Starter Grants for Clinical Lecturers: Research outputs and impact, 2016

December 2016

The **Academy** *of* **Medical Sciences**

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Contents

Executive summary

In 2008, the Wellcome Trust and the Academy of Medical Sciences launched the Starter Grants for Clinical Lecturers funding scheme; the first awards were made in 2009. These awards – which are of up to £30,000 over two years – address a key gap in biomedical funding in the UK, allowing doctors in training to maintain their research momentum following their PhD. The Starter Grants scheme provides much-needed financial support to enable trainees to secure preliminary data to develop further applications for substantive research funding awards.

Since the launch of the Starter Grants, a funding consortium has been formed to support the scheme; currently, comprising the Wellcome Trust, Medical Research Council, British Heart Foundation, Arthritis Research UK, Diabetes UK and Royal College of Physicians, to whom we are grateful for their continued support. Since 2009, 346 Clinical Lecturers have been supported through the scheme.

It is important for the Academy and its partner funding organisations to capture the outcomes of the research we fund, to ensure that our schemes are fit for purpose. This report demonstrates the outputs and impact of the Starter Grants for Clinical Lecturers scheme through quantitative analyses of data captured via Researchfish as of early 2016, and narrative case studies drawn from five awards. This report complements an independent evaluation of the scheme, which was completed earlier this year and covered all applicants – both successful and unsuccessful – to the scheme at that time.

In 2013, the Academy adopted the Researchfish platform to gather output and impact data from the grants it awards; we require award holders to submit information annually through the portal throughout the lifetime of their award and for at least three years afterwards. Starter Grants award holders first reported via the system in 2014 and, to date, 220 of the 346 Starter Grant awards have been captured in one or more reporting window; those that have not either pre date the adoption of the system or were awarded in 2016.

New Starter Grants outputs – 2015/16

These new outputs were reported to us between 01 April 2015 and 31 March 2016 and are additional to those contained in our previous Researchfish reports, published in 2014 and 2015. In this submission window we received reports from 207 Starter Grant award holders – 138 of whom were live award holders, some of whom had only recently received their grants, and 69 completed awards.

- £22.7m in follow on funding
- 337 publications
- 7 Clinician Scientist Fellowships
- 63 awards, prizes and other markers of esteem
- 93 new collaborations
- 24 instances of influencing policy

Aims of the report

This report aims to summarise the outputs and impact of our Starter Grants for Clinical Lecturers scheme in terms of research and career progression. The report brings together quantitative analyses of Researchfish data and narrative case studies drawn from awards that are either ongoing or recently completed.

The data collected via Researchfish provide a snapshot of 220 of the 346 Starter Grant awards up to the end of our most recent submission window, which ended on 31 March 2016. Award holders invited to use Researchfish were asked to submit research outputs that were a direct consequence of their Starter Grant award and had occurred up to the submission deadline. Consequently, awards that started in 2016 (i.e. Rounds 14 and 15) will not feature in this report; these will be captured in the 2017 submission period.

We have previously produced reports using Researchfish data captured in past submission windows. The quantitative analyses presented in this report primarily focus on newest the outputs from 207 awards captured in the most recent submission window, but will also make reference to the cumulative outputs data gathered to date.

Case studies complement the quantitative analysis by exploring single awards in greater detail, and beyond the most recent submission window. Each case study presents the research supported through the Starter Grant and the impact of the award on the award holder's career.

Background

Starter Grants for Clinical Lecturers

Starter Grants for Clinical Lecturers offer modest 'starter' funds to enable research active Clinical Lecturers to pursue their research. Clinical Lecturer posts provide a salary but often do not come with funding to support research costs; the Starter Grants scheme was designed to help bridge this gap. Each Starter Grant provides up to £30,000 towards research costs for up to two years. Award holders are encouraged to take advantage of the Academy's mentoring scheme and other career development activities.

The scheme was launched in October 2008 as a partnership between the Academy and the Wellcome Trust. Since then, further funders have added their support to the scheme, creating a funding consortium that has consisted of: the Wellcome Trust, the Medical Research Council, British Heart Foundation, Arthritis Research UK, the Royal College of Physicians, Diabetes UK and Prostate Cancer UK (2013-2015)[1].

The Starter Grants Selection Panel meets twice yearly and supports on average 45 new Clinical Lecturers each year, awarding over £1.3 million annually. To date, 346 Clinical Lecturers have been awarded over £9.8m through 15 grant rounds. The scheme funds a wide variety of research relevant to human health and supports Clinical Lecturers from a wide range of clinical specialities, which are summarised in Table 1. The number of awards and the gender statistics for rounds 1 to 15 are presented in Figure 1; the geographic distribution of these awards is outlined in Figure 2.

Starter Grants numbers at a glance

15 grant selection panels

£9.8m awarded in grants

346 grant awardees

104 female 242 male

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[1] The number of applications received within Prostate Cancer UK's (PCUK) research remit in 2013-15 was lower than anticipated. Discussions with researchers in the field revealed that this was primarily due to the paucity of Clinical Lectureships awarded to urologists over this period, which restricted the number of eligible clinical academics working in areas relevant to PCUK. PCUK left the consortium to focus efforts on increasing the number of Clinical Lectureships in these areas.

Table 1 – Clinical Speciality of Starter Grant holders reporting in the 2015/16 submission, and in total (i.e. Rounds 1 to 15).

| Awardee clinical speciality	Reporting in 2015/16	Total awardees
Surgery	34	49
Neurology	15	34
Oncology	14	26
Respiratory Medicine	13	18
Cardiology	11	29
Nephrology	11	21
Psychiatry	10	18
Obstetrics and Gynaecology	10	15
Paediatrics	10	12
Ophthalmology	8	12
Gastroenterology	7	8
Infectious diseases	6	13
Dentistry	5	8
Pathology	5	7
Anaesthetics and Intensive care	5	6
Public Health	5	6
Rheumatology	5	6
Haematology	5	5
Urology	4	8
Endocrinology	3	11
Clinical Genetics	3	7
Trauma and Orthopaedics	3	5
Clinical Pharmacology	3	3
Geriatric Medicine	2	3
Palliative Medicine	2	3
Radiology	2	3
Hepatology	2	2
Dermatology	1	3
Immunology	1	2
General Practice	1	1
Otolaryngology	1	1
Tropical medicine	0	1
Grand Total	207	346
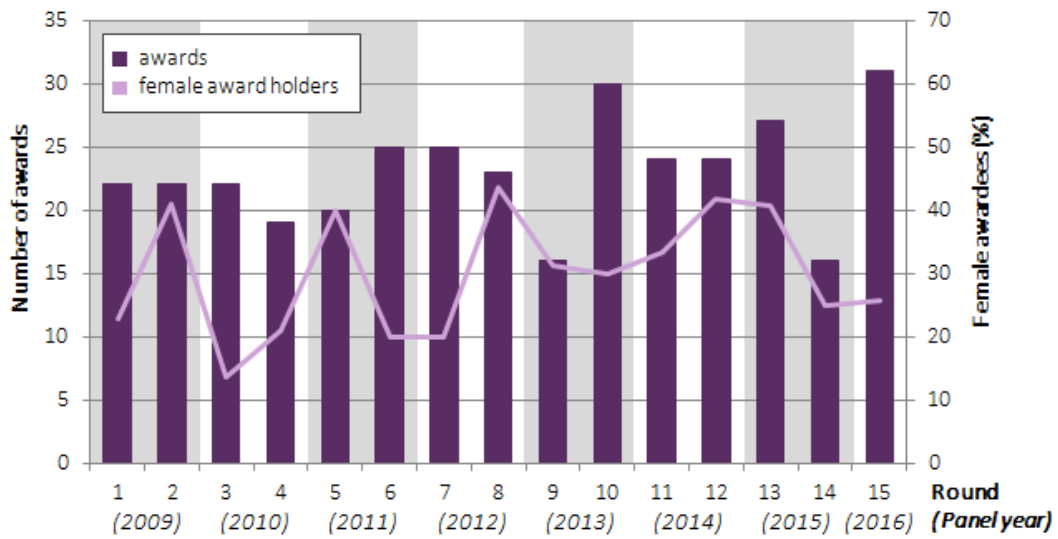
Figure 1 - Funding round awards made (right axis) and gender breakdown (left axis).
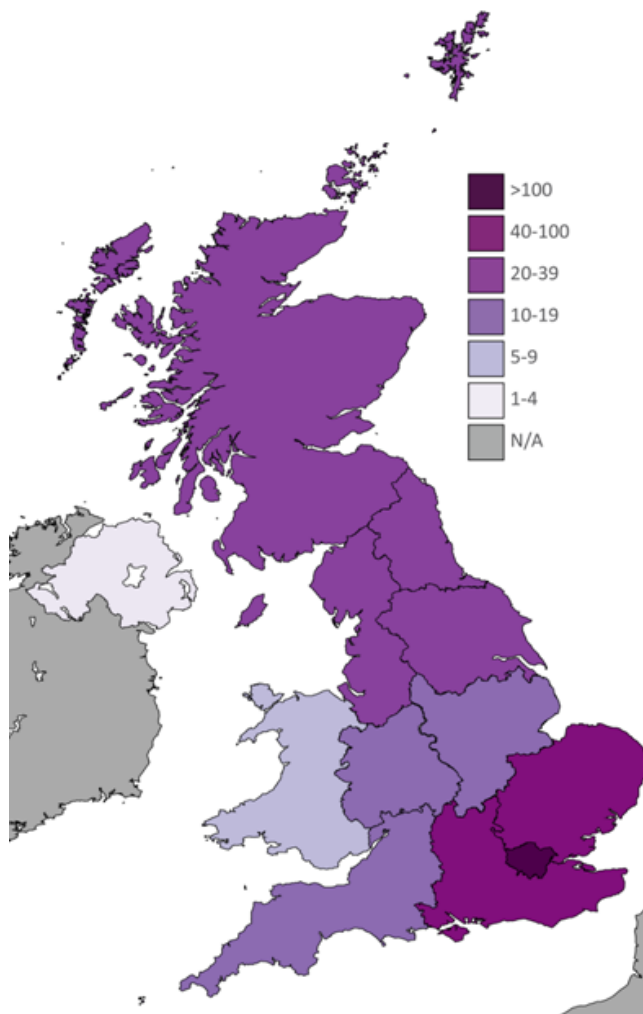

Figure 2 - Geographic distribution of award holders (created with mapchart.net©.)

Researchfish data capture

The Academy adopted Researchfish in 2013 as the sole reporting system for its grant schemes, replacing end of grant reports. Award holders are **required** to submit data to Researchfish annually throughout the lifetime of their grant, and the year immediately following the close of their award; they are also **requested** to continue doing so for three years after their award finishes. Researchfish submissions are completed between January and March of each year.

As we adopted Researchfish four years after the launch of the Starter Grants scheme, not all awards have been captured on the system. Of the awards that started prior to 2016, 64% have reported on their award via the Researchfish to date, with 96% of awards from Round 5 (June 2011 Panel) onwards being captured on the system (Figure 3). Starter Grants awardees whose award started in 2016 (i.e. Rounds 14 and 15) will make their first report to us in 2017.
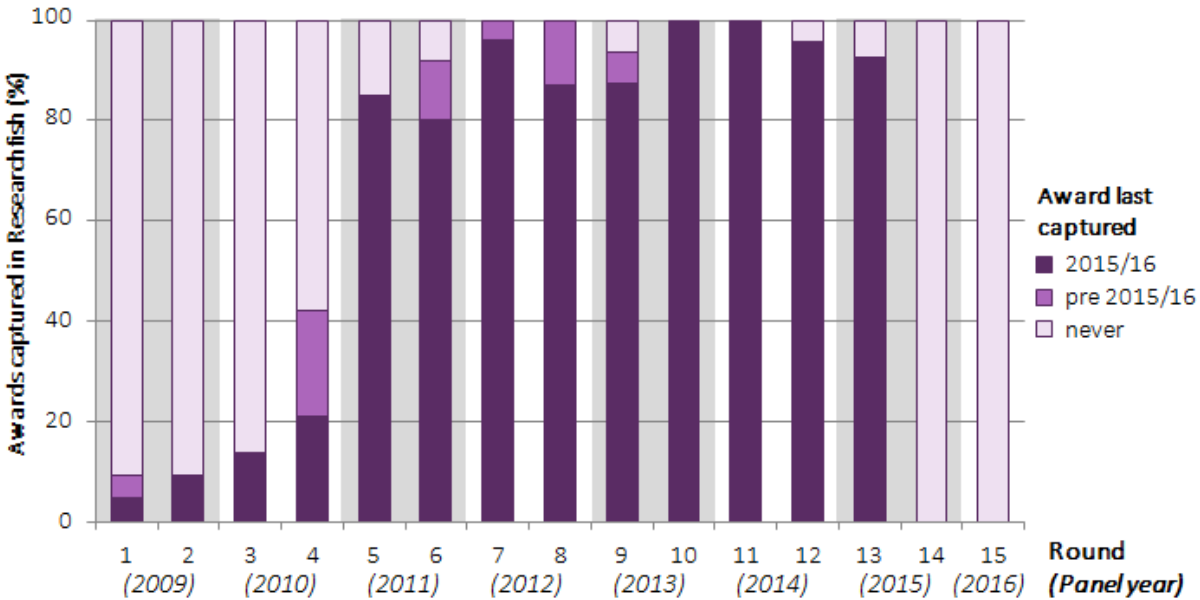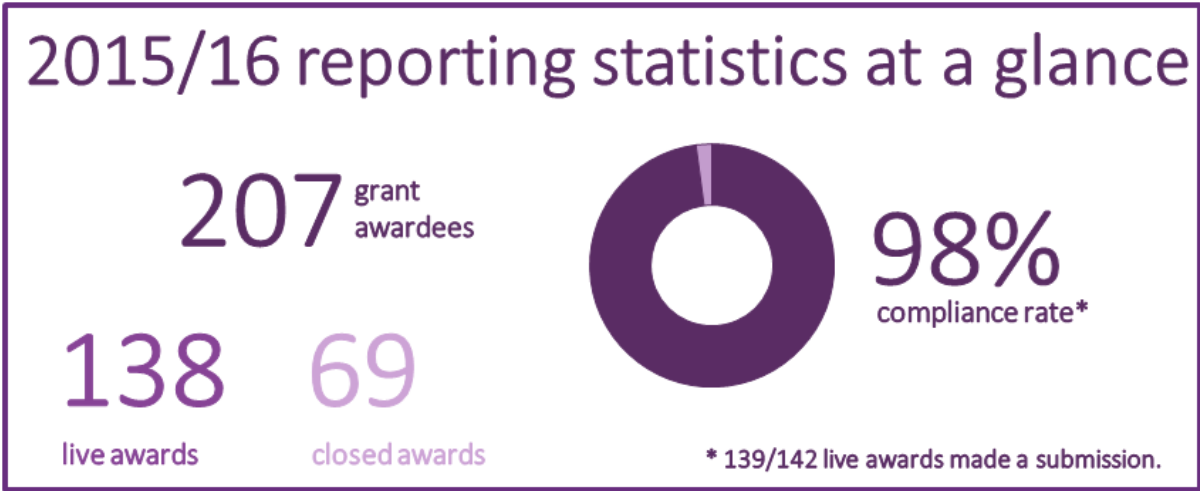

Figure 3 – Coverage of Starter Grants round in the Researchfish data as of 2015/16.

Outputs and impact

The Academy is an authoritative voice on the development of training and career pathways, and a source of personal support for early-career biomedical researchers. Our Starter Grants for Clinical Lecturers scheme aims to support early-career researchers and thus nurture the next generation of leading medical researchers. Through our policy activities, we also seek to positively influence the research culture, such as through our recent policy reports on Team Science and Research Reproducibility.

In this section, we discuss outputs that were reported through Researchfish, which demonstrate the impact of the scheme in generating new knowledge and enabling the development of our Starter Grant holders. For this, we focus primarily on the publications produced, the further funding leveraged as a result of this scheme, and career progression. We also look to the collaborations, markers of esteem, and influences on policy and practice reported to us for further indicators of research quality and esteem.

Awardees were asked to report outputs that arose as a result of their Starter Grant award. We rely on award holders to make accurate reports; data were cleaned prior to analyses to remove records that could not have occurred as a result of the grant (e.g. publications arising before the award start date) but there could remain some inaccuracies and omissions. Because research is a collaborative endeavour, some of the outputs presented here may also have been supported by additional awards.

Notes on the analysis

Three time periods have been used for analysis of the Starter Grants Researchfish data, which span rounds 1 to 13 of the scheme:

- **2015/16** – new outputs first submitted in the 2016 submission window (i.e. between April 2015 to March 2016).
- **To date** – all data submitted to us via Researchfish since its adoption in 2013.

In addition to the above, trend analyses will draw upon the data reported 'to date' by award holders from round 5 (June 2011 Panel) to round 13 (June 2015 Panel), where the majority of awards have been captured via Researchfish (Figure 3).

Awardees report to us both during their award and after it has completed. References are made to live and closed awards in this report, which are defined as follows:

- **Live** – award with an end date occurring after 31 March 2015 (i.e. the end of the previous submission window).
- **Closed** –award with an end date occurring on or before 31 March 2015.

Publications

New outputs captured in the 2015/16 submission window:

- Awardees reported **337** publications stemming from their Starter Grants award:
    - **307** of these were peer-reviewed journal articles,
    - **22** conference proceedings and abstracts, and
    - **8** books or book chapters.
- A further **49** publications were *in press* as of 31 March 2015 – these are not discussed further in this report but will be included in the 2016/17 data analysis in next year's report.
- The most popular journal in which our awardees published was the *British Journal of Surgery* (Table 2).

In 2015/16, publications were reported by award holders belonging to 29 of the 31 medical specialities represented in the Researchfish data that year. Table 3 shows the disciplines with the highest number of reported publications this year. Award holders specialising in surgery, psychiatry, paediatrics, cardiology and neurology were together responsible for over half (55%) the publications reported in 2015/16. The association between a medical speciality and the number of publications reported tends to be a reflection of the number of award holders working in that area. The ten specialities with the highest number of awardees reporting (recall Table 1) all featured amongst the specialities with the most publications (Table 3). The elevated number of publications in the two medical specialities that feature in this ranking despite having relatively fewer award holders – pathology and geriatric medicine – is due to a number of highly productive individuals, with four award holders across these two specialities each reporting six or more publications in 2015/16 alone.

Table 2 – Journals in which Starter Grants holders published in 2015/16.

Journal	Publication instances
British journal of surgery	6
Arteriosclerosis, thrombosis, and vascular biology	4
European journal of surgical oncology	4
Journal of neurology, neurosurgery & psychiatry	4
Nature communications	4
Psychological medicine	4
Scientific reports	4
Trials	4
Colorectal disease	3
EBioMedicine	3
Journal of the American college of cardiology	3
Methods in molecular biology	3
NeuroImage	3
Pediatric surgery international	3
Schizophrenia bulletin	3
The international journal of tuberculosis and lung disease	3
Remaining 214 journals	*249*
Total	**307**

Table 3 – Clinical specialities that reported the most new publications in 2015/16.

Clinical speciality	Publications	Award holders reporting
Surgery	69	34
Psychiatry	41	10
Paediatrics	28	10
Neurology	24	15
Cardiology	23	11
Pathology	23	5
Nephrology	11	11
Ophthalmology	11	11
Respiratory medicine	10	13
Geriatric medicine	9	2
Obstetrics and gynaecology	9	10
Oncology	9	14
Remaining 19 specialities	*70*	*61*
Total	**337**	**207**

To date, the 220 Starter Grants award holders that have made Researchfish submissions have reported a combined total of 986 publications. Figure 4 shows the publications reported to us to date, according to the year of publication. The number of new publications has continued to increase year-on-year but the rate of increase has begun to slow. This is in line with expectations as Starter Grants fund projects for up to two years and the awards on Researchfish have now matured since its adoption three years ago.

Focusing on the publications to date from awards in rounds 5 to 13 – where the majority of awards have now been captured in Researchfish – reveals longitudinal trends. There are two Selection Panels each year with meetings held every six months; grouping Starter Grants awards by round therefore clusters these within half yearly intervals since the start of award. Going from the most recent to the oldest awards (i.e. round 13 to round 5) reveals a general increase in the number of publications reported to date (Figure 5, upper panel). As the number of awards made in each round varies (see Figure 1), these data were normalised to the number of awards per round captured in the Researchfish data to date (Figure 5, middle and bottom panels). Both the proportion of award holders with publications, and the average number of publications per award holder increases as their award matures. The proportion of awardees reporting publications stemming from their Starter Grant begins to plateau approximately three and half years after the start of the award (i.e. rounds 5 to 7). Focusing on the data from rounds 5 to 7 highlights that the vast majority (88%) of awardees produce publication(s) linked to their Starter Grant, with an average of 7 linked publications reported per award holder.
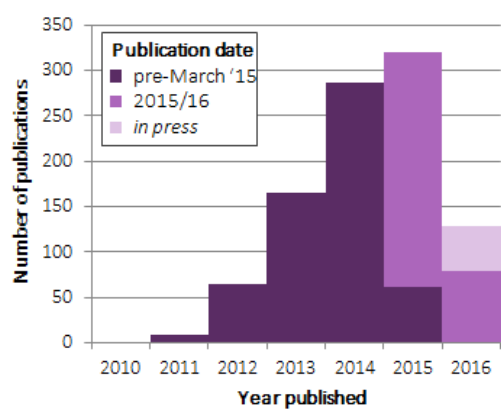

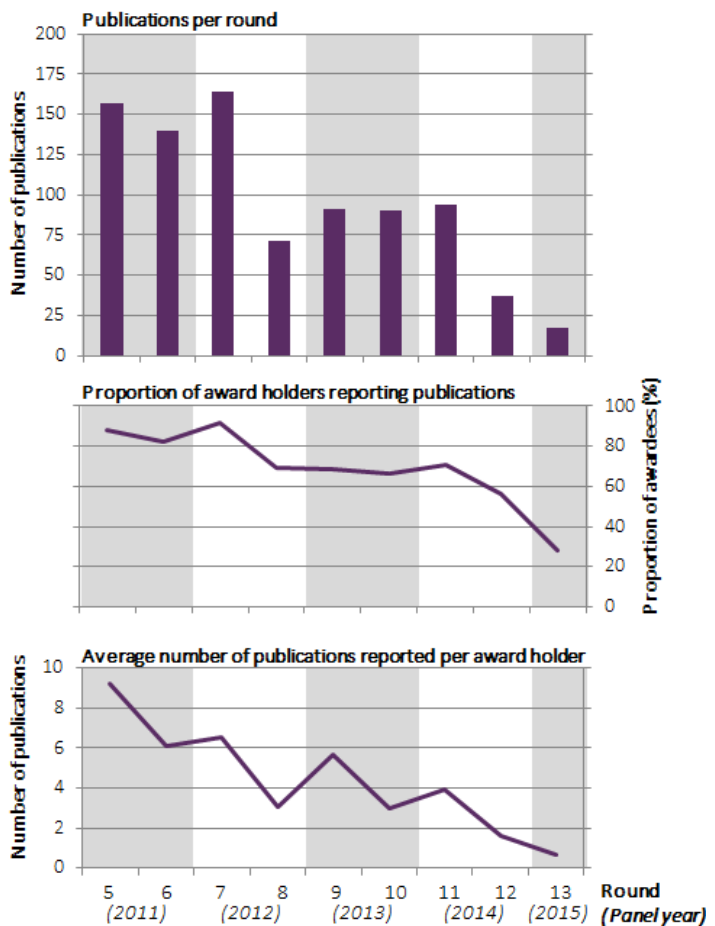**Figure 4** – Publications reported by Starter Grants award holders to date

Figure 5 - Publication trends for rounds 5-13 using data collected to date. Middle and lower panel analyses are based on the total number of award holders in each individual round that have made a Researchfish report to date.

Further funding

New outputs captured in the 2015/16 submission window:
- **£22.7m** of further funding was leveraged by 74 awardees.
- **97%** of further funding awards came from UK-based organisation.
- The majority of funding awards came from the **charity/non profit** and **public sectors** (60 and 37%, respectively).
- **£452k** of further funding was secured from private/industry sources.
- Starter Grants funders contributed **£12.3m** (54%) of the further funding secured by award holders (Figure 6; Table 4).

Most of the further amount funding secured in 2015/16 comes from research grants and fellowships – together these award categories account for 77% of the further funding instances (Figure 7) and 98% of the further funding amount. The majority of the further funding awards were small grants but Starter Grants holders also succeed in securing large research grants and fellowships – 30% of the awards had a value exceeding £500k (Figure 8). It should be noted that further funding as currently reported via Researchfish does not include a record of the share of award where there are co-Investigators. In particular, sums relating to project and programme grants – both of which fall under the 'Research grant' header in the figures below – may be shared across the Starter Grant holder and other investigators. In 2015/16, £12.4m of the further funding reported to us came from such grants.
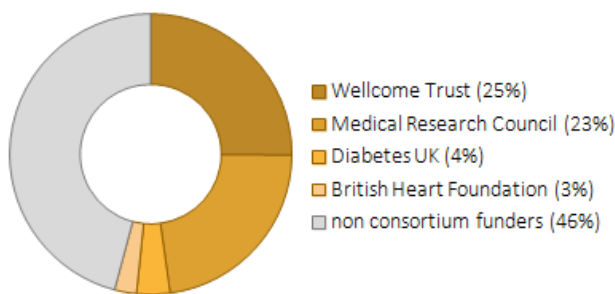

Wellcome Trust (25%)
Medical Research Council (23%)
Diabetes UK (4%)
British Heart Foundation (3%)
non consortium funders (46%)

Figure 6 – Starter Grants consortium member contributions to the further funding amount reported in 2015/16.

Research grant (50%)
Fellowship (27%)
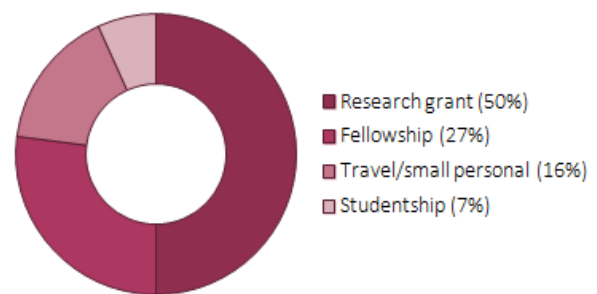Travel/small personal (16%)
Studentship (7%)

Figure 7 – Funding type of individual awards reported in 2015/16 as a proportion of the number of awards.

Table 4 – Top ten organisations providing further funding to Starter Grants holders in 2015/16.

Organisation	Sum of award(s)
Wellcome Trust	£5,699k
Medical Research Council	£5,147k
Yorkshire Cancer Research	£2,997k
Engineering and Physical Sciences Research Council	£2,110k
Medical Research Foundation	£1,275k
National Institute for Health Research	£1,123k
Diabetes UK	£871k
Stroke Association	£616k
British Heart Foundation	£575k
CHDI Foundation	£400k
Remaining 37 funders	£1,882k
Total	**£22,694k**

over £1m (9%)
£751-£1m (7%)
£501k-750k (5%)
£251k-£500k (9%)
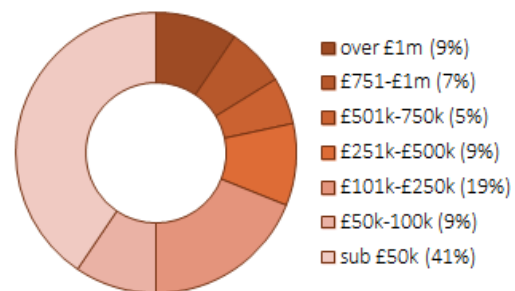£101k-£250k (19%)
£50k-100k (9%)
sub £50k (41%)

Figure 8 – Value of individual awards received in 2015/16 as a proportion of the number of awards.

Note: percentages may not add up to 100% due to rounding.

To date, 46% of the 220 Starter Grants awardees that have reported via the system have indicated leveraging further funding as a result of their award, with awards totalling over £54m (Figure 9).

Focusing once again on the normalised data reported to date for awards from rounds 5 to 13 reveals longitudinal trends. The proportion of Starter Grants award holders reporting further funding as a result of their award increases with the time since the start of award, with approximately half of the award holders from rounds 10 and earlier having reported further funding (Figure 10, middle panel). This suggests that roughly half of Starter Grants award holders go on to secure further funding as a result of their award, with the first instance of further funding usually being secured within two years of the start of their award. The average amount of further funding per award holder, however, continues to increase after this time point (Figure 10, bottom panel). This suggests that award holders are initially obtaining other small grants to support their research soon after securing their Starter Grant; whereas they then go on to secure larger and longer term funding (e.g. Clinician Scientist Fellowships) a few years later. This is consistent with the Starter Grants scheme's aim to enable Clinical Lecturers to produce preliminary data to support applications for large competitive grants.

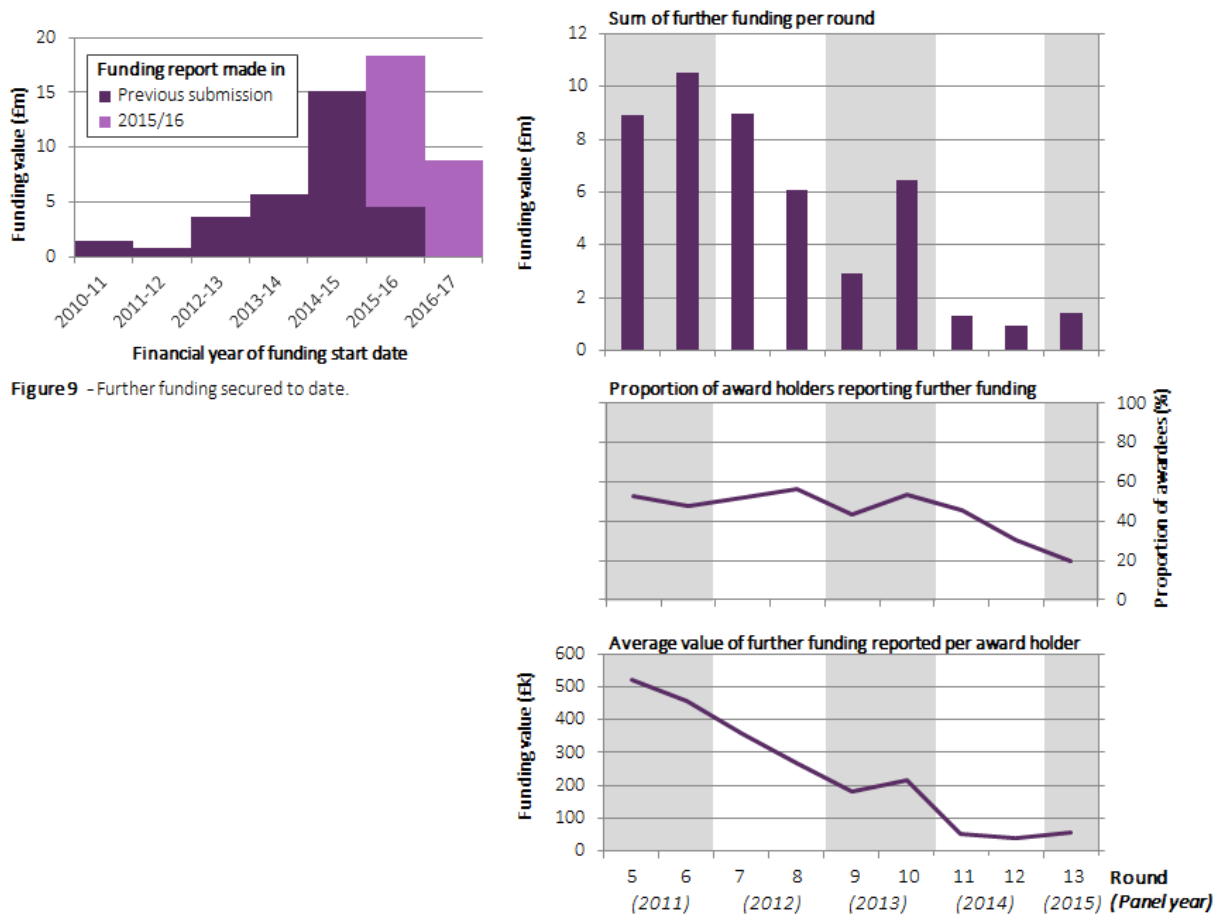Figure 9 – Further funding secured to date.

Figure 10 – Further funding trends for rounds 5-13 using data collected to date. Middle and lower panel analyses are based on the total number of award holders in each individual round that have made a Researchfish report to date.

Capacity building

At the present time, career progression data is not systematically captured via Researchfish; a career tracker is currently being considered for development for the system, and is likely to come online in 2018. Some career progression data is, however, collected indirectly when Starter Grant holders report securing large personal fellowships to us as part of their further funding. Pending the development of a career tracker function in Researchfish, we also introduced a funder-specific question regarding promotions in this submission window.

New outputs captured in the 2015/16 submission window:
- Awardees reported securing **15** large personal fellowships, of which there were:
    - **7** Clinician Scientist Fellowships, and
    - **8** post-doctoral clinical fellowships.
- Awardees secured **5** studentships for junior researchers working with them.

The above awards take the total number of senior fellowships reported to us via Researchfish to date to 21 Clinician Scientist Fellowships (or equivalent awards) and 17 senior clinical postdoctoral fellowships. The number of such Fellowships won by all the Starter Grants awardees is, however, likely to be much higher. This is because the majority of the awardees from rounds 1-4 of the scheme – whose awards closed prior to our adoption of Researchfish – have never reported via the system, and these awards are often secured following the completion of a Starter Grant.

In 2016, we introduced a funder specific question that asked award holders if they had secured a promotion; if so, award holders were also asked to provide details of that promotion, which could then be manually coded for whether or not it is a research active role. We thus obtained data from the 69 closed and 138 live awards captured in this submission window (Figure 11). Of those Starter Grant holders whose award was closed, 87% reported securing promotions, with 85% of these promotions being research active roles (e.g. Senior Lecturer). The proportion of award holders reporting promotions increases with time since the grant start date; a greater proportion of those from the earlier rounds, and from closed awards, reported securing promotions (Figures 11 and 12). However, a significant proportion of awardees secure promotions whilst their award is still active. Over 40% of the award holders from rounds 9 and 10 combined – where all awards were still live at the close of the submission window – reported securing a promotion, where this data was captured.
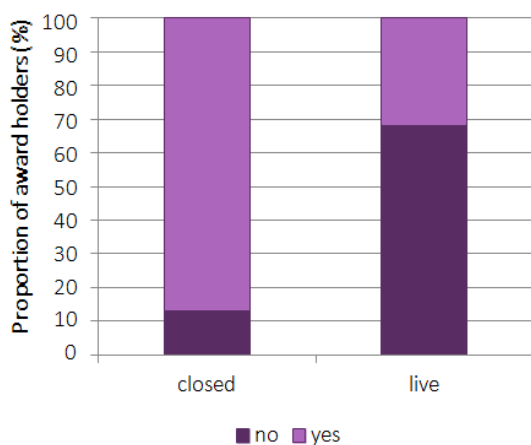

Figure 11 – Proportion of award holders captured in 2015/16 reporting securing a promotion based on award status
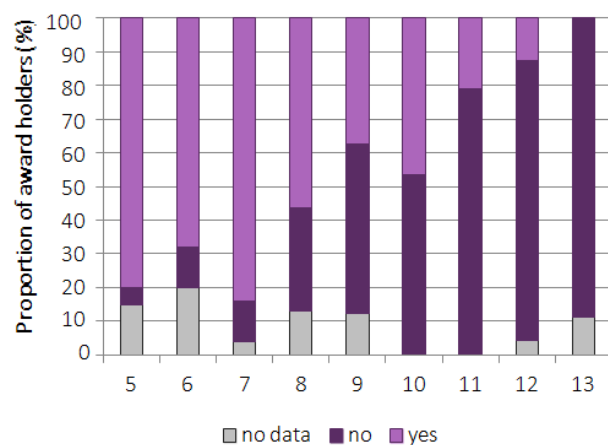
Figure 12 – Proportion of award holders in each round reporting whether they have received a promotion.

Other outputs

In addition to publications and funding, we collect information on the collaborations initiated by our Starter Grants holders, awards and prizes they have received, and their influences on policy and practice. These outputs can serve as indicators of research quality and esteem, and are also of interest to us as they align with our strategic priorities and careers policy activities – in particular, the Team Science report.

Collaborations

New outputs captured in the 2015/16 submission window:
- Award holders reported **93** new collaborations linked to their Starter Grant;
  - **11** of these collaborations were for projects with multiple named collaborators, bringing the total number to **121** new partners.
  - The largest collaboration in terms of number of partners is a clinical research network group bringing together ten UK hospitals and NHS trusts.
- Collaborators were primarily UK-based and with partners in the Academic sector (Figures 14 and 15).

To date, 126 of the 220 (57%) Starter Grant holders whose outputs have been captured via Researchfish reported collaboration(s) linked to their project; together, they have reported 297 collaborations totalling 379 partners.
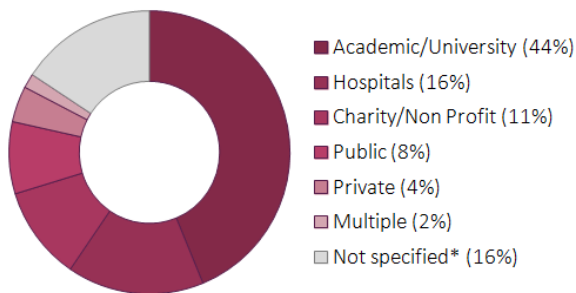

Academic/University (44%)
Hospitals (16%)
Charity/Non Profit (11%)
Public (8%)
Private (4%)
Multiple (2%)
Not specified* (16%)

Figure 14 – Sector of newly reported collaborating partners in 2015/16.

UK (46%)
North America (15%)
Europe (12%)
Africa (8%)
Asia (1%)
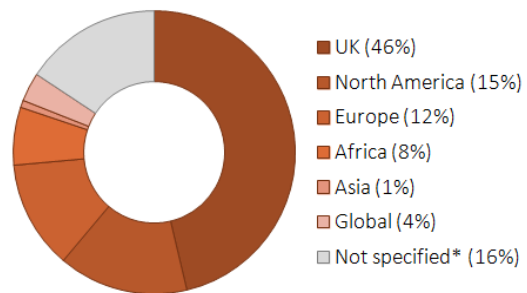Global (4%)
Not specified* (16%)

Figure 15 – Location of newly reported collaborating partners in 2015/16.

Notes: Collaboration partner sector and location were not reported in all cases. Percentages may not add up to 100% due to rounding.

Policy influences

New outputs captured in the 2015/16 submission window:
- Starter Grant holders reported **24** new activities influencing policy and practice (Table 5)
- 87.5% of these influences were at the **National level**, with the remaining at the local or European level.
- Two grant holders reported their participation in Academy careers policy activities to influence the training of practitioners or researchers, sitting on the SUSTAIN reference group and participating in the researcher workshop for our Team Science report.

Table 5 – New influences on policy and practice reported in 2015/16.

Type of influence	Instances
Influenced training of practitioners or researchers	8
Membership of a guideline committee	5
Participation in an advisory committee	5
Gave evidence to a government review	2
Citation in clinical guidelines	1
Citation in other policy documents	1
Citation in systematic reviews	1
Participation in a national consultation	1
Total	**24**

To date, 36 of the 220 (16%) Starter Grant award holders who have made Researchfish reports have reported a total of 62 policy influences. The most frequently reported influence types were influencing the training of practitioners or researchers, and participation in advisory committees.

Awards and markers of esteem

New outputs captured in the 2015/16 submission window:
- **31** Starter Grant holders reported receiving **63** new awards or other markers of esteem.
- Together, personal invitations to speak at conferences, research prizes and poster/abstract prizes accounted for 81% of the instances reported (Figure 16).
- Starter Grant holders also reported **11** appointments to external bodies or editorial boards.

To date, 80 of the 220 (36%) award holders whose awards have been captured via Researchfish have reported at total of 228 awards and esteem markers.

■ Personally invited as conference speaker (35%)
■ Research prize (27%)
■ Poster/abstract prize (19%)
□ Honorary/advisory position to an external body (13%)
□ Appointed as editor to a journal (5%)
□ Attracted visiting staff (2%)

Figure 16– Distribution of award types reported in 2015/16.
Note: percentages may not add up to 100% due to rounding.

Case studies

In this section, we present narrative case studies from selected Starter Grants holders. These case studies complement the quantitative analyses of Researchfish data by exploring single awards in greater detail, and beyond the 2015/16 reporting window. Awards were selected to cover a range of research areas, institutions, award holder medical specialities and gender. The selected case studies are from awards ranging from rounds 7 to 11 (i.e. awarded between 2012 and 2014) and so capture awards that are either ongoing or recently completed.

The selected award holders were asked to complete a short questionnaire on the research that is, or was, supported through their Starter Grant, and the impact of this award on their career. Each case study presented here is structured to recall the initial aim and motivation for the Starter Grant project, its progress to date and the impact of the Starter Grant on the award holder's career.

Case studies were drawn from the following awards:

- **Tom Bird**, University of Edinburgh (Round 7)
  Observation of the differentiation of hepatic stem cells into hepatocytes in real time
- **Rachel Clough**, King's College London (Round 8)
  An integrated imaging and modelling approach for individualised treatment planning in aortic dissection.
- **Alastair Lamb**, University of Cambridge (Round 11)
  Advancing sub-classification of prostate cancer populations for targeted molecular treatment
- **Victoria Salem**, Imperial College London (Round 10)
  Evaluation of a novel positron emission tomography (PET) tracer for the direct measurement of brown adipose tissue (BAT) thermogenesis
- **Ed Vital**, University of Leeds (Round 8)
  Understanding cutaneous responses to rituximab in systemic lupus erythematosus

Tom Bird

Observation of the differentiation of hepatic stem cells into hepatocytes in real time

What did you seek to do with your Starter Grant?

It is thought that liver regeneration is driven primarily by differentiated cells within the liver, which are called hepatocytes. However, until recently, there were also questions over whether stem cells could also help regenerate the adult mammalian liver.

My Starter Grant project aimed to investigate whether precursor cells with stem cell like characteristics could regenerate hepatocytes. I used precursor cells from mice containing a reporter gene that turns on as cells develop hepatocyte-like functions. We grew these cells in culture and watched them to see if, and how, they turned into hepatocytes.

How did it go?

As the project developed I realised that with minor modifications our system could be used to manipulate hepatocytes in mice. This was important because it allowed us to test questions about the regeneration of the whole organ that couldn't be addressed with cells in culture. We engineered a system that allowed us to shut down regeneration by hepatocytes, which made it possible to test whether the potential stem cells could indeed regenerate the liver in their place. When we did this, we saw that the entire liver in the adult mammal could be replaced by the precursor cells. We were also able to transplant lab-grown precursor cells into mice to show that they could successfully regenerate the liver.

These were exciting results that have changed the landscape of the research field: we showed that cells which are present in each and everyone one of us can be used to regenerate the liver. Contrary to the previous consensus, we showed that these cells are capable of widespread regeneration and can be transplanted into adults. The hope in the longer term

is that these cells may be used to regenerate the adult liver and prevent death and the need for transplantation in patients with liver failure; work in my former laboratory is now paving the way for translation into human transplantation studies.

What has been the impact of the award on your career?

The Starter Grant has been absolutely pivotal in allowing me to continue my basic science in the laboratory following completion of my PhD. Without this support it would have been near impossible for me to have performed this work, which went on to form the platform for my successful grant application to the Welcome Trust. It allowed me to continue to develop as a Clinical Academic Hepatologist.

A major challenge in performing this work was balancing my clinical training and service commitments whilst keeping research active. The flexibility of the grant allowed me to defer my research for one year, in order to complete subspecialty clinical training in Liver Transplantation. With strong internal support I was able to continue to get into the lab despite a busy clinical rota.

Research highlights

- Awarded a Wellcome Trust Clinical Intermediate Fellowship.
- *Hepatic progenitor cells of biliary origin with liver repopulation capacity*, published in Nature Cell Biology, 2015.
- Received the Young Gastroenterologist of the Year Award for Clinical & Translational Science prize from the British Society of Gastroenterology in 2015.

Rachel Clough

Starter Grant awarded December 2012
Kings College London

An integrated imaging and modelling approach for individualised treatment planning in aortic dissection.

What did you seek to do with your Starter Grant?

Aortic dissection is a life-threatening condition in which a tear in the wall of the aorta – the largest blood vessel in the body – expands to create a false passage or lumen. Patients are usually 40-70 years old and typically experience sudden chest pain; if left untreated, they may develop stroke, paraplegia, kidney failure or death. Fortunately, the majority of patients survive to hospital discharge but follow-up survival is poor; despite best medical care, overall survival is approximately 50% at 5 years.

Those who survive can have ongoing problems with expansion of the false lumen leading to complications and we want to better understand why some patients fare worse than others. My Starter Grant project was to develop non-invasive methods to evaluate patients with aortic dissection to better understand the characteristics of blood flow and pressure within the false lumen in individual patients. My longer-term aim is to develop patient-specific, personalised treatment for aortic dissection.

How did it go?

One of the challenges to developing non-invasive methods for assessing aortic dissection is first understanding the differences that exist between patients. Our imaging work showed substantial differences between patients in terms of, for example, the velocity, patterns and amount of blood flow, and the wall shear stress in the false lumen. We found that the presence of the aortic dissection significantly increased the effort required by the heart to push blood around the body compared with the healthy aorta, and features such as the number and type of openings between the aorta and the false lumen has

an important effect on how the condition progresses.

To advance the models further so that they will be informative for clinical practice, we also needed a method to accurately measure the material properties of the aortic wall. We therefore developed a non-invasive method to do this called magnetic resonance elastography.

What has been the impact of the award on your career?

The Starter Grant award has made a significant impact on my career by providing mentoring, career development activities and allowing me to perform high quality research. Through this project I developed collaborations with other scientists and industry; this also led to further funding to support and develop the project and fund personnel. Throughout the course of the award I have been able to develop significantly as a clinical academic.

Research highlights

- Awarded a prestigious fellowship from the Conseil National des Universités that funded an out of programme training year post in Lille, France.
- Won the Poster Prize at the Academy's Winter Science Meeting for Clinical Lecturers, 2014.
- Currently preparing an agreement with Cook Medical to obtain $3.8m towards an international registry evaluating new technologies for aortic disease.

Alastair Lamb

Starter Grant awarded June 2014
University of Cambridge

Advancing sub-classification of prostate cancer populations for targeted molecular treatment

What did you seek to do with your Starter Grant?

Prostate cancer is a disease that varies in its aggressiveness however it is difficult to predict progression and whether treatment is necessary. Often the current treatments can have life-long repercussions for patients, such as impotence. The aim of my research is to help identify those men who have highly aggressive prostate cancer and therefore need treatment and close monitoring thereafter, while allowing those with non-aggressive disease to have the confidence to undergo less intensive treatment – or avoid it altogether.

My Starter Grant project was linked to the Cambridge Carcinoma of the Prostate (CamCaP) study, which analysed tissue samples from men who have undergone surgery for prostate cancer. Our project aim was to identify sub-groups of prostate cancers based on their 'molecular' profile – that meant looking at the patterns of genes that are turned on/off, or have mutations, in the prostate.

How did it go?

We identified five different groups of men with prostate cancer using our molecular approach. This included two groups with early prostate cancer that had high levels of genetic changes in their prostate, which is something we usually associate with much more advanced disease. These two groups also had much higher rates of relapse; we therefore think that men falling into these groups should be monitored more closely following surgery.

The five prostate cancer groups have proven to be very interesting and we are continuing to investigate these. The next step for us is to identify which changes best explain the differences between these groups, and determine how these drive the cancer.

What has been the impact of the award on your career?

My project is currently on hold while I spend a year in Melbourne for a robotic surgery training fellowship. The Starter Grant has so far enabled me to lead to completion the key publication from the CamCaP Study Group. It has also been integral to preparing applications for further funding, including a CRUK Clinician Scientist Fellowship application. My intention is to secure an academic position in a leading urology unit along with independent funding to continue research along these lines.

Research highlights

- *Integration of copy number and transcriptomics provides risk stratification in prostate cancer: A discovery and validation cohort study*, published in EBioMedicine, 2015.
- Collaborated with the Karolinska Institute on a study to identify gene regulatory mechanisms underpinning prostate cancer susceptibility.
- Invited review in Future Oncology on the topic of molecular classification.

Victoria Salem

Starter Grant awarded December 2013
Imperial College London

Evaluation of a novel positron emission tomography (PET) tracer for the direct measurement of brown adipose tissue (BAT) thermogenesis

What did you seek to do with your Starter Grant?

Diabetes rates continue to rise in the Western world and the illness can bring devastating consequences including limb loss and blindness. The major contributor to the rise in Type 2 diabetes is obesity, arguably the world's greatest modern health crisis. At the moment the only realistic cure for obesity-linked diabetes is bariatric surgery – a major and life changing operation. My research aims to safely re-create the effects of surgery by modifying natural hormones to reliably induce long term weight loss and reverse diabetes.

A special type of fat called brown adipose tissue (BAT) is known to accelerate metabolism when activated - it burns calories to produce heat. There is much research into drugs designed to activate BAT to aid weight loss. With my Starter Grant, I researched new compounds that would help us image BAT in humans, making it easier for us to measure it and the effects of different BAT activators. I also studied whether a hormone called glucagon activates BAT in humans. This type of knowledge is vital for the development of safe and effective cures for obesity and diabetes.

How did it go?

I found that the hormone glucagon does raise calorie burning in humans, but not through the activation of BAT. This was personally a very satisfying piece of research, because we now know a little more about how the human body works than we did before! More importantly though, we know that this hormone has potential as an anti-obesity treatment, but there is still work to be done to properly understand how it works so we can be sure that it is safe.

I am still working on a new chemical that can be given to human volunteers before they have a PET scan that will help us to visualise their brown fat stores. This is an exciting opportunity for me to work with the radiochemists at Imperial College. If we are successful, we will have designed a new tool to help all BAT investigators better visualise BAT physiology.

What has been the impact of the award on your career?

My NIHR Clinical Lectureship gave me protected time to pursue my research interests but little funds for research consumables. At the same time I had to finish my specialist training in Diabetes, Endocrinology and General Internal Medicine, juggling long hours at the hospital as well as being mum to my three young children. This grant was instrumental in allowing me to keep my research going and maintain the competitive edge that I needed to apply for larger intermediate fellowships.

I won the grant early on after my PhD and the panel feedback was exactly what I needed to keep my confidence up and pursue a clinical academic career.

Research highlights

- Awarded the first ever Diabetes UK Harry Keen Intermediate Clinical Fellowship.
- *Glucagon increases energy expenditure independently of brown adipose tissue activation in humans*, published in Diabetes, Obesity and Metabolism, 2015.
- Oral Plenary talk at the Academy's Winter Science Meeting for Clinical Lecturers, 2015.

Ed Vital

Starter Grant awarded December 2012
University of Leeds

Understanding cutaneous responses to rituximab in systemic lupus erythematosus

What did you seek to do with your Starter Grant?

I research skin disease in patients with Systemic Lupus Erythematosus (SLE), a disease that can cause inflammation in many organs. It can result in skin rashes or arthritis, but it can also affect internal organs such as kidneys. I was investigating patient response to treatment with a drug that depletes immune cells called B cells. I had previously found that this therapy was effective for most symptoms, but response was more variable in skin disease – some patients even experienced worsening in their skin while other organs improved. This suggested that the immune cause of different aspects of the disease may differ, and that the same treatment might not be right for all patients.

I used my Starter Grant to gather more detailed data on responses in the skin from a larger group of patients, in which I also looked for immune changes in the blood. The aim was to better understand when B cell treatments are likely to work, and get clues as to what type of treatment should be used in patients where it is not effective.

How did it go?

We usually think that treatments that deplete B cells are best, but my findings suggested that completely different drugs might be needed in some cases. A traditional view of SLE is that B cells are somehow responsible for most of the inflammation in organs, but I identified patients with classic lupus skin inflammation despite their blood having been depleted of B cells due to the treatment. This suggests that there is "B cell independent inflammation" in some lupus patients.

What has been the impact of the award on your career?

The Starter Grant allowed me to clarify my hypotheses and develop expertise in new research areas to pursue longer term projects. I used the results I obtained to design a clinical trial that formed part of my successful application to NIHR for a Clinician Scientist fellowship, and to design a larger study as part of a national consortium funded by the Medical Research Council. I also designed a clinical trial to try a different approach to treat the types of skin lupus that won't improve with B cell depletion; that study has been funded by the NIHR

When I started this research I was the only member of my department working in SLE. I now have 4 PhD students and 2 post doctoral researchers working in SLE as well as lab technicians and study coordinators and skin disease is a major theme of my group.

Research highlights
- *Responses to rituximab suggest B cell-independent inflammation in systemic lupus erythematosus*, published in Arthritis & Rheumatology, 2015.
- Co-I on MRC-funded stratified medicine consortium grant MASTERPLANS: *Maximising Sle ThERapeutic PotentiaL by Application of Novel and Stratified approaches.*
- Awarded an NIHR doctoral research fellowship to support a PhD student.

Closing remarks

This report has demonstrated, in numbers and narrative, the variety, progress and impact of the research conducted by our Starter Grants holders. Data in this report were taken from the Academy's third Researchfish submission window in early 2016 and show the research outputs reported in the period running April 2015 to March 2016, but also emerging cumulative trends.

The data collected through this submission period shows the continued outputs of our Starter Grant holders. As the awards captured via the system have started to mature, longer term trends are emerging. It is apparent that the overwhelming majority of Starter Grants holders produce publications relating to the research funded by their Starter Grant, and roughly half go on to leverage further funding for their research as a result of the award. Their research is being recognised through awards and prizes, and collaborations are numerous and diverse.

Awardee case studies highlight the range of the projects funded via Starter Grants, which generate new knowledge and tools that have the potential to inform further research and patient care. A common thread throughout the case studies is importance of flexible working in pursuing Clinical Academic careers, with award holders noting having taken breaks in order to meet training or family commitments. The Academy recognises the challenges clinicians face when managing a clinical and a research career with family and caring commitments. During the review process, prior career breaks are taken into account when evaluating a candidate's research output and progress; award holders are also able to apply for no-cost extensions to their grant to account for periods of absence during their award.

The Academy is committed to the career development of early career researchers and remains interested in tracking the career progression of its award holders, including Starter Grants holders. In 2016, we gathered additional data through a funder specific question (i.e. outside the question set common to all funders) in Researchfish, which indicates the success of Starter Grants award holders in securing promotions to further research-active roles, in some instances before the close of their Starter Grants award. Award holders who provided case studies all indicated that the grant helped them in generating data for applications for further funding or more senior research positions.

Together with the independent evaluation of the scheme undertaken earlier this year, this report demonstrates the value of the scheme in nurturing the next generation of clinical academics. The evaluation concluded that the Starter Grant had significant impact on the career development of its award holders. A common finding of both reports is our award holder's success in securing external funding. To date, £9.8m has been awarded in grants and awardees have reported leveraging over £54m in further research funding, with the actual value likely to be much higher as only 64% of awards have been captured via Researchfish thus far.

Overall, the present report demonstrates the continued progress made by Starter Grant holders and celebrates their achievements to date. As one of the National Academies, we are committed to celebrating individuals and their achievements. We pride ourselves on our ability to convene the best medical scientists to address some of the most significant challenges facing society. We add value for our award holders by providing not only a grant and career development support – including access to our acclaimed mentoring scheme – but also extensive opportunities for networking, interacting with Fellows and participating in policy activities.