Number with at least one instance of further funding	Number without any further funding	Percentage with at least one instance of further funding
2006 or earlier	2,076	1,346	730	65%
2007	466	320	146	69%
2008	569	367	202	64%
2009	565	365	200	65%
2010	470	251	219	53%
2011	410	181	229	44%
2012	525	151	374	29%
2013	478	78	400	16%

Figure 1: *Number of awards reporting further funding by award start date*

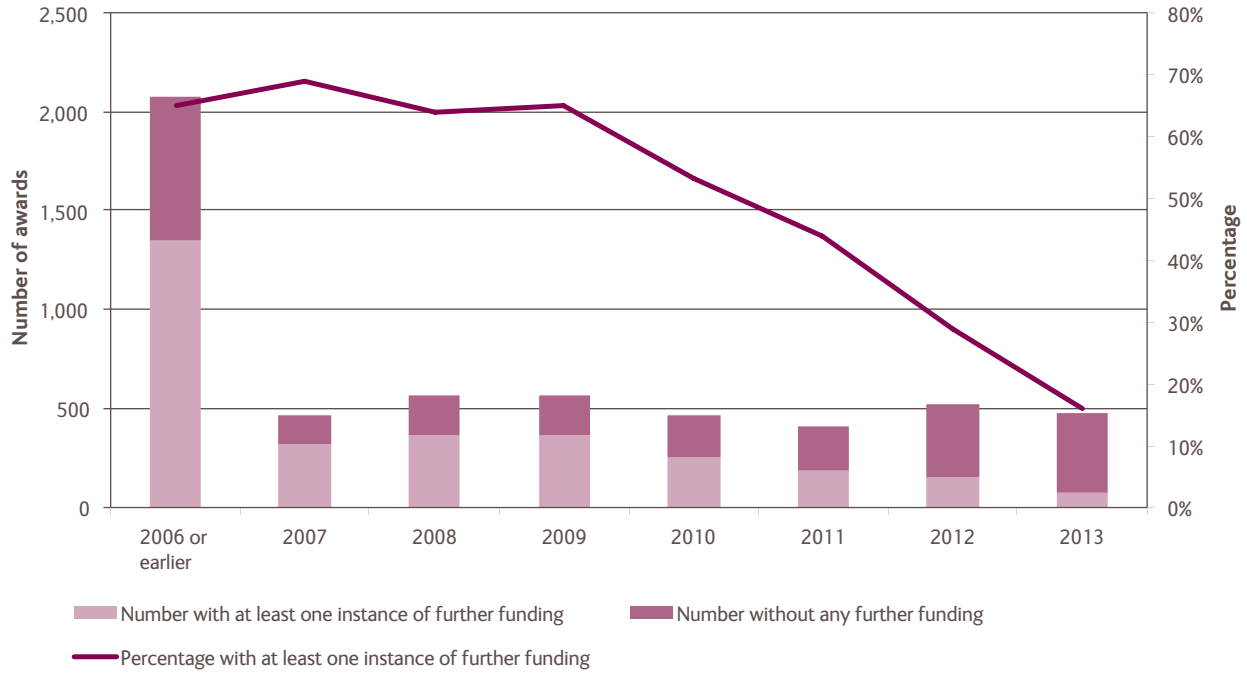
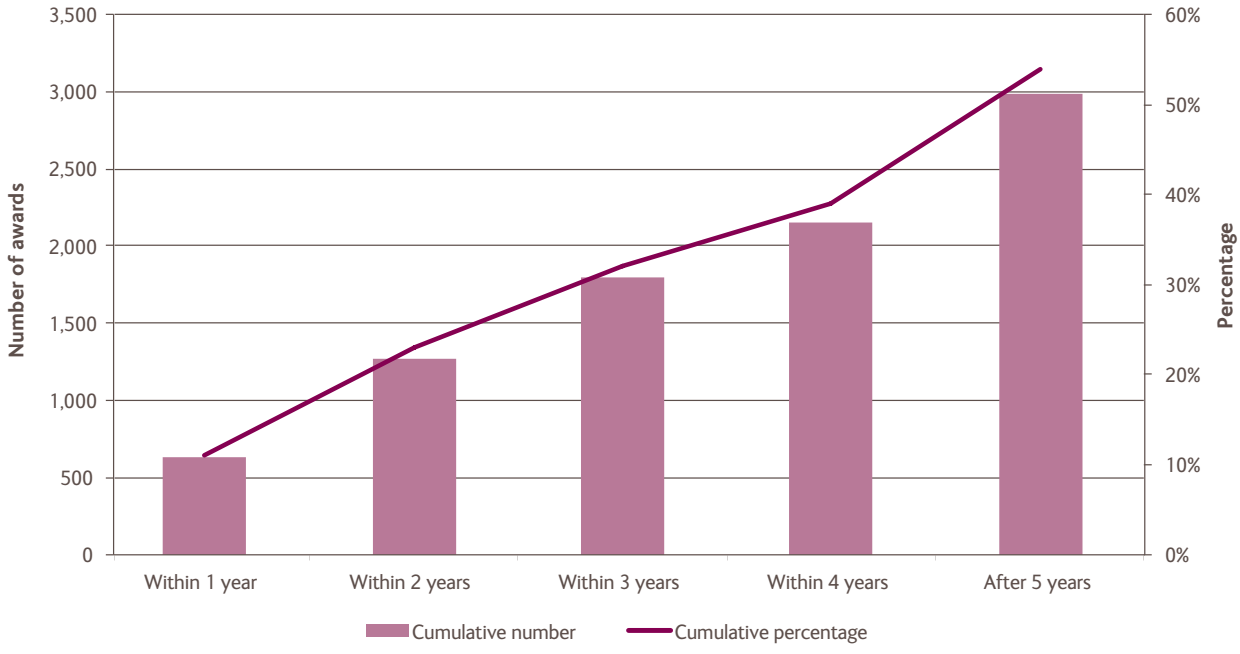


Table 2: *Time between start of the award and first instance of further funding*

	Number reporting at least one instance of further funding	Cumulative number	Cumulative percentage
Within 1 year	630	630	11%
Within 2 years	642	1,272	23%
Within 3 years	527	1,799	32%
Within 4 years	347	2,146	39%
After 5 years	845	2,991	54%

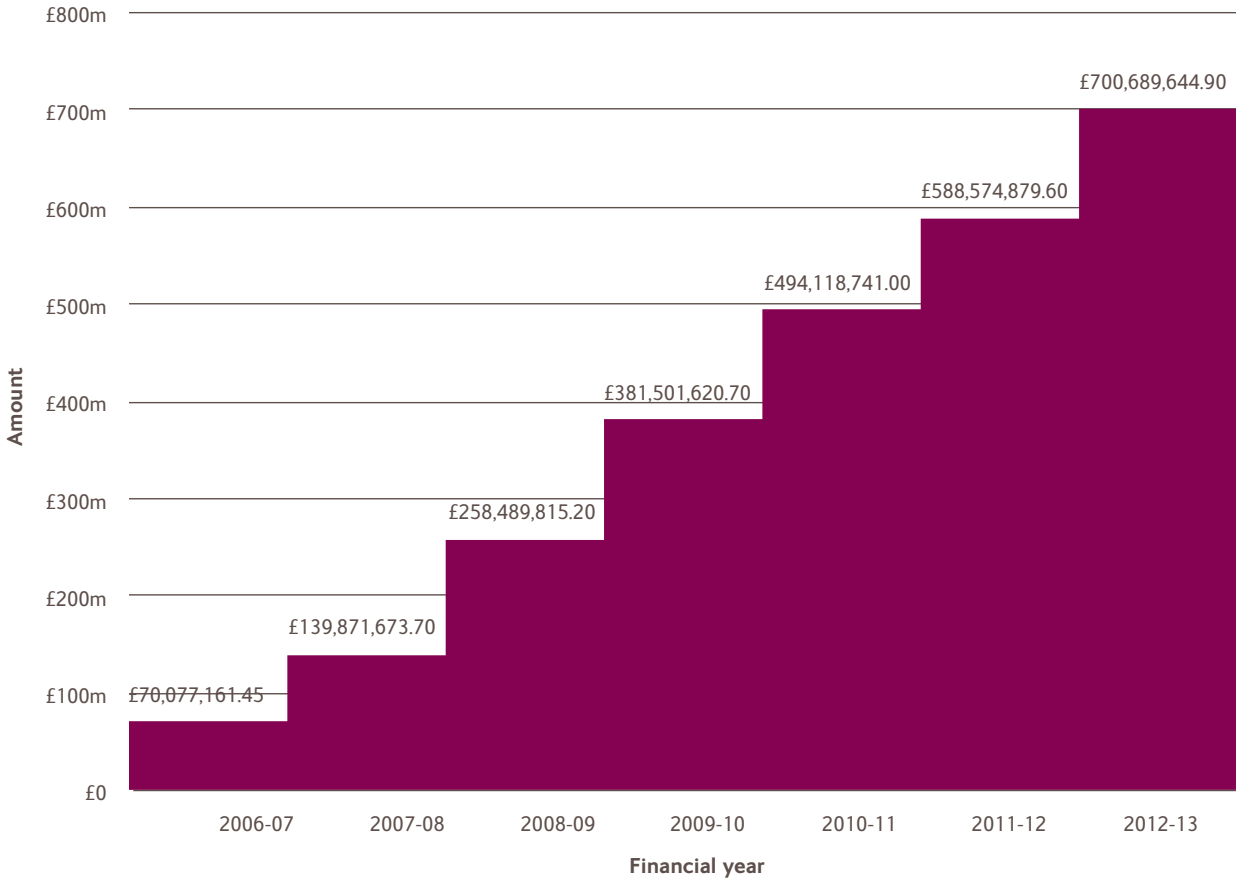
Figure 2: *Time between start of the award and further funding*



Further funding by value

- Researchers reported a total value of £3.2bn in further funding[6], with the average total value being £1.2m amongst those reporting further funding. 12 per cent of awards received more than £1m in further funding.
- A total value of £700.7m was reported to have been leveraged in 2012/2013, which is an increase on last year's total of £562m. The value of further funding by year is shown in figure 3.

Figure 3: *Value of further funding by year*

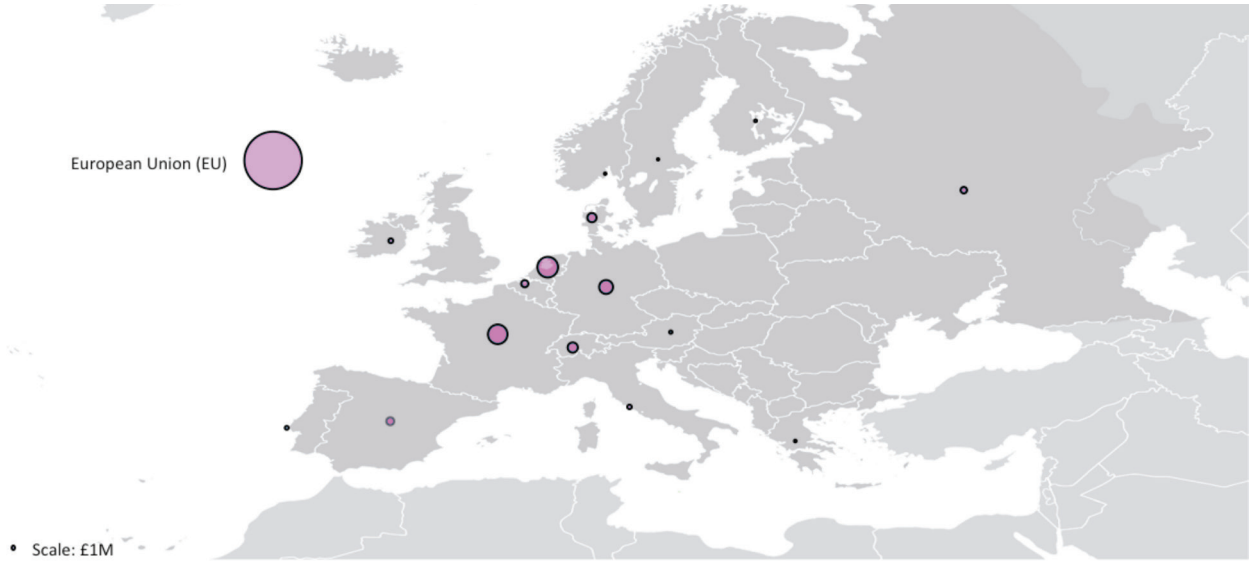


Further funding by location

- The sources of further funding have been coded for country and sector to gain a greater understanding of the importance of other countries, governments, companies and non-profit organisations in funding the same research as the MRC.
- The majority of further funding reported in Researchfish was leveraged from the United Kingdom between 2006 and 2013 - 68 per cent of further funding (£2.1bn). 14 per cent of further funding (£447m) was obtained from the rest of Europe. Figures 4 (European, excluding UK) and 5 (International, excluding Europe) show the amount of further funding by location.
- The largest value of further funding between 2006 and 2013 came from the public sector (£1.4bn – 46 per cent of the total further funding reported). This was closely followed by non-profit organisations (£1.2bn – 37 per cent of the total further funding reported). Table 3 and figure 6 shows the value of further funding by sector.
- Six per cent of further funding (£197m) was leveraged from the private sector between 2006-2013. In 2012/13, this figure was £33.5m, seven per cent.

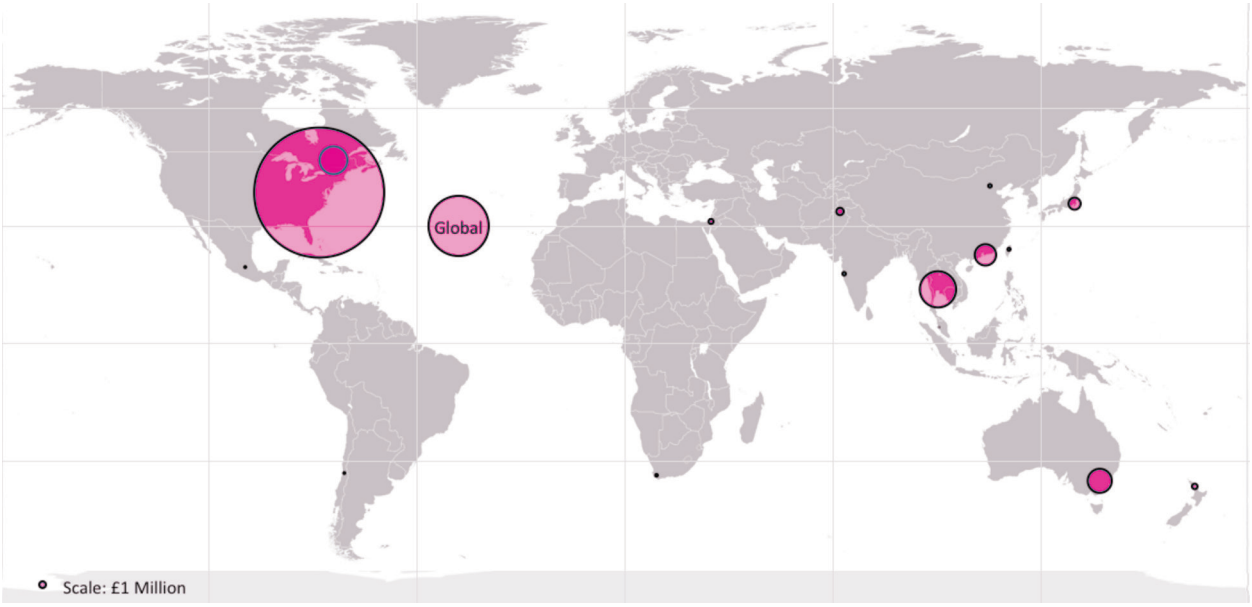
- The Wellcome Trust provided the largest value of further funding, contributing £435m between 2006 and 2013. This was followed by the National Institute for Health Research (£195m). The top ten funders by value is shown in table 4.
- The largest overseas funder was the European Commission, contributing £120m between 2006 and 2013, followed by the National Institutes of Health (£95m).
- The largest single private sector funder was Merck & Co Inc, providing around £88m in this period.

Figure 4: *Amount of further funding by location (European, excluding UK)*



European Union(EU):	*£246,217,331*
Austria:	*£833,874*
Belgium:	*£3,845,052*
Denmark:	*£6,382,612*
Finland:	*£648,680*
France:	*£28,461,651*
Germany:	*£14,457,002*
Greece:	*£565,029*
Ireland:	*£1,683,796*
Italy:	*£514,961*
Norway:	*£487,085*
Portugal:	*£1,137,572*
Russia:	*£145,000*
Spain:	*£4,798,854*
Sweden:	*£416,708*
Switzerland:	*£7,832,861*

Figure 5: *Amount of further funding by location (international, excluding Europe)*



Global:	£79,754,959
Australia:	£12,764,280
Canada:	£17,150,922
Chile:	£78,609
China:	£276,543
Hong Kong:	£10,025,487
India:	£279,885
Israel:	£546,581
Japan:	£3,224,431
Mexico:	£86,500
New Zealand:	£673,500
Pakistan:	£1,181,002
South Africa:	£159,480
Taiwan:	£215,562
Thailand:	£28,894,654
USA:	£371,545,335

Table 3: *Value of further funding by sector*

Sector	Value	Percentage
Academic	£105,314,414	3%
Non-profit	£1,184,518,846	37%
Learned society	£13,802,588	0%
Multiple sectors	£31,528,955	1%
Private	£197,204,966	6%
Public	£1,472,075,012	46%
Hospital	£111,292,741	4%
Unknown	£57,979,843	2%
Total	£3,173,717,367	100%

Figure 6: *Percentage of further funding by sector*

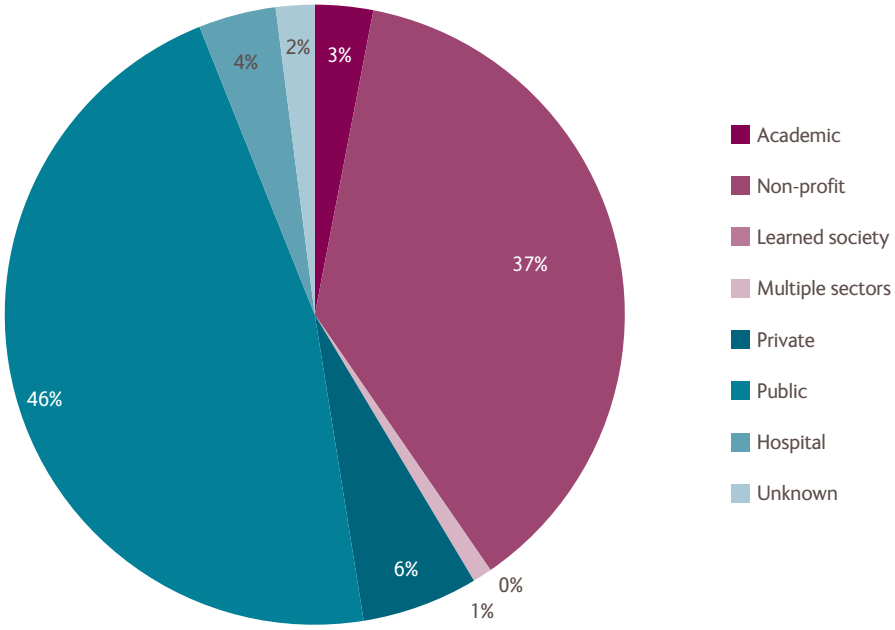


Table 4: *Top 10 funders by value*

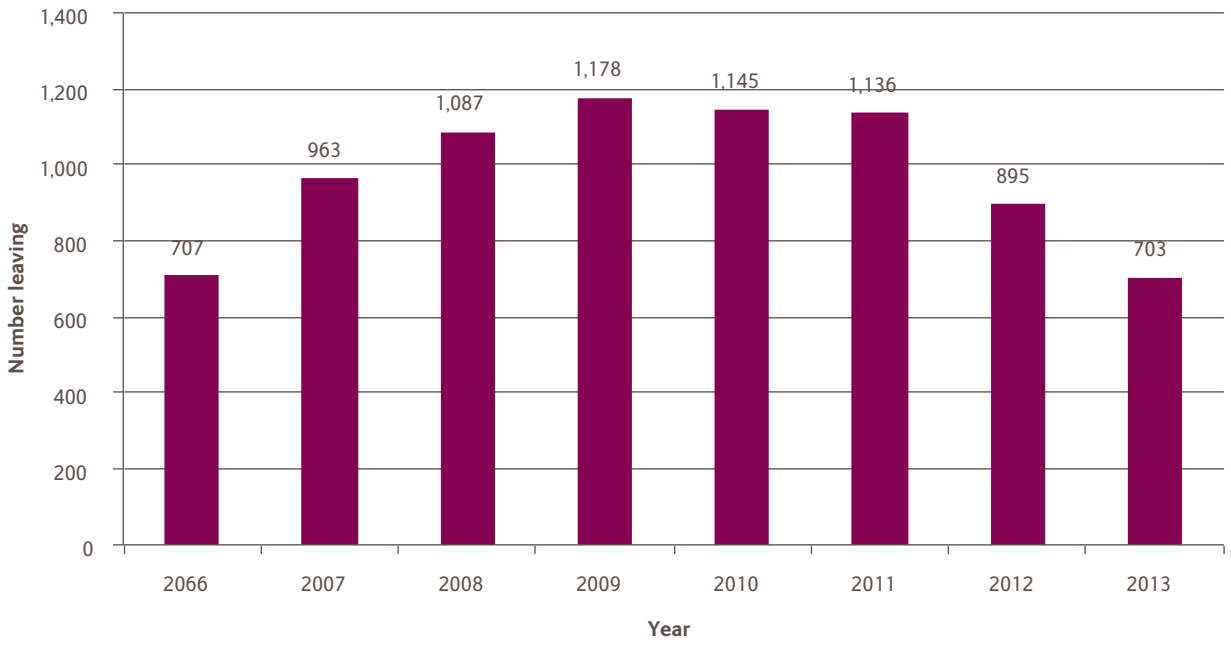
Top funders	Pro-rated spending
Wellcome Trust	£434,967,269
National Institute for Health Research (NIHR)	£194,571,599
Biotechnology and Biological Sciences Research Council (BBSRC)	£123,290,325
European Commission (EC)	£120,066,222
Cancer Research UK (CRUK)	£109,401,877
Engineering and Physical Sciences Research Council (EPSRC)	£101,287,979
National Institutes of Health (NIH)	£95,180,674
Merck & Co., Inc. (MSD)	£88,272,263
Bill and Melinda Gates Foundation	£77,528,405
British Heart Foundation (BHF)	£71,809,556

3.4: Next destination

Summary

- Principal investigators reported details of staff who had left MRC support in 47 per cent of MRC awards.
- On average, there were three instances (3.02) reported per award (for those awards where it was reported staff had left).
- Of the 7,814 reports of staff who moved from MRC support between 2006 and 2013[7], 20 per cent were research fellows and 13 per cent were research students.
- Figure 1 shows the number of staff leaving MRC support by year, as reported in Researchfish. The data includes people leaving MRC awards that have terminated, people leaving for opportunities elsewhere or retiring, and people leaving fixed-term positions such as studentships.

Figure 1: *Number of staff leaving MRC support by year*



Positions held at the MRC and future positions

- 35 per cent of staff leaving the MRC were in a post-doctoral position, 24 per cent held a researcher position and 20 per cent held a research fellow position. The distribution of all roles held is shown in figure 2.
- The majority of next destinations for research students leaving the MRC were described as 'post-doctoral researcher' (51 per cent), followed by 'student' (16 per cent). A breakdown of next destinations of research students is shown in figure 3.
- The majority of post-doctoral researchers left MRC support to take up a further post-doctoral position (51 per cent), followed by research fellow/project leader (16 per cent)[8]. A breakdown of next destinations of post-doctoral researchers is shown in figure 4.

» Overall, 61 per cent of staff remained in the academic (university-based) sector. 10 per cent of leavers moved into the private sector. Figure 5 shows a breakdown of next destinations by sector.

» These results are very similar to those published last year.

Figure 2: *Distribution of roles held by staff leaving the MRC*

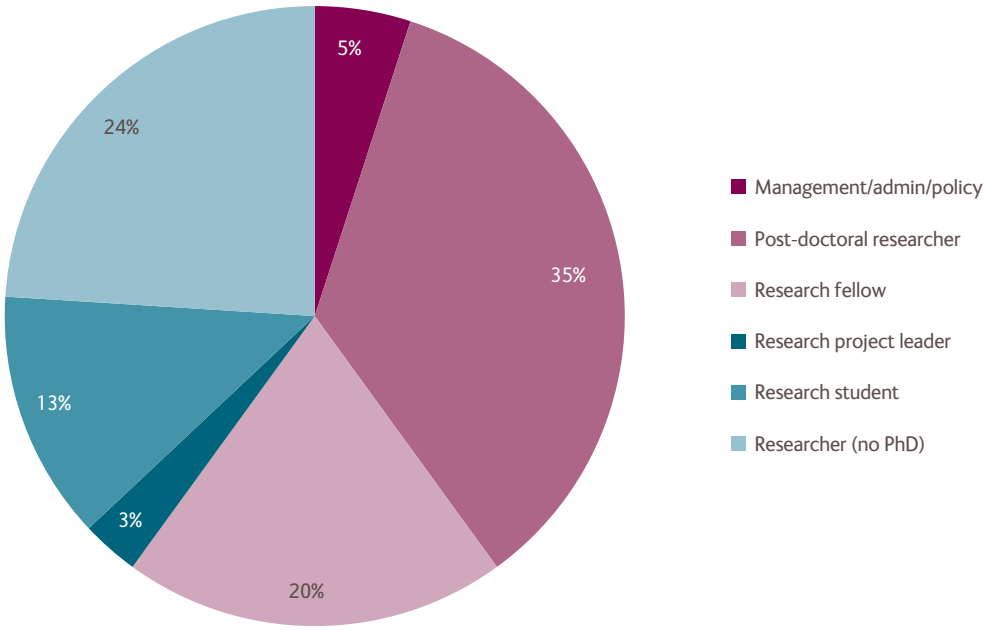


Figure 3: *Distribution of next destinations of research students*

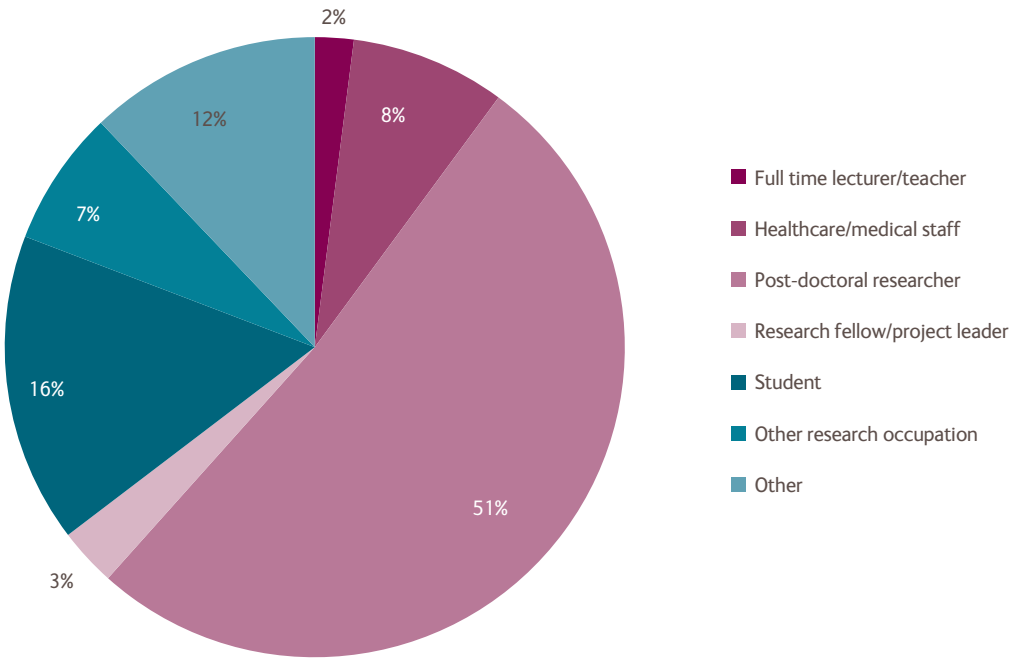


Figure 4: *Distribution of next destinations of post-doctoral researchers*

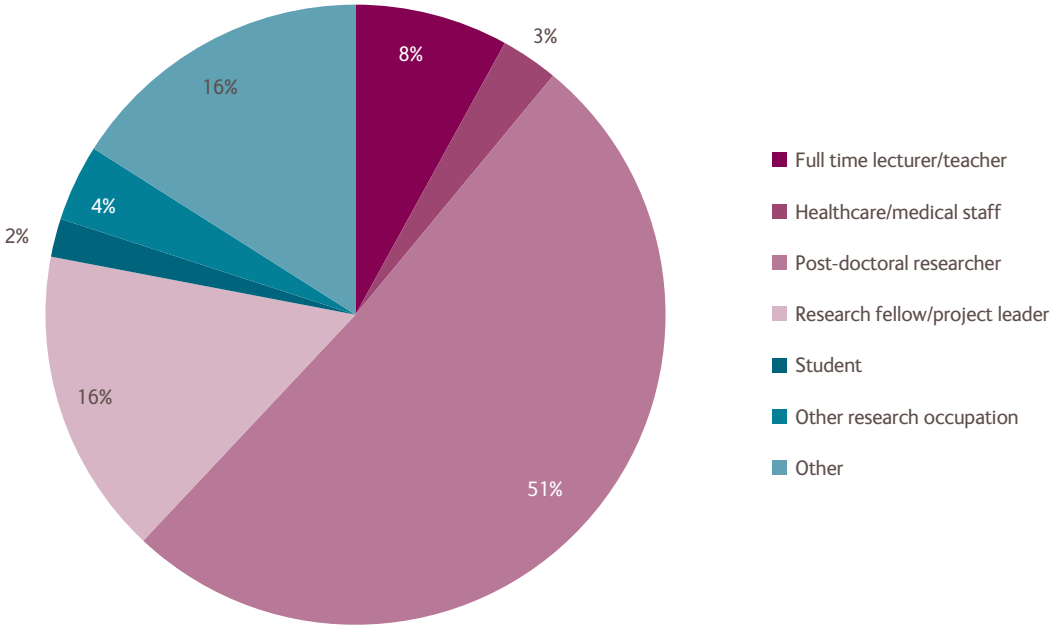
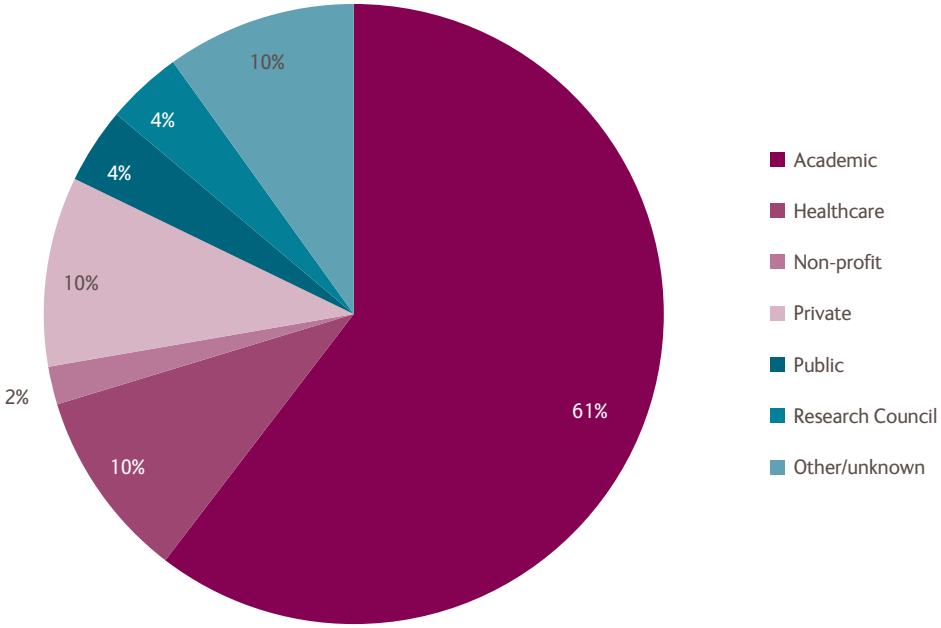


Figure 5: *Distribution of next destinations by sector*



3.5: Engagement activities

Summary

- Researchers reported participating in engagement activities outside of academia in 56 per cent of awards.
- The total number of engagement activities reported between 2006 and 2013 was 23,292[9].
- The average number of engagement activities per award (for awards reporting engagement activities) was seven (7.47).
- 11 per cent of all awards reported more than ten engagement activities.

Engagement activities by year

- There were 3,146 instances of engagement activities starting in 2013. A breakdown of engagement activities per year is shown in figure 1.
- The longer that an award has been running, the greater number of opportunities to participate in engagement activities there are. Recipients of 62 per cent of awards starting in 2006 or earlier reported at least one engagement activity, compared to 26 per cent of awards starting in 2013. The number of awards reporting at least one engagement activity by start year is shown in table 1 and figure 2.
- 19 per cent of awards reported at least one engagement activity within one year of the award starting compared to 56 per cent after five years. The time between the award starting and the engagement activity taking place is shown in table 2 and figure 3.

Figure 1: *Breakdown of engagement activities per year*

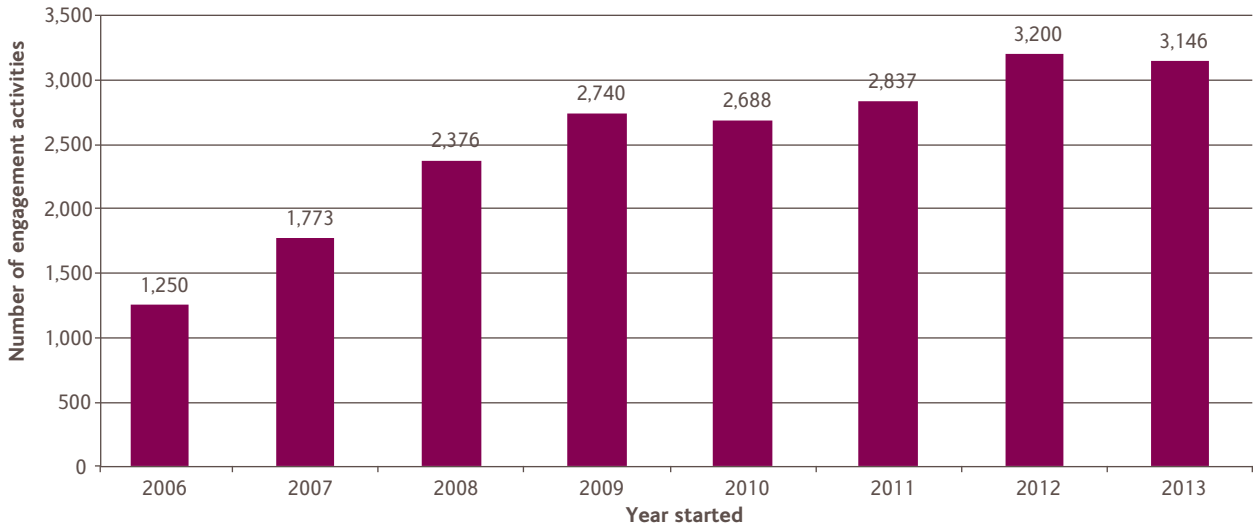


Table 1: *Number of awards reporting at least one engagement activity by start year*

Start year	Number of awards	Number with at least one engagement activity	Number with no engagement activities	Percentage with at least one instance of engagement activity
2006 or earlier	2,076	1,290	786	62%
2007	466	304	162	65%
2008	569	370	199	65%
2009	565	344	221	61%
2010	470	270	200	57%
2011	410	204	206	50%
2012	525	213	312	41%
2013	478	125	353	26%

Figure 2: *Number of awards reporting at least one engagement activity by start year*

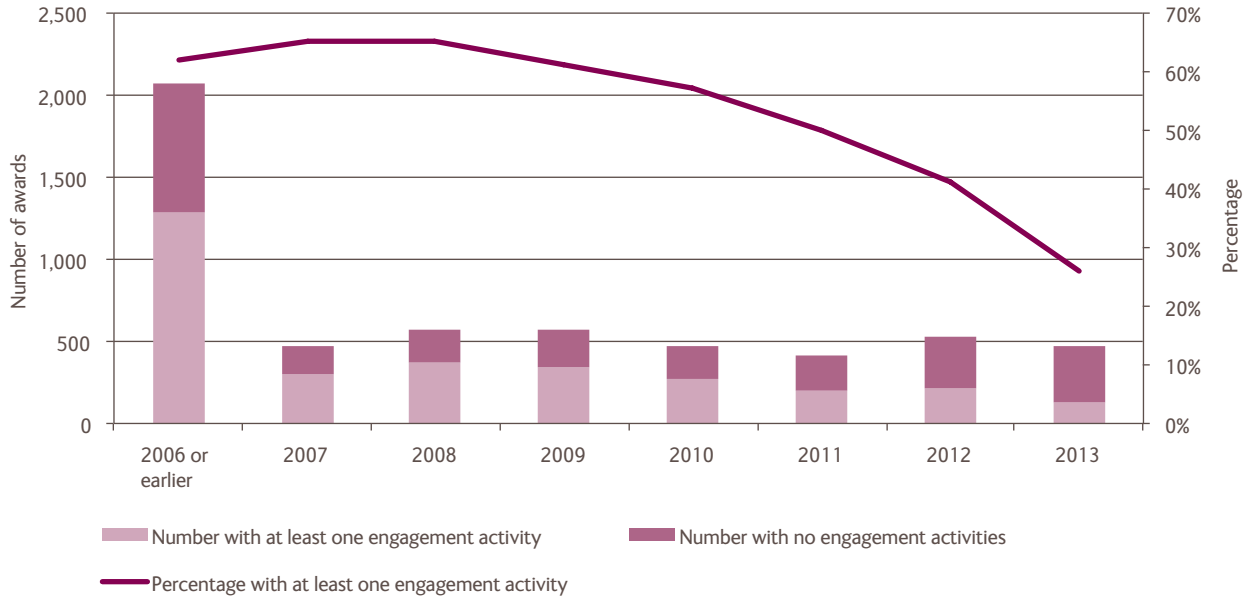
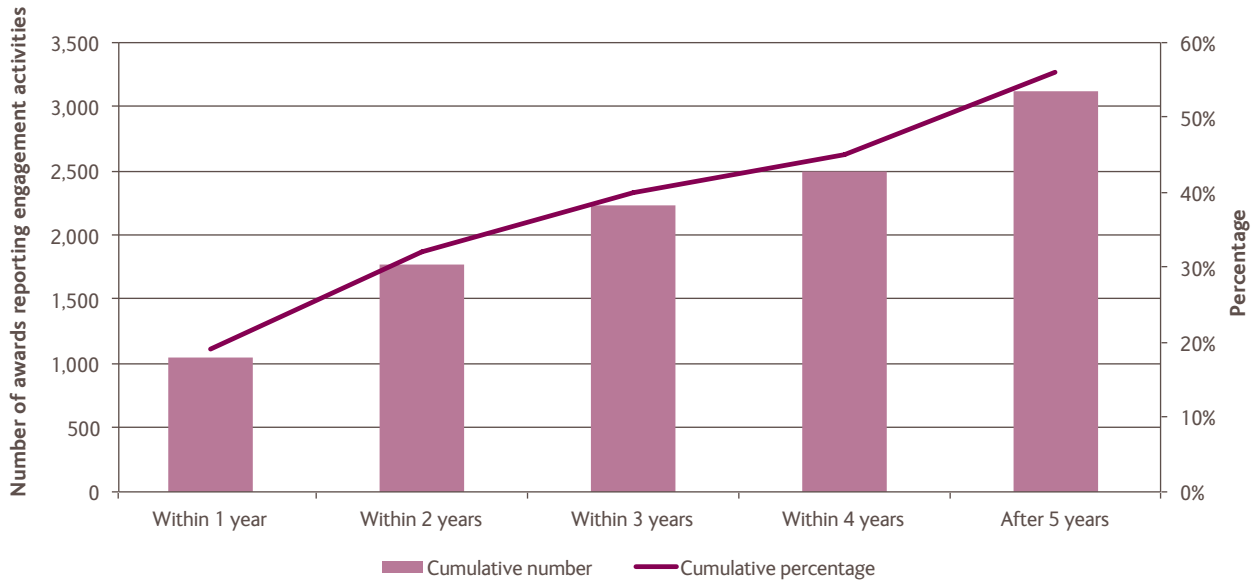


Table 2: *Time between the award starting and engagement activity taking place*

	Number reporting at least one engagement activity	Cumulative number	Cumulative percentage
Within 1 year	1,045	1,045	19%
Within 2 years	721	1,766	32%
Within 3 years	464	2,230	40%
Within 4 years	270	2,500	45%
After 5 years	620	3,120	56%

Figure 3: *Time between the award starting and engagement activity taking place*



Engagement activity by type and audience

- Engagement with audiences outside of academia[10] is an important part of the research process. It helps to enhance understanding of complex topics, communicate the importance of research carried out and inspire future careers in science.
- The most popular method of engagement reported was a talk or presentation (37 per cent), followed by participation in an activity, workshop or similar (17 per cent). A full breakdown of engagement activities by type is shown in table 3 and figure 4.
- Around a third of engagement activities were aimed at the public/other audiences (31 per cent), while 16 per cent were aimed at health professionals and 15 per cent at other academic audiences. A more detailed breakdown of engagement activities by audience type is shown in table 4 and figure 5.

Table 3: *Engagement activities by type*

Engagement activity	Number of instances	Percentage
A formal working group, expert panel or similar	1,992	10%
A magazine, newsletter or online publication	2,344	12%
A press release, press conference or response to a media enquiry.	1,854	9%
A talk or presentation	7,371	37%
Participation in an activity, workshop or similar	3,328	17%
Participation in an open day or visit at my research institution	1,371	7%
Scientific meeting (conference/symposium etc)	1,748	9%
Total	20,008	100%

Figure 4: *Engagement activities by type*

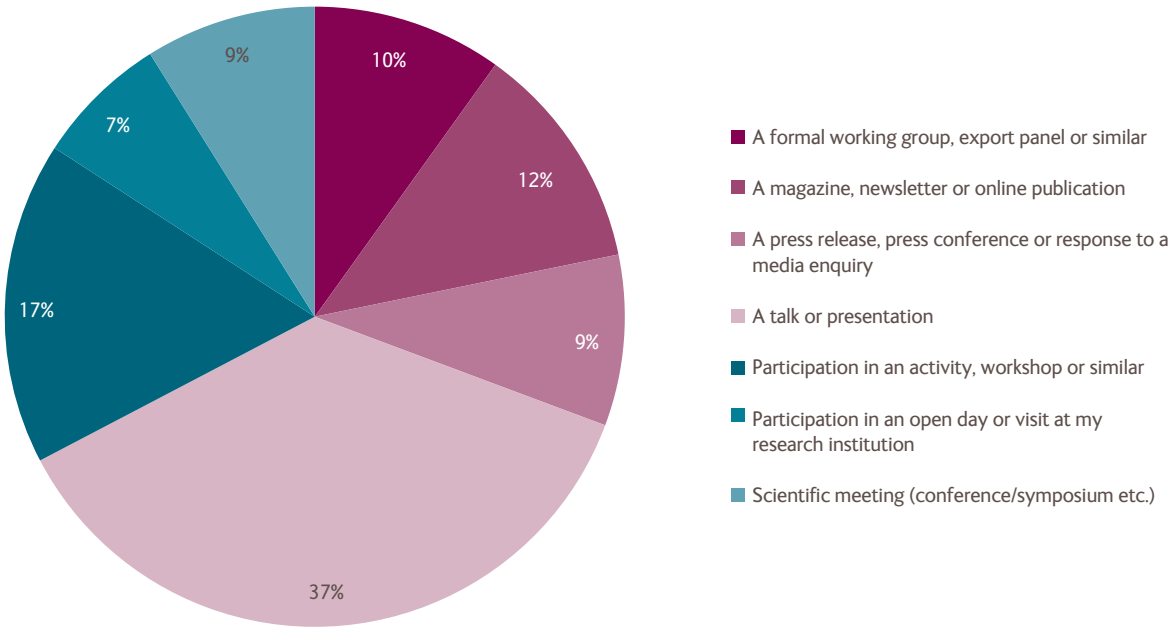
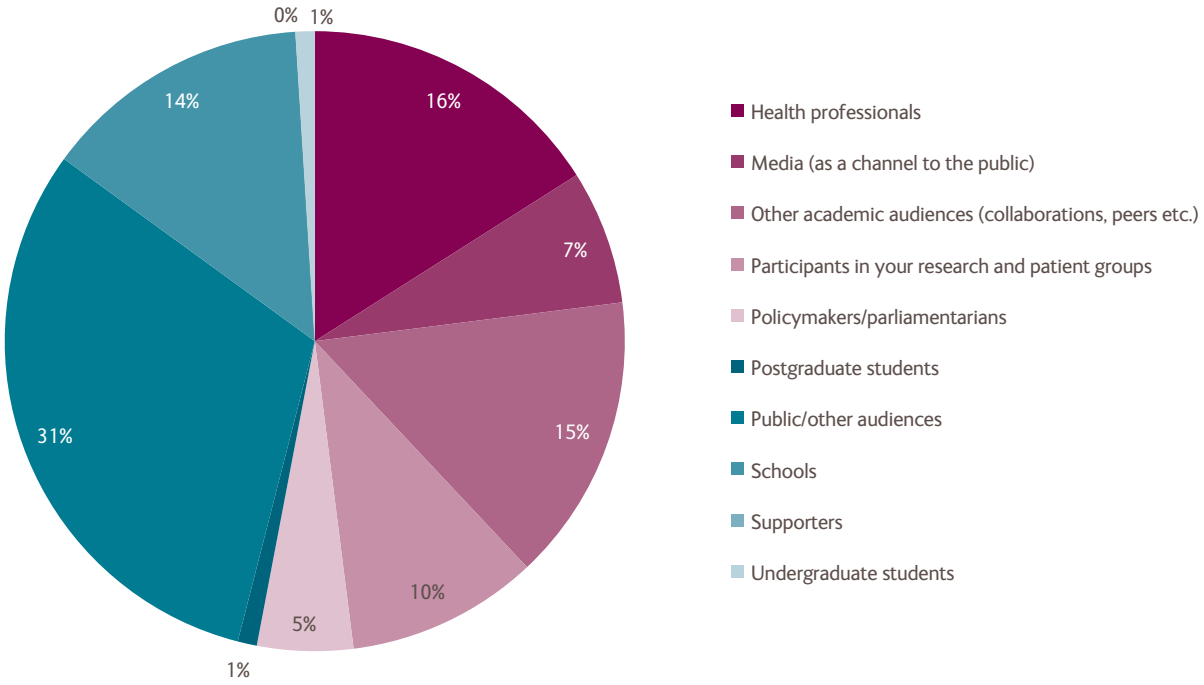


Table 4: *Engagement activities by audience type*

Audience type	Number of instances	Percentage
Health professionals	3,278	16%
Media (as a channel to the public)	1,418	7%
Other academic audiences (collaborators, peers etc.)	2,973	15%
Participants in your research and patient groups	1,929	10%
Policymakers/parliamentarians	976	5%
Postgraduate students	268	1%
Public/other audiences	6,223	31%
Schools	2,768	14%
Supporters	67	0%
Undergraduate students	110	1%
Total	20,010	100%

Figure 5: *Engagement activities by audience type*



3.6: Influence on policy

Summary

- MRC researchers reported 3,455 examples of influences on policy between 2006 and 2013.
- Influences on policy were reported in more than a fifth (22 per cent) of all awards. In these awards, the average number of influences on policy was three (3.2).

Influences on policy by year

- 460 policy influences started in 2013. A breakdown of policy influences by year is shown in figure 1.
- As with other output types, there is naturally a time lag between the award being made and the influence on policy being realised. More than a quarter (26 per cent) of awards made in 2006 or earlier reported at least one policy influence, compared to 18 per cent of awards in 2011 and six per cent in 2013. Table 1 and figure 2 show the number of policy influences by award start year.
- 22 per cent of awards reported at least one policy influence within five years after the award starting, compared to five per cent within one year. Table 2 and figure 3 shows the time taken to report the first policy influence.

Figure 1: *Policy influence by year realised*

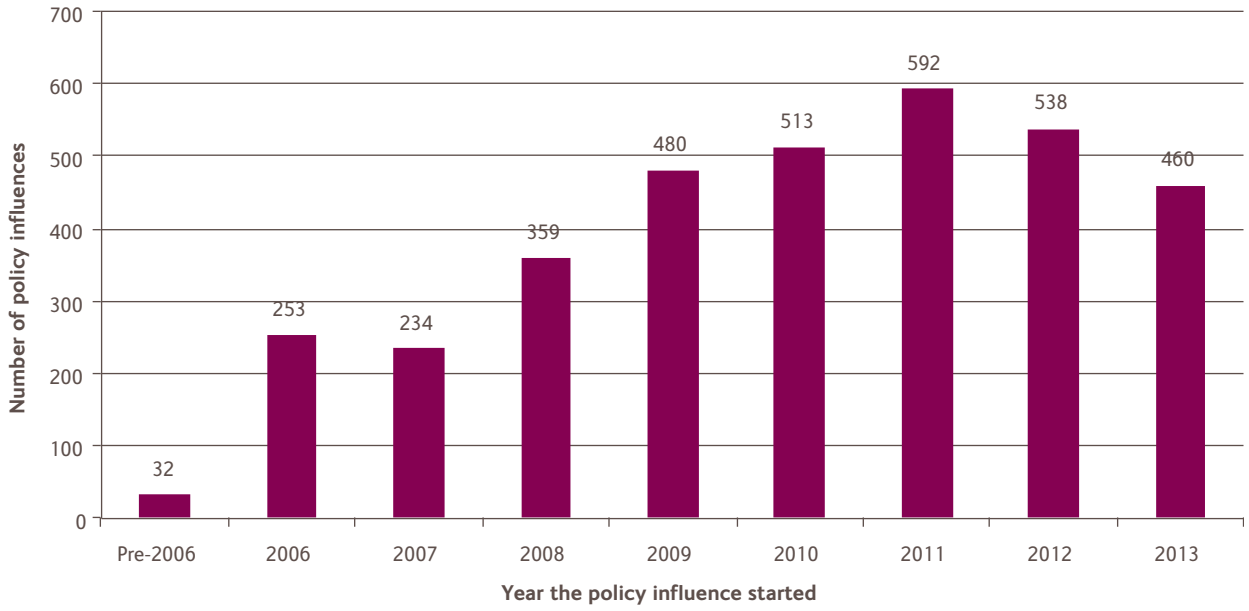


Table 1: *Policy influence by award start year*

Start year	Number of awards	Number with at least one policy influence	Number with no policy influences	Percentage with at least one policy influence
2006 or earlier	2076	543	1533	26%
2007	466	109	357	23%
2008	569	139	430	24%
2009	565	140	425	25%
2010	470	108	362	23%
2011	410	73	337	18%
2012	525	63	462	12%
2013	478	31	447	6%

Figure 2: *Policy influence by award start year*

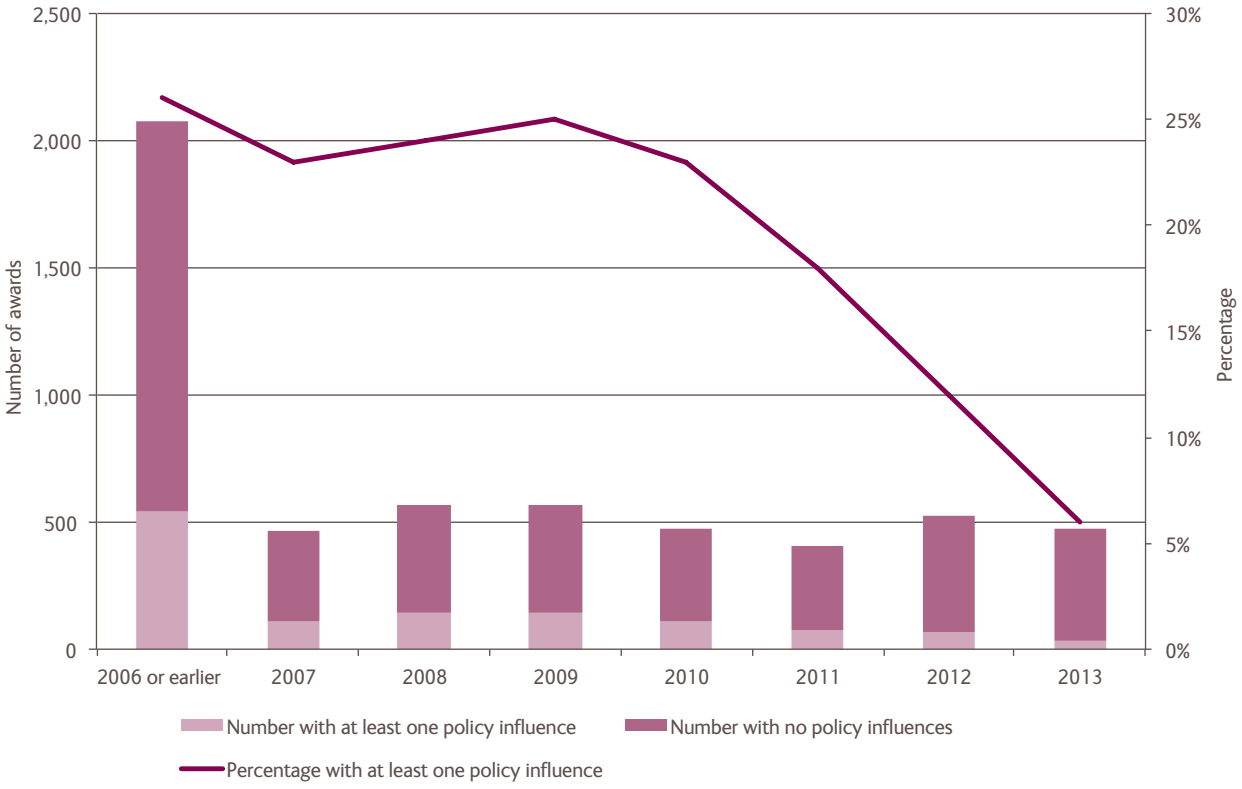
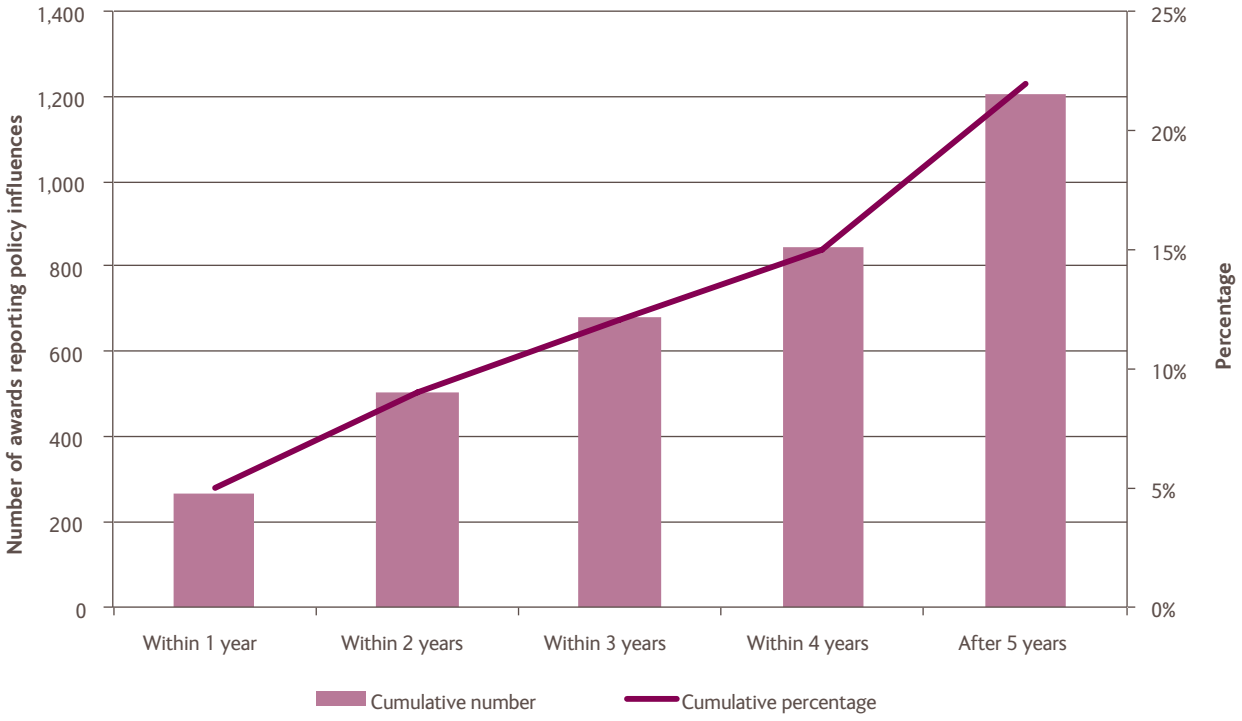


Table 2: *Time taken to report first policy influence*

	Number reporting at least one policy influence	Cumulative number	Cumulative percentage
Within 1 year	268	268	5%
Within 2 years	235	503	9%
Within 3 years	176	679	12%
Within 4 years	165	844	15%
After 5 years	362	1,206	22%

Figure 3: *Time taken to report first policy influence*



Policy influence by type and location

- Once unique policy outputs have been identified, the type of policy influence can be divided into citations in key policy documents (754/3,455 - 23 per cent of all policy influences) and influences on policy setting processes (2,701/3,455 – 77 per cent).
- A breakdown of policy influence by type is shown in table 1 and figure 4.
- Almost half of all policy influences (47 per cent) occurred in the UK. 27 per cent of policy outputs had an international influence. A breakdown of policy influences by location is shown in table 2 and figure 5.

Table 1: *Policy influence by type*

Influence Type	Number of instances	Percentage
Key policy documents		
Citation in clinical guidelines	376	11%
Citation in clinical reviews	94	3%
Citation in other policy documents	226	7%
Citation in systematic reviews	58	2%
Policy setting processes		
Gave evidence to a government review	186	5%
Influenced training of practitioners or researchers	762	22%
Membership of a guideline committee	422	12%
Participation in an advisory committee	1,005	29%
Participation in a national consultation	301	9%
Implementation circular/rapid advice/letter to eg Ministry of Health	23	1%
Other/unknown	2	0%
Total	3,455	100%

Figure 4: *Policy influence by type*

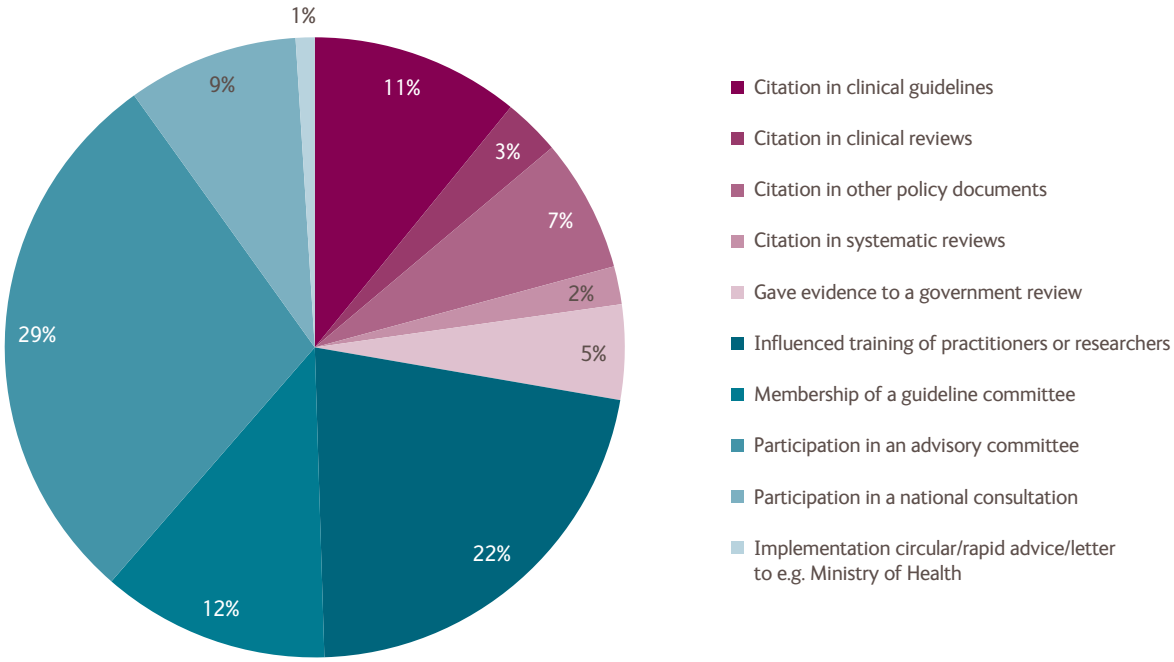
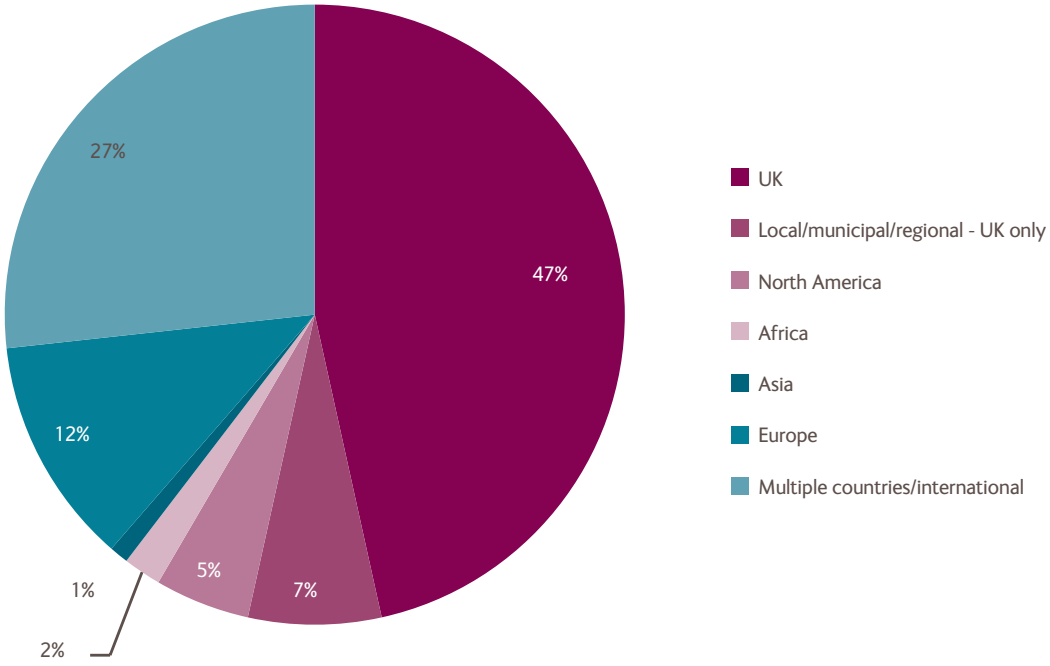


Table 2: *Policy influence by location*

Location of policy influence	Number of instances	Percentage
UK	1,607	47%
Local/municipal/regional - UK only	246	7%
North America	163	5%
Africa	59	2%
Asia	31	1%
Oceania	16	0%
Europe	415	12%
Multiple countries/international	916	27%
South America	1	0%
Unknown	1	0%
Total	3,455	100%

Figure 5: *Policy influence by location*



3.7: Research materials

Summary

- Recipients of 31 per cent of awards reported that their work had produced materials for others to use.
- The average number of research materials for awards reporting at least one instance was two (2.3).

Research materials by year

- The year when the research materials were first made available is shown in figure 1.
- The longer that an award has been running, the greater number of opportunities there are to create and share research materials. 47 per cent of awards starting in 2006 or earlier resulted in the production of a research material, compared to three per cent of awards starting in 2013. Table 1 and figure 2 show the number of materials reported by award start year.
- 31 per cent of awards reported at least one research material within five years[11], compared to just six per cent within one year. Table 2 and Figure 3 show the time taken to report the first research material.
- It should be noted that there is a large variety of materials produced and in future, as more data is captured, the time to produce research materials will be analysed by 'type' of research material.

Figure 1: *Distribution of when the research material was first made available*

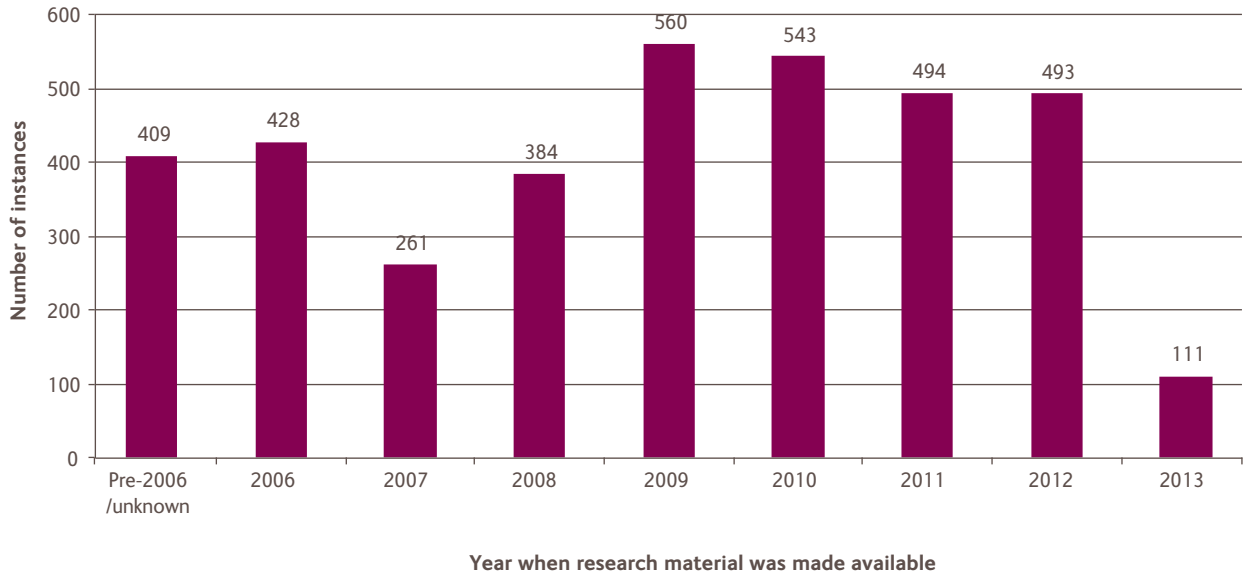


Table 1: *Research materials by award start year*

Start year	Number of awards	Number with at least one research material	Number with no research materials	Percentage with at least one research material
2006 or earlier	2,076	978	1,098	47%
2007	466	164	302	35%
2008	569	184	385	32%
2009	565	173	392	31%
2010	470	110	360	23%
2011	410	48	362	12%
2012	525	33	492	6%
2013	478	15	463	3%

Figure 2: *Research materials by award start year*

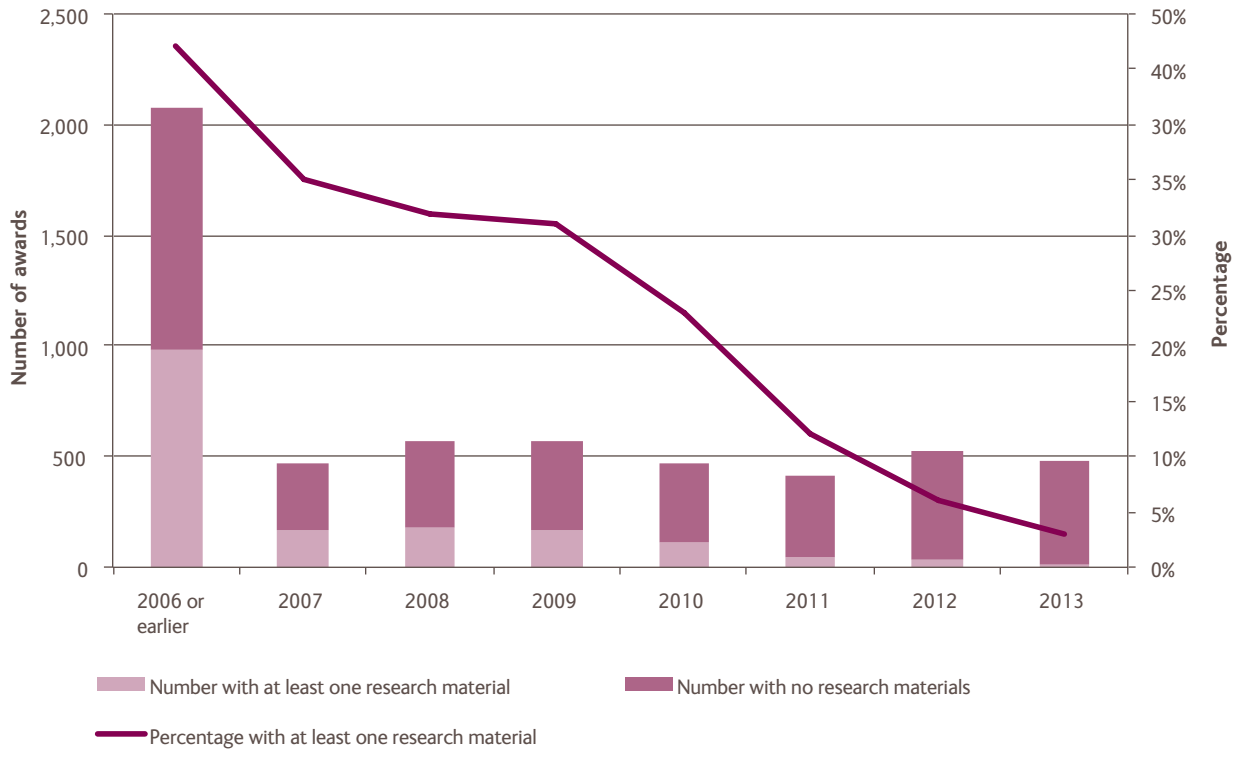
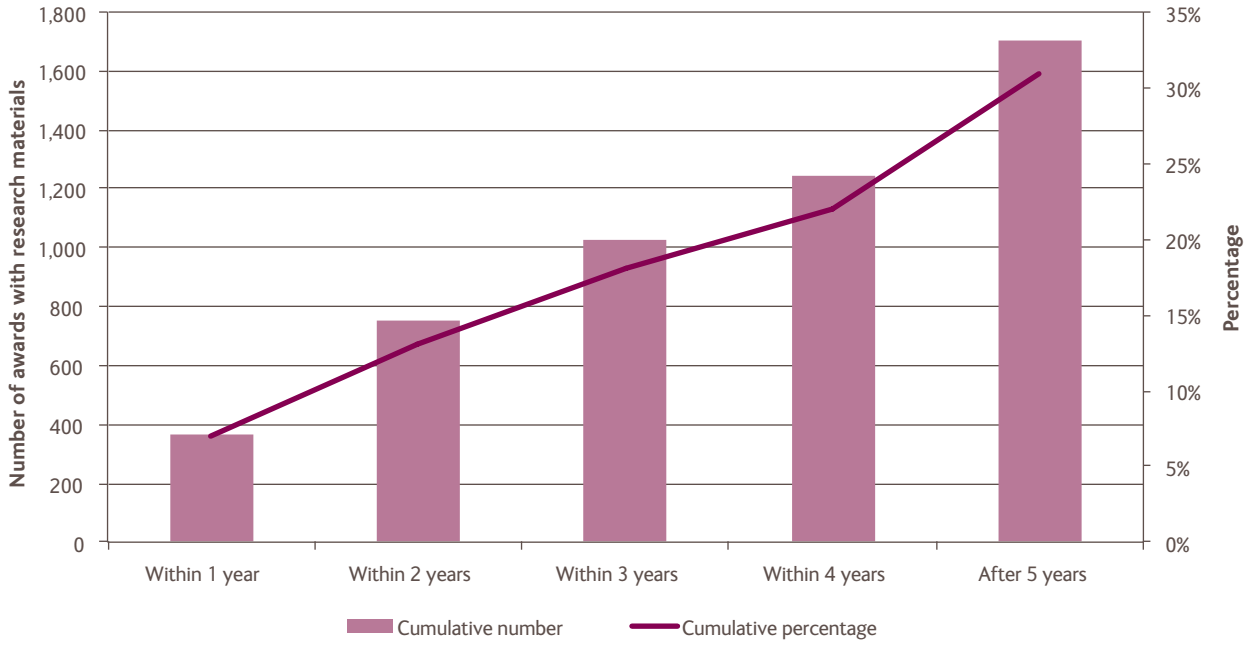


Table 2: *Time taken to report the first research material*

	Number reporting at least one research material	Cumulative number	Cumulative percentage
Within 1 year	369	369	7%
Within 2 years	381	750	13%
Within 3 years	275	1025	18%
Within 4 years	217	1242	22%
After 5 years	463	1705	31%

Figure 3: *Time taken to report the first research material*



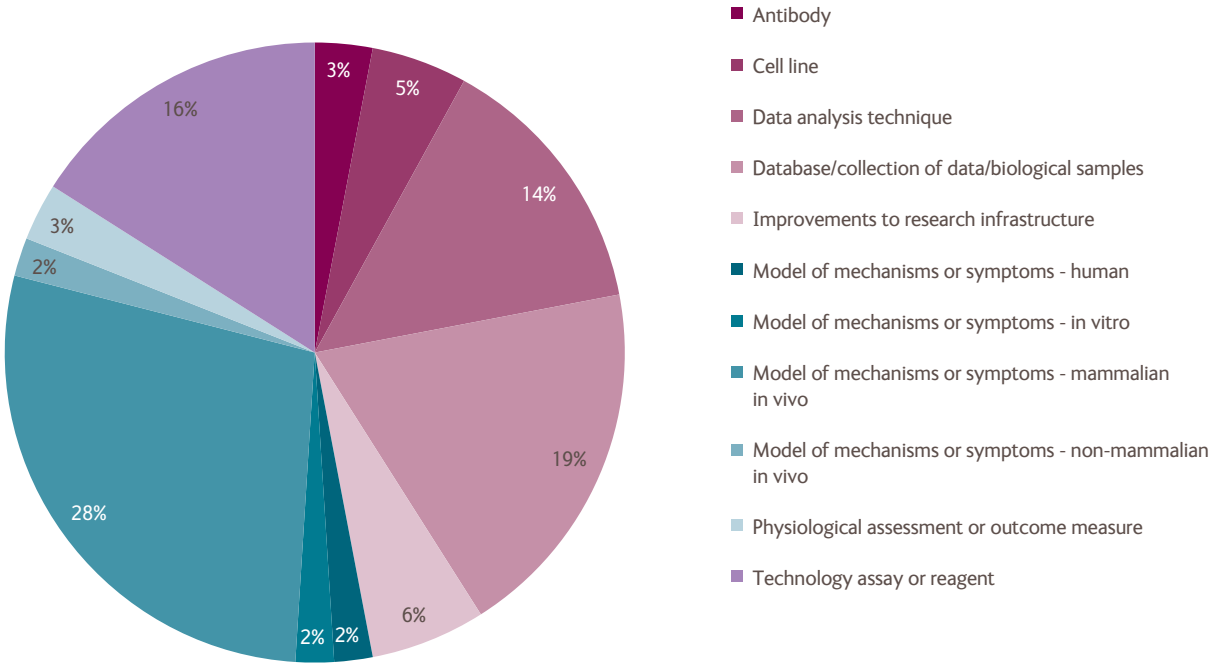
Research materials by type

» Models of mechanisms or symptoms – non-mammalian in vivo were the most common type of research material reported (28 per cent), followed by database/collection of data/biological samples (19 per cent). Table 3 and figure 4 show a breakdown of the type of research materials reported.

Table 3: *Research material by type*

Type of research material	Number of instances	Percentage
Antibody	126	3%
Cell line	173	5%
Data analysis technique	504	14%
Database/collection of data/biological samples	687	19%
Improvements to research infrastructure	235	6%
Model of mechanisms or symptoms - human	77	2%
Model of mechanisms or symptoms - in vitro	60	2%
Model of mechanisms or symptoms - mammalian in vivo	1,040	28%
Model of mechanisms or symptoms - non-mammalian in vivo	73	2%
Physiological assessment or outcome measure	110	3%
Technology assay or reagent	602	16%
Other/unknown	1	0%
Total	3,688	100%

Figure 4: *Research material by type*



3.8: Intellectual property

Summary

» The MRC dataset contains details of 849 discoveries in the intellectual property section. These include 74 reports of copyrighted works, 210 reports of discoveries for which formal protection was not possible or required, and 565 reports relating to published and granted patents.

Intellectual property by year

» Creating intellectual property can take a long time and therefore the longer that an award has been running for, the greater number of opportunities there are to create a patentable idea. 12 per cent of awards starting in 2006 reported at least one item of intellectual property, compared to one per cent of awards starting in 2013. Figure 1 shows the distribution of awards by start date and whether they have reported at least one item of intellectual property.

» Eight per cent of awards report at least one instance of intellectual property after five years[12], compared to one per cent within one year. Table 1 and figure 2 shows the time taken to report the first instance of intellectual property. In future analyses we will look to see if this elapsed time is different across the different 'types' of intellectual property.

» Supplemental analyses will be added in future to examine the way in which publicly-funded research is cited in these patents and the organisations that are noted as applicants on the patents. In 2014, Researchfish will add a patent lookup facility which will assist researchers in recording accurate patent details.

Figure 1: *Intellectual Property by award start date*

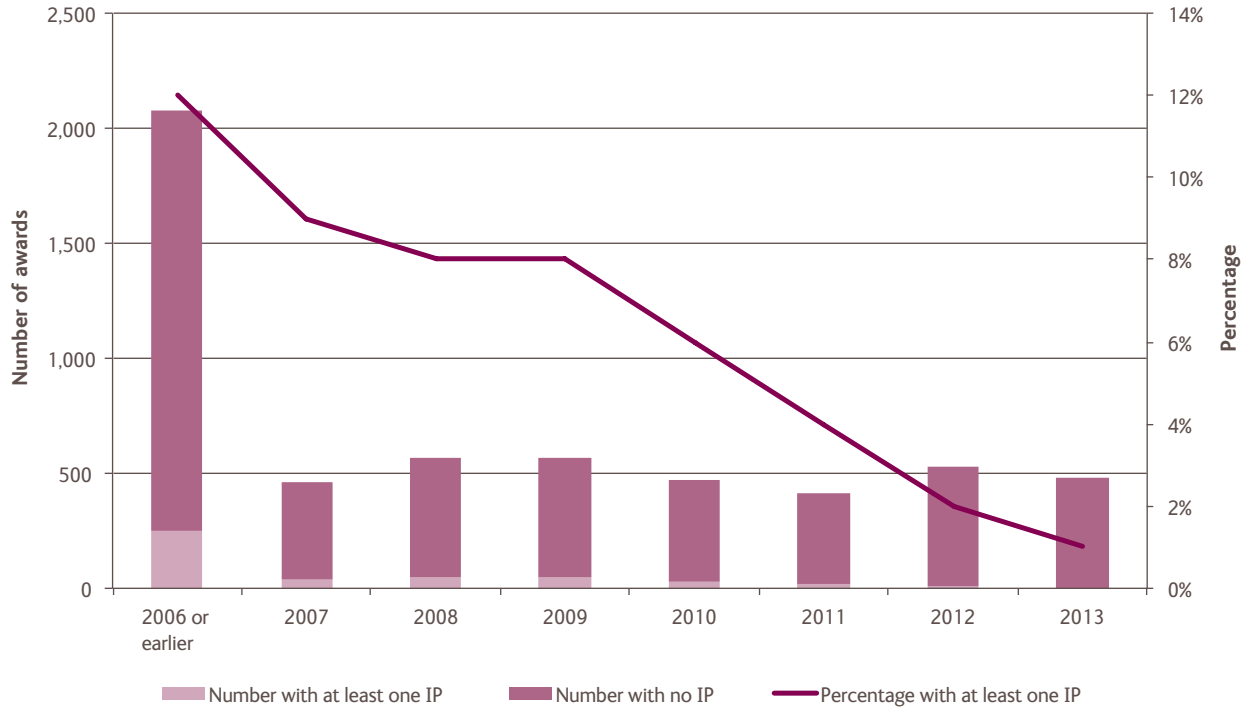
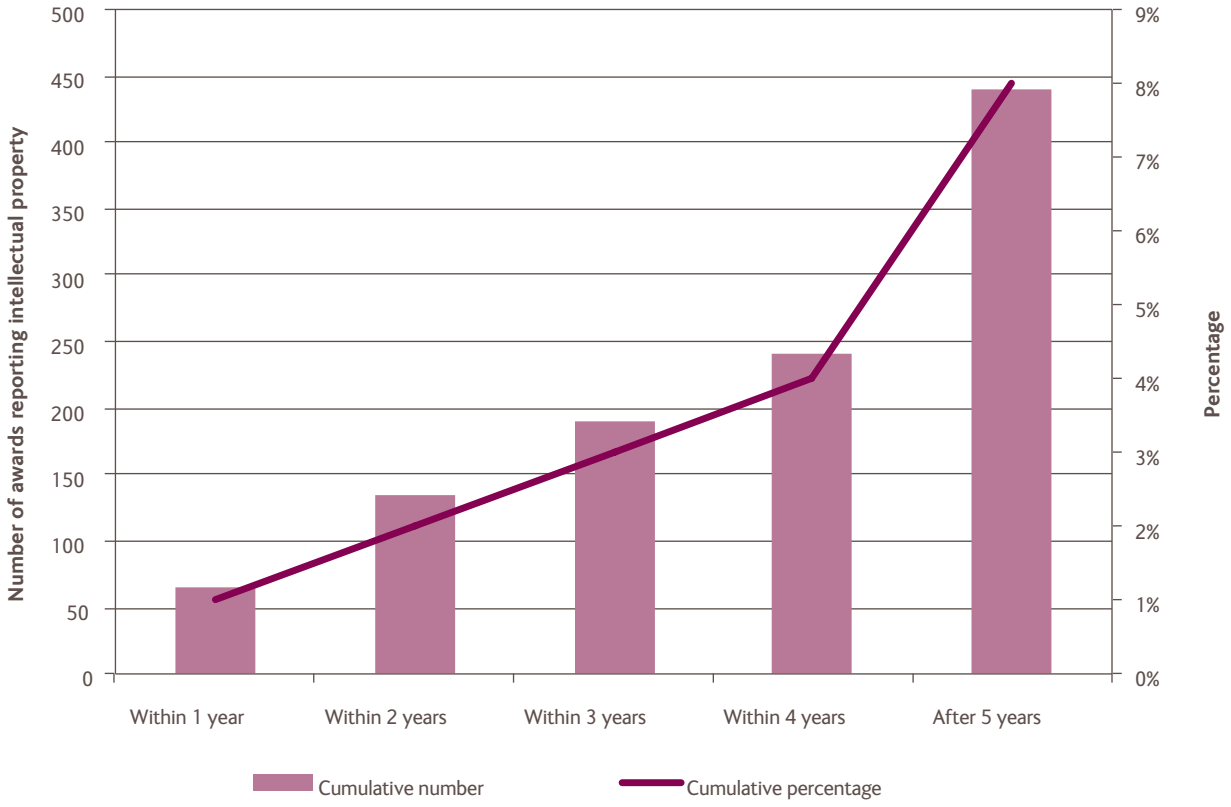


Table 1: *Time taken to report the first instance of intellectual property*

	Number reporting at least one IP	Cumulative number	Cumulative percentage
Within 1 year	66	66	1%
Within 2 years	68	134	2%
Within 3 years	55	189	3%
Within 4 years	51	240	4%
After 5 years	200	440	8%

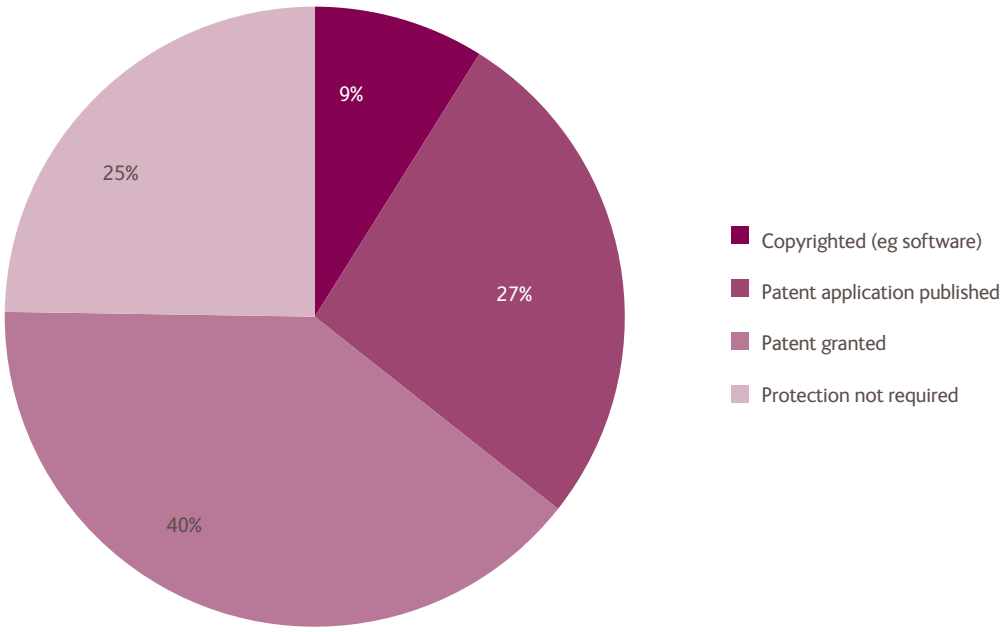
Figure 2: *Time taken to report the first instance of intellectual property*



Intellectual property protection by type

» 40 per cent of reports in this section were concerning a granted patent. Figure 3 gives a breakdown of the type of intellectual property reported.

Figure 3: *Type of intellectual property protection reported*



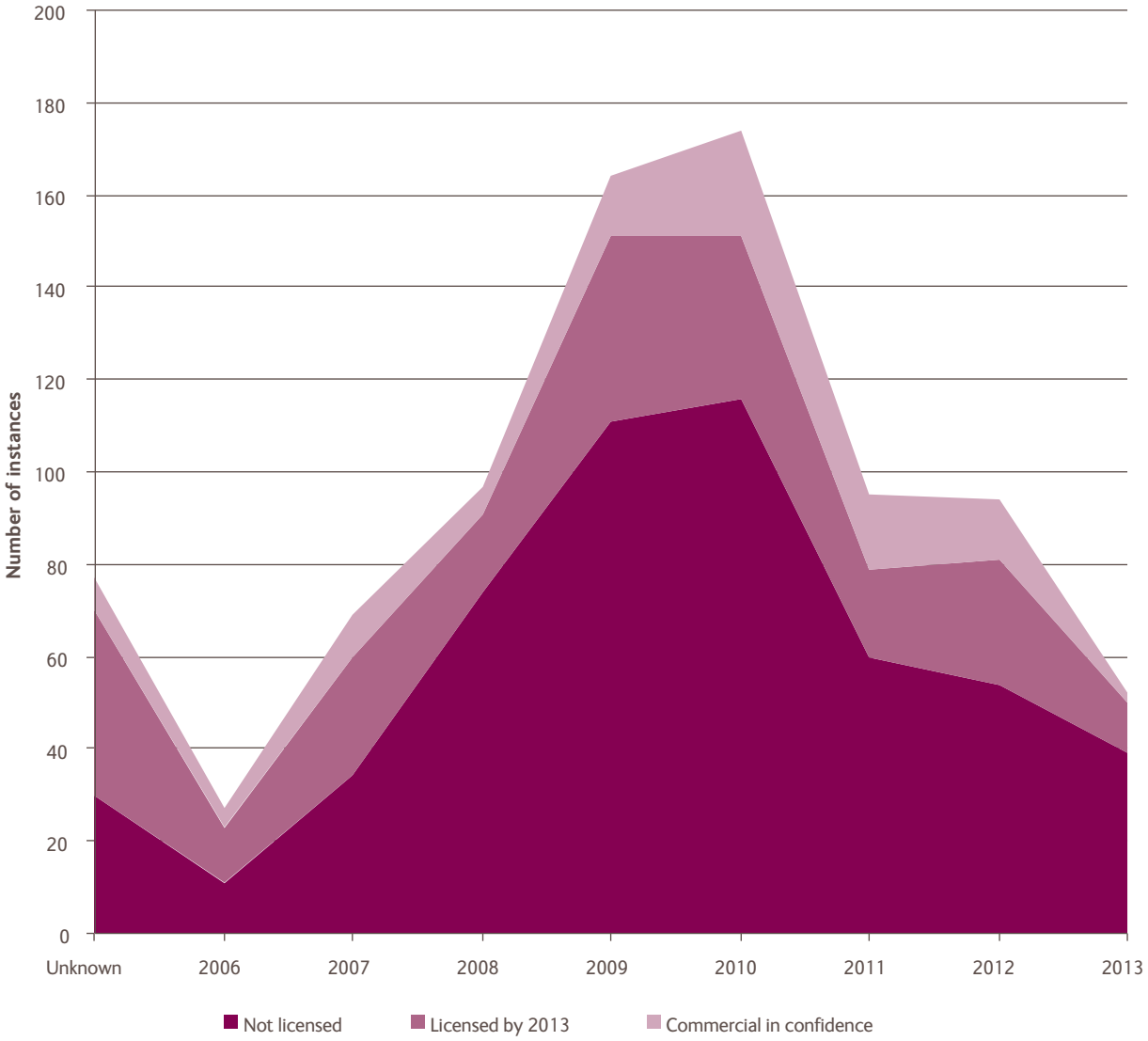
Licensing of intellectual property

- 27 per cent of discoveries overall (227/849) were reported as 'licensed' by 2013. The proportion is slightly higher for patented discoveries (31 per cent, 180/579). This is similar to the proportions reported in the last two years, and in our previous report from 2010, we suggested that this seemed reasonable in light of similar data from other organisations[13].
- This calculation does not include the 11 per cent of reports where researchers indicated that details were 'commercial in confidence' and could not be provided (93/849); it would be reasonable to assume that some of these cases will translate into new licenses in due course.
- The license status of intellectual property in 2013 by the year protection was granted is shown in table 3 and figure 4.

Table 3: *License status of intellectual property in 2013 by year of protection*

	Unknown	2006	2007	2008	2009	2010	2011	2012	2013	Total
Not licensed	30	11	34	74	111	116	60	54	39	529
Licensed by 2013	40	12	26	17	40	35	19	27	11	227
Commercial in confidence	7	4	9	6	13	23	16	13	2	93
Total	77	27	69	97	164	174	95	94	52	849

Figure 4: *License status of intellectual property in 2013 by year of protection*



3.9: Products and interventions

Summary

- Researchers reported that their work had led to the development of products or interventions in 12 per cent of awards (642/5,559), an increase on last year's data, in which recipients of 10 per cent of awards reported products or interventions.
- As can be seen by the chapter on case studies drawn from this section, this is a particularly important set of information with respect to the outcomes from research. We know from telephone surveys of MRC principal investigators that there is significant under-reporting of the developments arising from MRC research in this section, and so will be working to improve reporting in this area. A targeted effort to capture the details of trials linked to MRC research, which should be reported in this section, brought excellent results with more than 200 trials now linked to MRC research.
- There were 1,019 instances of products and interventions being reported in total; the average number of products and interventions reported per award (of those awards reporting products or interventions) was two (1.59).

Products and interventions by type

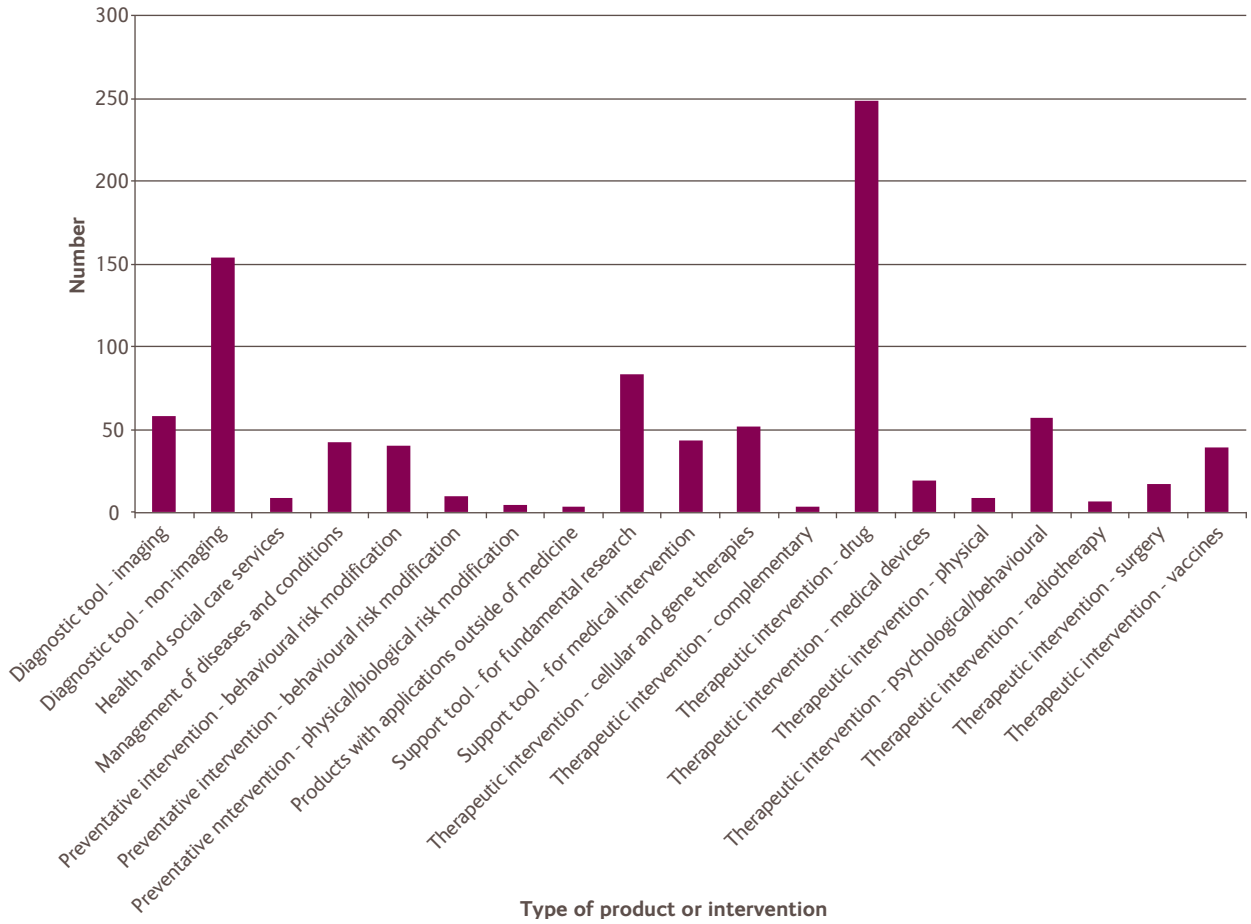
- The most common type of product or intervention in development was the therapeutic intervention – drug, reported by 249 awards (28 per cent of all products and interventions reported). This was closely followed by the diagnostic tool – non-imaging, reported by 154 awards (17 per cent of all products and interventions). The breakdown of products and interventions by type is shown in table 1 and figure 1.

Table 1: *Breakdown of products and interventions by type*

Type of product or intervention	Number of instances	Percentage of total
Diagnostic tool - imaging	58	6%
Diagnostic tool - non-imaging	154	17%
Health and social care services	9	1%
Management of diseases and conditions	43	5%
Preventative intervention - behavioural risk modification	40	4%
Preventative intervention - nutrition and chemoprevention	10	1%
Preventative intervention - physical/biological risk modification	5	1%
Products with applications outside of medicine	4	0%
Support tool - for fundamental research	83	9%
Support tool - for medical intervention	44	5%
Therapeutic intervention - cellular and gene therapies	52	6%
Therapeutic intervention - complementary	4	0%
Therapeutic intervention - drug	249	28%
Therapeutic intervention - medical devices	19	2%
Therapeutic intervention - physical	9	1%

Therapeutic intervention - psychological/behavioural	57	6%
Therapeutic intervention - radiotherapy	7	1%
Therapeutic intervention - surgery	17	2%
Therapeutic intervention - vaccines	39	4%
Total	903	100%

Figure 1: *Breakdown of products and interventions by type*



Products and interventions by development stage

- A total of 125 awards reported products and interventions as being launched onto the market since 2006, with a further 18 awards reporting products and interventions currently undergoing the process of market authorisation.
- There were 287 reports of products and interventions in early- or late-stage clinical evaluation demonstrating the strengthening pipeline of developments supported via MRC's investment in experimental medicine.
- There were 473 reports of products in initial or refinement stages, demonstrating the strength of MRC's investment in discovery and translational science. The inclusion of DPFS projects in 2011 has significantly added to the number of projects in early developmental stages.
- Table 2 and figure 2 show the distribution of products and interventions by development stage. Figure 3 shows the distribution of products and interventions by type and development stage.

Table 2: *Products and interventions by development stage*

Stage of development	Number of instances	Percentage of total
Initial development	277	31%
Refinement, non-clinical	113	13%
Refinement, clinical	82	9%
Early clinical assessment	180	20%
Late clinical evaluation	107	12%
Market authorisation	18	2%
Small-scale adoption	71	8%
Wide-scale adoption	54	6%
Total	902	100%

Figure 2: *Products and interventions by development stage*

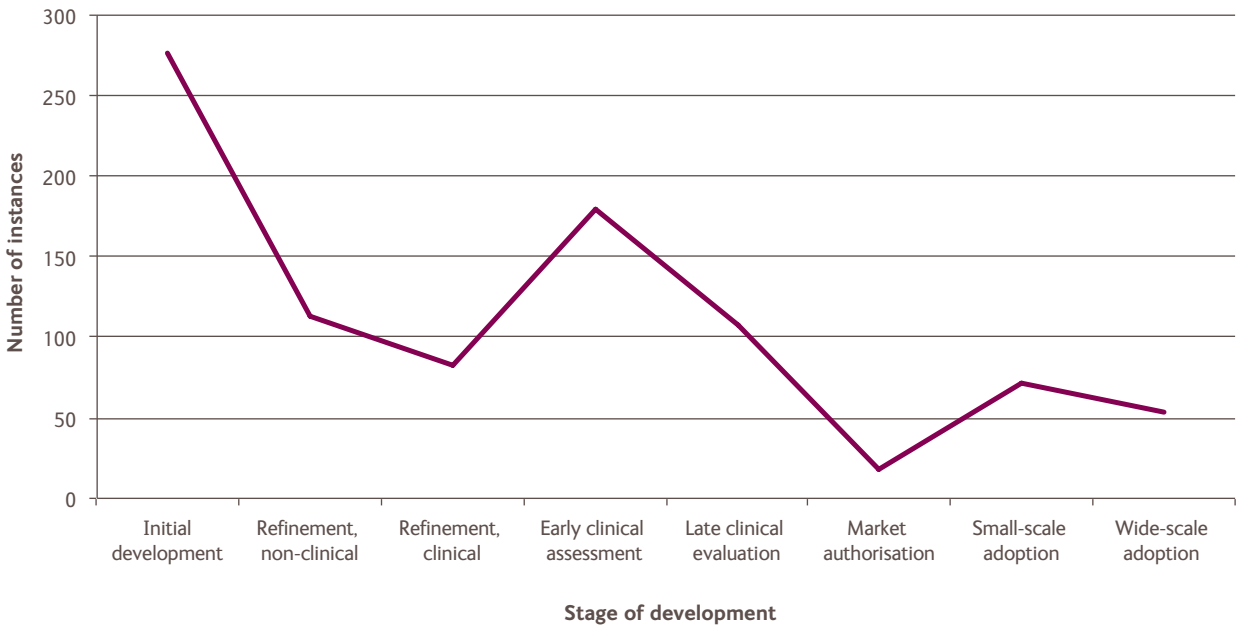
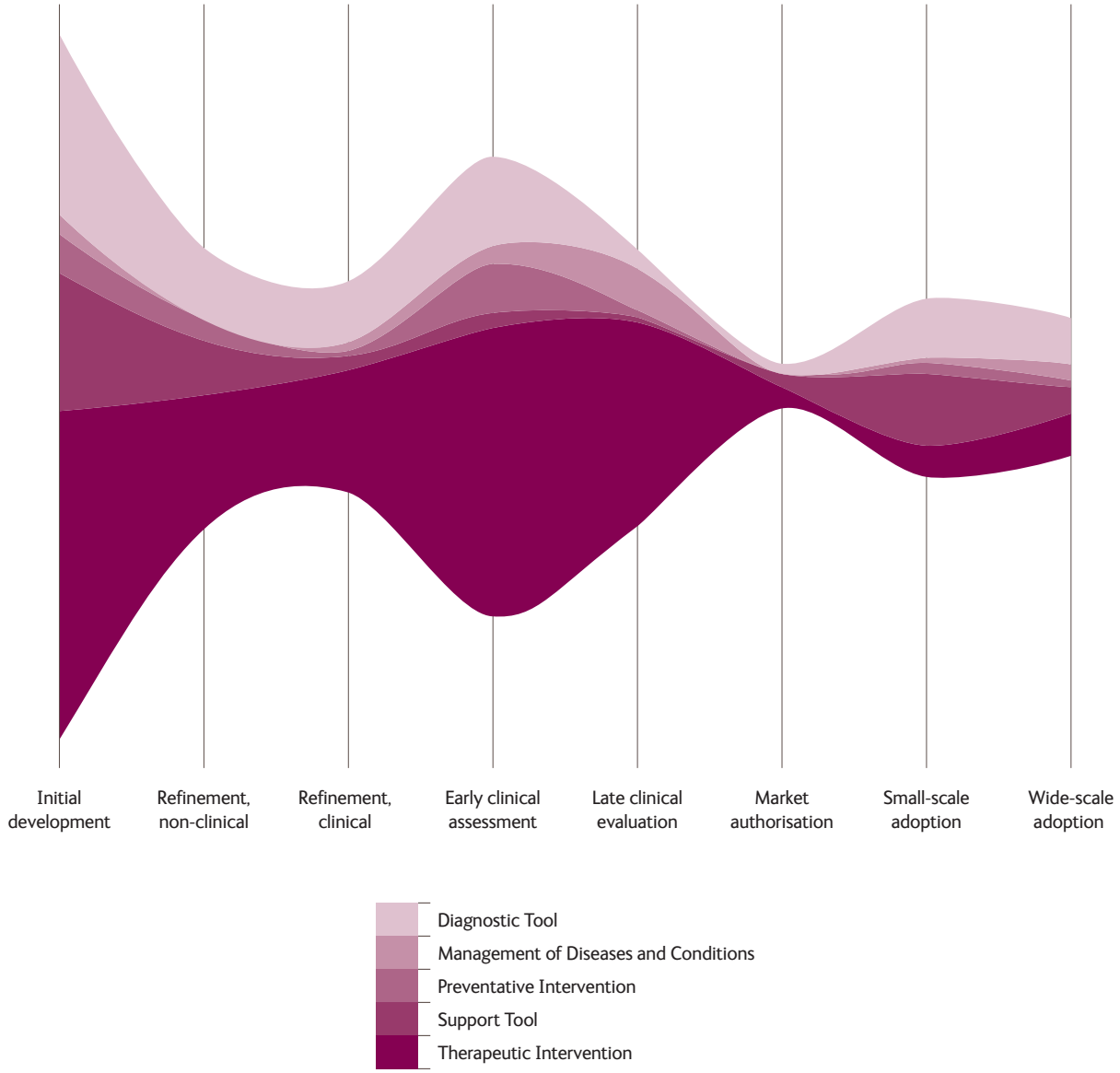


Figure 3: *Distribution of products and interventions by development stage and type*



3.10: Impacts on the private sector

Summary

- The MRC now has evidence of MRC-supported research leading to the creation of 109 companies, 82 of which have been formed since 2006. It is estimated that these companies represent at least 500 new highly skilled jobs in the UK.
- Further details on each of the spin out companies are on the MRC website[14].

3.11: Awards and recognition

Summary

- Recipients of 50 per cent of awards reported that their work had resulted in formal recognition or award for them personally or members of their team.
- The average number of reports per award (of those reporting recognition) was six (5.93).
- In total, researchers made 16,317 reports in this section; a large increase on last year's figure of 11,338.

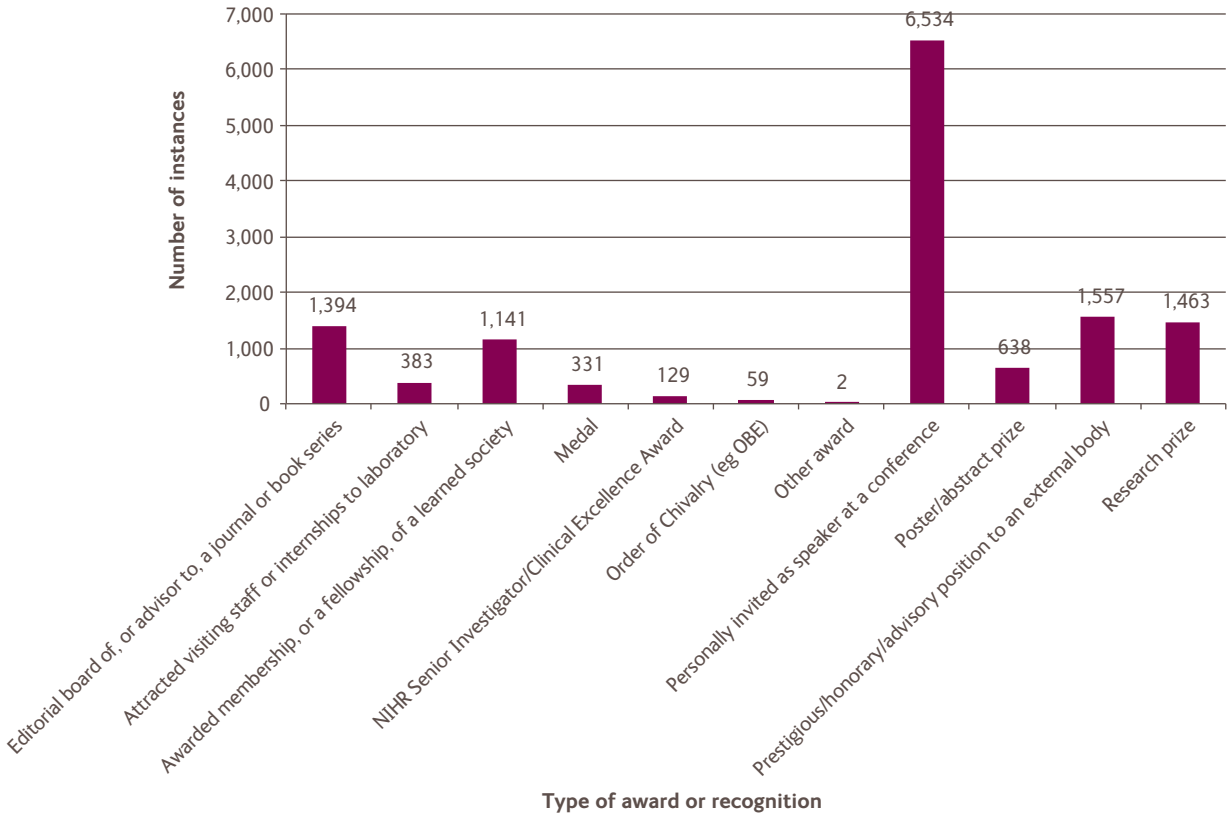
Awards and recognition by type

- The most common form of award or recognition was being personally invited as a speaker at a conference (47 per cent), followed by being appointed to a prestigious/honorary/advisory position to an external body (12 per cent) and appointed to the editorial board of, or as an advisor to, a journal or book series (11 per cent).
- Table 1 and figure 1 show the distribution of types of award and recognition.

Table 1: *Awards and recognition by type*

Type of awards and recognition	Number of instances	Percentage of total
Appointed to the editorial board of, or advisor to, a journal or book series	1,394	10%
Attracted visiting staff or internships to laboratory	383	3%
Awarded membership, or a fellowship, of a learned society	1,141	8%
Medal	331	2%
NIHR Senior Investigator/Clinical Excellence Award	129	1%
Order of Chivalry (eg OBE)	59	0%
Other award	2	0%
Personally invited as speaker at a conference	6,534	48%
Poster/abstract prize	638	5%
Prestigious/honorary/advisory position to an external body	1,557	11%
Research prize	1,463	11%
Total	13,631	100%

Figure 1: *Distribution of type of award and recognition*



Endnotes

1. All primary, peer-reviewed publications that were published in refereed journals from 01.01.06 onwards, in which the PI or members of their research group were named as authors.
2. Where more than one award claims to have contributed to a publication, each is credited equally. This means that several thousand publications are counted multiple times.
3. Researchers reporting a collaboration via Researchfish can list any number of partner organisations as party to that collaboration. For the purposes of this summary analysis all partners across all collaborations are referred to as 'collaborators' linked to an award. So if two collaborations, each involving two partner organisations, are attributed to an MRC award, it is noted that four 'collaborators' are linked to this award.
4. In this analysis, the occurrence of non-unique collaborators from different locations is counted, so for example, if three MRC researchers indicated that they collaborated with the same partner in North America, this would be counted three times. Collaborators with more than one location, for example, the United Nations, or multi-national companies, are categorised as 'global'.
5. Each map has a number of circles and each circle's size represents the number of non-unique collaborators reported with each particular country. Global collaborations are also listed and the scale is noted.
6. This is the estimated expenditure of further funding during the time frame of Researchfish, rather than a reported commitment of further funding. Estimates of expenditure are based on the assumption that the spending is distributed evenly over the period reported. For example, if a researcher reported £100k of funding from 1 December 2012 until 1 December 2014, it is estimated that 50 per cent of this award or £50k will have been spent in the period covered by the 2013 data-gathering period.
7. Reported in Researchfish.
8. Discounting the 'other' category.
9. Researchers are advised to report any recurring activities only once.
10. The range of options in this section changed in 2012 to include activities where the audience was primarily academic, however, MRC researchers are still advised not to report these.
11. The time between the start of the award and the influence being reported.
12. The time between the start of the award and the intellectual property being reported.
13. A study of over 1200 patents published by the University of California and the University of Columbia in all disciplines between 1980 and 1994 found that 41 per cent of these were licensed by 1992. A similar study of 686 patents published by the Memorial Sloan-Kettering Cancer Centre and Dana Faber Cancer Institute between 1983 and 2003, also found that 41 per cent of these were licensed by 2007. Other studies have indicated a lower proportion of patents licensed (for example, 25 per cent of NASA patents published between 1994 and 2002 were licensed by 2007).
14. www.mrc.ac.uk/documents/xls-csv/spin-out-company-list/