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NHS funded research training has a positive impact on careers for medical trainees

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Abstract

Objectives - This study aimed to investigate the impact of NHS funded research training on medical trainees compared to traditional clinical research training fellowships (CRTF).

Design, Setting and Participants– online survey of 221 clinical trainees who had completed a period of research during their clinical training between 2009-2015 in the West Midlands

Main outcome measures – research success

Results – Overall response rate was 59%, of which 72 participants were funded by CRTFs and 51 funded by the NHS. Although, Participants with CRTFs were more likely to be awarded a higher degree compared to those on NHS funding (66/72 CRTFs , 37/51 NHS, p≥0.01), similar proportions of NHS and CRTF funded Participants entered clinical lecturer posts on completing initial research training (8/51 NHS and 16/72 CRTF, p>0.05). 77% of participants had 3 or more publications (CRTF 59, NHS 39 p>0.05). Fifty seven participants had completed clinical training; similar proportions of CRTF and NHS funded trainees had research included in their consultant contract (12/22 NHS and 14/26 CRTF p>0.05) or were appointed to academic posts (3 of 25 NHS funded, 6 of 32 CRTF p>0.05). 95% of Participants would recommend to colleagues and 82% of Participants felt the research experience improved their provision of clinical care with no difference between CRTF and NHS funded participants (p>0.05). Continuing to participate in clinical work during the research reduced reports of trainee difficulty on returning to clinical work (23/108 continued clinical work vs 12/22 no clinical work, p>0.01).

Conclusion - Research training funded by the NHS provides a quality experience and contributes to the clinical academic capacity within the UK. More needs to be done to support NHS Participants to successfully achieve a higher degree.

Strengths and limitations of this study

- **This is the first study to describe the outcomes and experience of clinically qualified trainees undertaking research training funded by the NHS compared to those in receipt of clinical research training fellowships funded by the MRC and charities.**
- **The study systematically identified all clinical trainees undertaking research using a prospectively collected database**
- **The study uses conferment of degree, progression to further academic appointments, number of publications and participants' perception of impact on clinical care as measures of success.**
- **The study uses a retrospective questionnaire based design**
- **Due to the characteristics of medical trainees in the West Midlands the study may not be widely generalizable.**

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Introduction

Effective translation of scientific discoveries into clinical practice has a major impact on improving medical care. By bringing a clinical perspective, academic clinicians are ideally placed to identify a need for more scientific evidence in patient care and to incite new scientific questions. Clinical academics play a significant role in medical research, especially in shortening the time to translation between basic research and clinical practice (1, 2). In order to follow a clinical academic career path, junior doctors (trainees) are required to undertake a period of dedicated biomedical research training with the aim of attaining a higher degree, such as a PhD or MD. Funding is available from a variety of different sources. Organisations such as the Medical Research Council (MRC), National Institute of Health Research (NIHR), and medical charities fund clinical research training fellowships (CRTFs), of 2-3 years duration. Approximately 350 of these CRTFs are awarded per year through open competition (3). CRTFs provide excellence in research training and successfully obtaining a competitive CRTF is predictive of progression to a clinical academic leadership role (3-5), although a recent review reported that only one third of people completing a CRTF progress to more senior academic posts (5).

Research training is also funded in the UK by the National Health Service (NHS) although the process for a trainee to secure this training is different. As the funding decision may be made at a local level within the NHS the research project may be funded without undergoing robust peer-review and appointment is often via closed procedures. Little is reported about the experience of these trainees, the quality of their research and career outcomes, or their satisfaction with the research training provided.

The GMC quality review of academic training in 2014 provided a detailed insight into the views of trainees undertaking research training (6). Although most trainees had a positive view of their research training, there was no assessment of whether funding source impacted on this. The GMC review identified concerns from both trainees and their supervisors regarding trainees' potential loss of clinical skills and the processes for supporting their return to clinical practice following a period of research training. It did not investigate whether trainees perceived their clinical practice benefitted from the research experience.

To build upon the previous research, we aimed to systematically survey all trainees within the Health Education England West Midlands clinical training programme who undertook a period of research training. We aimed to compare the experience and outcomes of trainees funded by the NHS with those funded through CRTFs using an on-line questionnaire. In addition we aimed to investigate the trainees satisfaction with the research and how the research training impacted on their return to clinical training.

Methods

The Survey

An on-line questionnaire was sent to West Midland's trainees who had undertaken a period of research training and subsequently returned to clinical training between 2009 and 2015. The questionnaire was administered from January to May 2016. Four reminders were sent to encourage participation. Trainees were identified from records held by the Local Education and Training Board,

which were collected prospectively when trainees applied for approval to take time "Out of Programme" for research (OOPR). The study protocol was approved by the University of Worcester Research Ethics Committee and all Participants provided informed consent prior to completing the survey.

The Questions

The survey questions covered three areas: *trainee characteristics, including funding source, experience during research training* and *progress following completion of research training* (see Appendix 1 for full questionnaire). The aim of the survey was to gather mainly quantitative data but also allowed Participants to clarify or qualify their responses by the addition of free text answers. The questionnaire was designed to allow comparison between Participants in receipt of NHS funding and those who obtained competitive CRTFs and to assess the overall value of the research experience. This included satisfaction with the outcome of their research and the support they received from their academic supervisor. Participants were also asked to quantify the influence they perceived their research training to have had on their career or future career choice and if they felt there had been any impact on the quality of the clinical care they provided on return to clinical practice. Finally, Participants were asked about their progress following the research experience on return to clinical training (Full questionnaire appendix 1).

Data Analysis

The questions and measurement scales used in the questionnaire were largely adopted from previous studies that also measured career choice(5) and participant satisfaction (National Student Survey, 2016), in order to provide content reliability and validity. The level of internal consistency of the items in the satisfaction scales was acceptable at 0.77 as measured by Cronbach's Alpha test. For the purposes of this study Participants who identified NHS funding but then progressed to CRTFs were considered to be NHS funded. Self-funding Participants were excluded from the analysis of funding source.

Categorical variables are shown as number (percentage). Differences between groups were analysed by Pearson's chi-square test. Analysis of free text responses was performed using conventional content analysis(7)to identify themes and the number of Participants mentioning each recurrent theme was counted.

Results

Survey Response rates and Characteristics of Participants

Two hundred and twenty two Participants completed OOPR research training between 2009 and 2015. The overall response rate to the survey was 138/222 (62%), with eight responses removed due to incomplete data, which reduced the final response rate to 130 (58.8%).

The genders, training stages and specialties of the 130 Participants who responded were comparable to the overall West Midlands trainee population who undertook research (table 1). Participants were enrolled in a broad range of secondary care specialties with the majority in hospital medicine (51%) or surgery (26%). One hundred and twenty three (94%) were in specialty training. Ninety two (71%) Participants undertook a period of research training of three years or more. Participants were asked to describe the research they undertook with 52% having some laboratory experience

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(experimental/translational research) and 30% were involved in running clinical trials. It was notable that although there were fewer women than men undertaking research c there were no differences in the gender distribution across the research areas (table 1) defined by the participants (p>0.05).

Responder Population	Clinical Research Training Fellowships Total =72	NHS Funded research training Total =51	All Survey respondents Total = 130 (%)	Survey non respondents Total= 91 (%)
Gender				
Men	45 (62%)	37 (72%)	86 (66%)	58 (63%)
Women	27 (38%)	16 (28%)	44 (34%)	33(37%)
Training Level				
ST1-2	3 (4%)	3 (6%)	7 (5%)	4 (4%)
ST3-4	29 (40%)	19 (37%)	48 (37%)	25 (27%)
ST5-6+	40 (56%)	29 (57%)	75(58%)	62 (68%)
Specialty				
Anaesthetics	2 (3%)	3 (6%)	5 (4%)	2 (2%)
Medicine	40 (56%)	24 (47%)	67 (51.5%)	53 (59%)
Obstetrics and gynaecology	5 (7%)	7 (14%)	15 (11.5%)	6 (7)%
Paediatrics	4 (6%)	4 (8%)	8 (6%)	3 (3%)
Psychiatry	1 (1%)	0 (0%)	1 (1%)	1(1%)
Surgery	20 (27%)	13 (25%)	34 (26%)	26 (28%)
Years in research median [IQR]	3 [3,3]	3 [2,3]	3 [2, 3]	
Research Area				
Applied health research [M:F]	8 [3:5]	4 [0:4]	16 (12%) [8:7]	
Experimental [M:F]	24 [14:10]	17 [11:6]	40 (31%) [25:16]	
Clinical trials [M:F]	19 [13:6]	18 [12:6]	40 (31%) [28:12]	
Translational [M:F]	21 [15:6]	12 [9:3]	34 (26%) [25:9]	

Table 1. Responder Profile

Funding Source

Seventy two Participants (55%) held competitively funded CRTFs (11 from the Wellcome Trust, 12 from MRC, 11 NIHR and 38 other charities) and 51 Participants (39%) reported the NHS as a source of funding, three of whom subsequently obtained CRTFs (1 MRC, 2 other). Seven Participants identified as self-funding. There was no difference in the funding sources between men and women or associated with specialty ($p>0.05$). The majority of Participants (58%) undertook research in the later years of clinical training (ST 5-6 or above); there was no association between stage of training and funding source ($p>0.05$). There was no difference in duration of research when comparing funding source ($p>0.05$).

Motivation

Participants were asked about their motivation to undertake the research training and were provided with three options to select; improving career prospects, developing new skills and wishing to pursue an academic career. Responders were able to select all responses that were applicable, or add a free text response. The majority of participants (68%) cited more than one reason for undertaking research training. The commonest motivating factors for Participants to undertake research training were a desire to develop new skills and improve NHS career prospects (Figure 1). Of those who selected improving NHS career prospects, 40% also reported that they wished to pursue an academic career. Participants funded through CRTFs were more likely to report wanting an academic career as motivation for undertaking research than those funded by the NHS (44/72 CRTFs cf 20/51 NHS $p<0.01$). Thirteen participants reported additional reasons which include three wishing to experience an academic career (2 CRTF, 1 NHS), two to provide better care (1 CRTF, 1 NHS), two to delay CCT (both CRTF), one advised by mentors (NHS), three to understand mechanism of disease better (2 CRTF and 1 NHS), one as it provided flexibility to spend more time with a young family (NHS) and one to provide the opportunity to work overseas (CRTF).

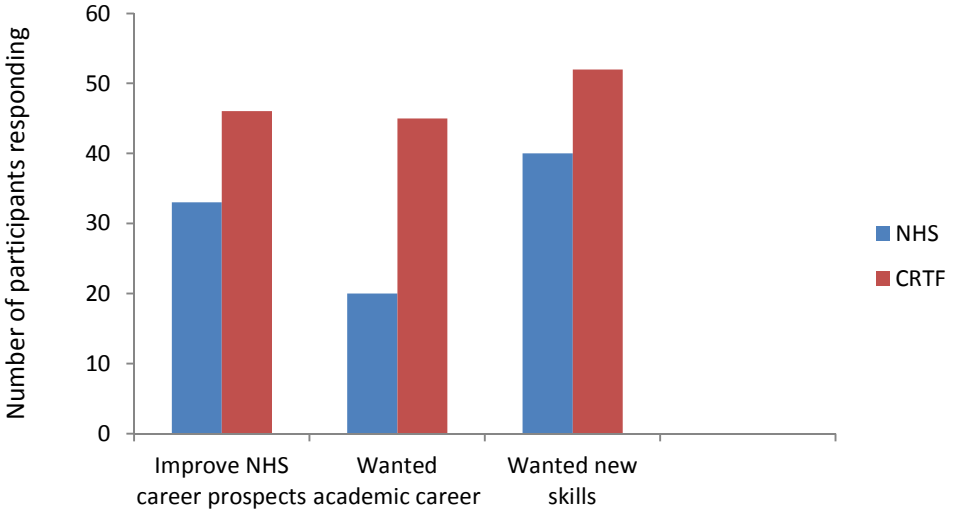

Figure 1. Reported motivation for undertaking research training by NHS funded and CRTF Participants.

Research training success

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One hundred and seven (82%) Participants were awarded a higher degree following their research training (66 PhD, 31 MD, 10 masters level qualification). At the time of the questionnaire 23 Participants had not been awarded a higher degree but eight planned to submit a thesis in the future and three were resubmitting after corrections had been addressed. Of the others, two NHS funded Participants reported that they had not registered with a university for a higher degree, two did not have sufficient funding to complete their research (1 NHS and 1 CRTF) and six Participants did not provide an explanation. Participants with a CRTF were more likely to have been awarded a degree than those with NHS funding (66/72 CRTFs , 37/51 NHS, p≥0.01) (table 2).There was no difference in the type of degree undertaken based on funding (45/66 PhDs CTRF cf 20/37 PhDs NHS, p=0.259) and no difference between those awarded a degree and specialty or stage of training (all p>0.05).

One hundred and seven participants (82%) were satisfied with their research supervisor. Participants who were not awarded a higher degree were more likely to report dissatisfaction or were neutral about the support received from their research supervisor although this did not reach statistical significance (7/23 [30%] vs 16/107 [15%]; p=0.078). Only four Participants provided additional information on why they were dissatisfied, two identified supervisor's lack of competence in the area of research, and two identified supervisor absence or supervisor's lack of time to supervise. There was no difference with supervisor satisfaction reported by Participants when comparing CRTF and NHS funding (p>0.05) (table 2)

Participants were asked about publication record (0, 1-2, 3-4 or ≥5 publications), only two Participants reported no publications, both were recipients of CRTFs; 77% of Participants reported three or more publications with no difference between those funded by CRTF or NHS (CRTF 59, NHS 39 p>0.05).
Ninety five per cent of the Participants reported that they would recommend a period of research training to colleagues. There was no difference in publication success between funding sources (p>0.05) (table 2).

Impact of research training on career

Participants were asked about the impact of the research training on their career choice; 92% of participants felt that it had an impact, with 69 of 130 participants describing the impact as very or having extreme impact. Participants who were awarded a PhD were more likely to wish to pursue a formal clinical academic role whereas participants undertaking an MD were more likely to wish to pursue an NHS career with research content (30/66 PhD cf 7/31 MD who desired a formal clinical academic career, p=0.031).

Eighty five (69%) Participants have continued to participate in research activity following completion of their research; of whom 24 (28%) progressed into a clinical lecturer post following completion of their research training (8/51 NHS and 16/72 CRTF, p>0.05). There was no difference between funding sources and continued participation in research (54/72 CRTF cf 31/51 NHS funding, p>0.05). At the time of the questionnaire 57 participants had finished clinical training and were employed at consultant level, nine had progressed to further academic positions (3 of 25 NHS funded, 6 of 32 CRTF p>0.05) and 26 participants in clinical posts had research included as part of their consultant programmed activities (12/22 NHS and 14/26 CRTF p>0.05)

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Participants were asked whether their research training improved their provision of clinical care. They were then provided with six options to describe the impact the research experience may have had with the opportunity to provide their own free text answer. Participants were allowed to register more than one answer (Figure 2). One hundred and six (82%) participants felt that their OOPR experience had improved the quality of clinical care they provide. The most frequently stated areas of improvement included better understanding of evidence-based medicine and improved critical assessment of complex problems.

	CRTF Funders (n.72)	NHS (n.51)	Self-Funded (n=7)	p
Degree Awarded	66 (92%)	37 (73%)	4 (57%)	0.005
Publications 3 or more	57 (79%)	39 (76%)	5 (71%)	ns
Satisfaction with Supervisor Support	59(82%)	42 (82%)	6 (86%)	ns
Participated in research on return to clinical work	53 (73%)	30 (59%)	5 (71%)	ns
Clinical Academic as Long Term Career Choice on return to work	22 (31%)	11 (22%)	2 (29%)	
Continued clinical work during research	57 (79%)	45 (88%)	6 (86%)	
Struggle on return to work	21(30%)	12 (24%)	2 (29%)	

Table 2. Analysis by funding support

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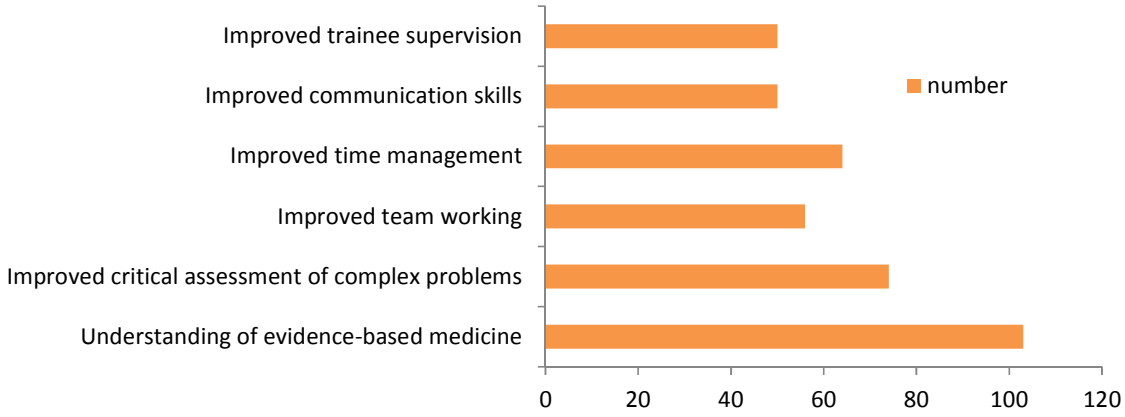

Figure 2. Aspects of clinical care that Participants felt had improved following OOPR

Maintenance of Clinical Skills and Return to the Clinical Workplace

Ninety (69%) reported that they continued to undertake some clinical work during their research training and all of these individuals felt that continuing with clinical work helped them to some extent with their return to clinical practice. The type of clinical work undertaken was on-call duties only (n=25 [24%]), clinics only (n=22 [28%]) or both (n=43 [48%]). There were no differences between funding source in clinical commitment (NHS 45/51 participants, CRTF 57/72 p>0.05). However, there was an association between continued clinical commitment and not being awarded a degree; 95% of those who did no clinical work were awarded a degree whereas only 77% of those who did some clinical work were awarded a degree (p=0.012) (table 3). There was no difference in being awarded a degree between those undertaking either on-call or clinic commitments or both (p>0.05).

	None	Clinic only	On-call only	Both on-call and clinic
PhD	24	14	9	19
MD	10	2	7	12
MSc	4	4	0	2
No degree	2	2	9	10

Table 3 Number of participants continuing in clinical activity during research training

Fifty nine (45%) Participants reported feeling somewhat or significantly isolated from clinical peers whilst undertaking their research. Feelings of isolation were less common in those who continued clinical work compared to those who did not, although this was not statistically significant (42% vs 61%, p>0.05).

Thirty five participants (27%) reported that they struggled following return to clinical work after their research training, with a reduction in clinical skills being the biggest concern (26/35 Participants), followed by concerns about re-integration into the clinical team/environment (17/35 Participants). Other themes identified by participants included; a lack of clinical supervision (2 Participants) and difficulty balancing the workload of completing their thesis submission and clinical training (3

Participants). Participants who undertook clinical work during research training were significantly less likely to struggle on returning to work than those who did not undertake clinical work (23/108 continued clinical work vs 12/22 no clinical work, p>0.01).

Discussion

Although it is well established that CRTFs provided by the MRC and charities are important in the capacity development of clinical academics (3-5) the role of the NHS in this regard has not been previously investigated. A third of Participants in the West Midlands were funded through the NHS to undertake formal research training. The research experience of Participants supported by NHS funding is positive and has a similar impact on future careers, in the short term, to those supported by CRTFs. Overall, 28% of Participants progressed to a clinical lecturer role, of whom one third had received funding from the NHS. Participants who were recipients of CRTFs had higher rates of degree conferment (90%) than those funded from the NHS (68%). Despite this there was no difference in the proportions of NHS and CRTF funded Participants continuing to participate in research following return to clinical work and they had similar success in achieving three or more publications. This is the first study to provide evidence that research training for doctors funded by the NHS is important in building a research active clinical workforce.

Trainee perception of the impact of research training on their clinical abilities has not previously been reported. Participants reported that they felt the experience enhanced their clinical performance and 95% would recommend a period of research training. This perception is supported by recent findings that scholarly activity, as measured by publication record, is associated with better clinical performance(8). It has been suggested that research and clinical practice both require the skills of time management, efficiency, diligence and effective teamwork(9). This is supported by our trainee perceptions that these skills are enhanced by research training. Evidence also suggests that research active NHS Trusts have lower mortality rates for acute admissions(10) and research engagement has a beneficial impact on healthcare performance(11). The skills identified as being enhanced by our participants may contribute to this improved performance. The NHS funds over a third of research training opportunities for doctors within the West Midlands and this study provides support for the continuation of that funding for development of a research active future medical workforce.

Strengths and limitations

Most previous studies have looked at CRTF funding schemes (3, 4). The 2015 MRC report attempted to look at a wider range of schemes in partnership with NIHR, Cancer Research UK, British Heart Foundation and the Wellcome Trust and to look at outcomes from those who failed to get funding through these schemes(5). However, the response rate to the study was poor with only 36% of invitees responding, of whom 72% of the responders had been awarded a fellowship. It is difficult to understand outcomes of those who did not receive a CRTF from this MRC led study. The present study benefitted from a systematic approach, inviting all participants who had completed OOPR within the West Midlands to participate in the study. The response rate to the survey of 59% was good and gender, training level and specialty of the 130 participants who responded was representative of the entire cohort. Data on participants who benefitted from NHS funding is particularly novel and suggests they do almost as well as those funded by CRTFs. Although this

survey is limited by its questionnaire methodology, response rates were good and represented the wider community undertaking research training. We identified excellent completion rates in our respondent population but it is unknown if this and funding source differed in those who failed to complete the survey. The study may also have a geographical bias as the West Midlands has a slightly lower percentage of licensed female doctors (41%) and higher proportion of licensed doctors who are non-UK graduates relative to the UK average(12).

Implications

The smaller proportion of NHS funded Participants having a higher degree conferred is disappointing. This may reflect differences in the qualities of successful applicants for NHS and CRTF funding or the rigorous peer review and interview process that is required before award of CRTFs. CRTFs are highly competitive with many schemes reporting only a 10-20% success rate. A recent study reported that medical trainees enrolled on PhD programmes at two research intensive universities had high levels of previous research experience(13); we did not examine previous research experience in our study. We did identify an association between continuing clinical work and not submitting a completed thesis. Although we were unable to assess how much clinical work was undertaken by Participants, this finding does raise the question as to whether those who are not awarded a degree are overwhelmed by clinical commitments. Using clinic or on-call commitment only or combined clinic and on-call commitment as a surrogate measure of work load there was no association between different clinical workloads and failure to be awarded a higher degree. Consideration should be given by those who approve OOPR training to ensure that research projects are appropriately peer reviewed and supervised prior to approval if the trainee is not funded via a CRTF and that clinical commitments are not too onerous.

Participants were very positive about their research training experience, with 95% recommending such experience to colleagues. However, returning to the workplace following a period of OOPR was identified as an area where improvements could be implemented. Despite the high number of participants reporting that OOPR had improved the quality of the clinical care they provide, a significant number also responded that they struggled when returning to the workplace. Those participants who maintained clinical contact during research training were less likely to struggle on return to work. It is recognised that clinical skills decline with time away from practice (14) and the GMC, in their recent quality review of academic training, note a requirement for clear return to clinical practice processes for those returning to clinical training from research (6). It is essential that those overseeing clinical training develop return to work packages that are tailored to the needs of participants. These should be developed, in accordance with the Joint Royal Colleges of Physicians Training Board and Academy of Medical Royal Colleges guidance, towards the end of research training with a focus on keeping in touch activities, agreement on learning and training needs and a record of re-introduction to clinical activities overseen by strong supervisory activity that ensures competence (15). This needs to be communicated to trainees. Unfortunately our study suggests high levels of dissatisfaction with the support provided by specialty training committees for Participants during research training with most unaware of return to work packages. Research supervisors must also have the time and competencies to support Participants, as 70% of Participants not awarded a higher degree expressed dissatisfaction or neutral satisfaction with their research supervision. Due to the nature of the survey it is difficult to comment more on this issue.

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Conclusion and further research

The results of this study provide strong evidence that research training is a valuable entity to almost all participants who undertake this experience, with 95% of participants stating they would recommend research training to other doctors. NHS employer funding provides an important source of capacity development for clinical academics and this report supports continuation of that funding stream. Further research is required to understand the reasons behind lower degree conferment for those funded by the NHS and the support required to improve this.

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Footnotes

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Contributors CM and LH developed the questionnaire. CM collected the data. All authors conceived the data analysis plan and later made substantive contributions to the interpretation of the findings and the writing of this article. CM and LH conducted the quantitative data analysis and reporting. CM, MM and LH wrote the first and subsequent drafts. All authors critically reviewed and edited drafts and approved the final version of the manuscript. They also had full access to all of the data (including statistical reports and tables) in the study and can take responsibility for the integrity of the data and the accuracy of the data analysis. The study guarantor is LH.

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Competing interests All authors have completed the ICMJE uniform disclosure form. CM, RS and LH declare that their salary is, in part, paid for by Health Education England in the West Midlands; no other financial relationships with any organisations that might have an interest in the submitted work in the previous three years; no other relationships or activities that could appear to have influenced the submitted work.

Ethics approval: The study protocol was approved by the University of Worcester Research Ethics Committee and all Participants provided informed consent prior to completing the survey.

Provenance and peer review Not commissioned; externally peer reviewed.

Data sharing statement No additional data are available

OOPR Survey 2016

Welcome to the OOPR Survey

Dear Participant,

You have previously taken time Out of Programme to undertake a period of Research (OOPR). We are interested in why you did this and the outcome or benefits you feel this may have had in relation to your career, research skills and clinical practice.

We would greatly appreciate your completion of this questionnaire to help us understand what motivates trainees to undertake a period of OOPR, and what you feel are the perceived and actual benefits of this for your future career.

Some of the questions ask about your personal view of various aspects of your experience, and we recognise that for some people these may be sensitive questions. Please be reassured that any information you provide in this questionnaire will only be seen by the research team, and will never be shared with anyone else in a way that could enable them to identify you.

Completion time for the questionnaire is approximately 15 minutes.

Many thanks for your participation.

Professor Lorraine Harper
Associate Dean for Academic Programmes at Health Education West Midlands
Head of Clinical Academic Training, University of Birmingham

OOPR Survey 2016

In completing this questionnaire, you agree to the following:

1. I understand the research aims

2. The research process has been fully explained and I understand what my participation will involve

3. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving reason

4. I agree to the use of [anonymised quotes/aggregated results] in publications

5. I understand and agree to how my responses will be used and stored

6. I agree to take part in the study

OOPR Survey 2016

Background Information

1. Your Name

* 2. What is your gender?

- Female
- Male

3. What is your Age?

OOPR Survey 2016

4. What was your year of graduation?

* 5. What is your current specialty area?

* 6. What motivated you to undertake OOPR? Choose all that apply.

- [ ] To improve NHS career prospects
- [ ] Wanted an academic career
- [ ] Wanted to develop new skills

Other (please specify)

OOPR Survey 2016

* 7. Stage of training when OOPR

- ST1-2
- ST3-4
- ST5-6

* 8. Length of OOPR undertaken

- 1 year
- 2 years
- 3 years

Other (please specify)

OOPR Survey 2016

* 9. Who funded your OOPR? Tick more than one option if split funded

- [ ] Wellcome Trust
- [ ] CRUK
- [ ] MRC
- [ ] Other Charity
- [ ] Self-funded
- [ ] Employer

Other (please specify)

OOPR Survey 2016

OOP Research Experience

* 10. Which clinical discipline was your OOPR experience based in?

* 11. What area was your research in?

Other (please specify)

OOPR Survey 2016

* 12. Did you complete your research?

- Yes
- No

13. Please tell us more about the reason why you 'did not' complete your research

OOPR Survey 2016

* 14. How satisfied were you with the outcome of your research?

Very satisfied	Satisfied	Neither satisfied or dissatisfied	Dissatisfied	Very dissatisfied
○	○	○	○	○

If you were dissatisfied, how could this have been improved?

* 15. How satisfied were you that you completed your research as planned?

Very satisfied	Satisfied	Neither satisfied or dissatisfied	Dissatisfied	Very dissatisfied
○	○	○	○	○

If you were dissatisfied, how could this have been improved?

OOPR Survey 2016

* 16. How satisfied were you with the advice and support from the following:

	Very satisfied	Satisfied	Neither satisfied or dissatisfied	Dissatisfied	Very dissatisfied
Your Supervisor	○	○	○	○	○
Specialty Training Committee	○	○	○	○	○

Please add any additional information you wish to provide regarding the advice and support you received.

* 17. Did you feel isolated from your clinical peers whilst undertaking OOPR?

To a very large extent	To a large extent	Somewhat	To a small extent	To a very small extent
○	○	○	○	○

Please add any additional information you wish to provide here.

OOPR Survey 2016

* 18. Did you ever feel contradictory demands were placed on you? ie. were you asked to give up your protected research time?

Always	Often	Sometimes	Rarely	Never
○	○	○	○	○

Please add any additional information you wish to provide here.

* 19. Did you continue with some clinical work during your OOPR?

- ○ Yes
- ○ No

OOPR Survey 2016

* 20. If you undertook clinical work during your OOPR, was it

- [ ] On-call
- [ ] Clinics

If clinics, please state frequency

* 21. Did continuing with clinical work during your OOPR assist with your return to clinical practice?

To a very large extent	To a large extent	Somewhat	To a small extent	To a very small extent
○	○	○	○	○

OOPR Survey 2016

Progress Following OOPR

* 22. What degree was awarded?

Other (please specify)

OOPR Survey 2016

Progress Following OOPR

* 23. If a degree was not awarded, why?

- Did not submit thesis
- Did not register for degree
- Not associated with a University
- Did not pass at Viva

Other (please specify)

OOPR Survey 2016

* 24. Have you reached CCT?

- Yes
- No

OOPR Survey 2016

* 25. What post do you hold currently?

- Academic Post
- Clinical Post

OOPR Survey 2016

26. Academic Post - Choose One

Other (please specify)

OOPR Survey 2016

27. Clinical Post - Choose one

Other (please specify)

OOPR Survey 2016

* 28. What are your current long term career plans?

- [ ] Clinical post - no teaching or research
- [ ] Clinical post - some teaching responsibility
- [ ] Clinical post - some research time
- [ ] Clinical post - some teaching and research
- [ ] Clinical academic post
- [ ] Undecided

Other (please specify)

* 29. How influential has your OOPR experience been in informing your long term career plans?

Extremely influential	Very influential	Moderately influential	Slightly influential	Not at all influential
○	○	○	○	○

OOPR Survey 2016

30. In what way did your OOPR experience influence your long term career plans?

* 31. Have you participated in research since completing your OOPR?

- Yes
- No

OOPR Survey 2016

* 32. Which best describes your continued research participation?

- [ ] As a Clinical Lecturer
- [ ] Within further training
- [ ] Grant funded
- [ ] Within PAs as a Consultant

Other (please specify)

* 33. How much of your time do you currently spend engaging in research activity?

- ( ) Up to 25%
- ( ) 25 - 50%
- ( ) Over 50%

OOPR Survey 2016

* 34. To what extent did undertaking research as part of your OOPR improve the quality of the clinical care you provide?

Significantly improved	Moderately improved	No impact on clinical care
○	○	○

OOPR Survey 2016

* 35. What aspects of your clinical care were improved? Choose all that apply.

- [ ] Understanding of evidence-based medicine
- [ ] Improved critical assessment of complex problems
- [ ] Improved team working
- [ ] Improved time management
- [ ] Improved communication skills
- [ ] Improved trainee supervision

Other (please specify)

OOPR Survey 2016

* 36. How many publication have you achieved?

1 - 2	3 - 4	5 +
○	○	○

* 37. Did you struggle when you returned to clinical work?

- ○ Yes
- ○ No

OOPR Survey 2016

* 38. In which of the following areas do you feel you struggled? Choose all that apply.

- [ ] Reduction of clinical skills
- [ ] Lack of clinical supervision
- [ ] Reintegration to clinical team/environment

Other (please specify)

OOPR Survey 2016

* 39. How satisfied were you with the support you received upon return to clinical work, with a return to work package?

Very satisfied	Satisfied	Neither satisfied or dissatisfied	Dissatisfied	Very dissatisfied
○	○	○	○	○

If you were dissatisfied with the support you received, how could this have been improved?

* 40. How would you rate the quality of support you received upon your return to clinical work?

Poor	Fair	Good	Very good	Excellent
○	○	○	○	○

How could the quality of support have been improved?

* 41. Would you recommend an Out of Programme to undertake Research to other doctors?

○ Yes

○ No

Please provide any additional information you wish to provide regarding your answer.

42. Please provide any additional information in relation to your OOPR experience you wish to add. (this information will be treated in the strictest confidence)

OOPR Survey 2016

Thank you for taking the time to complete this questionnaire.

If you have any questions relating to this questionnaire please contact Charlotte Maybury at c.maybury@bham.ac.uk

BMJ Open

How does the outcome of research training fellowships funded via the NHS compare with that from competitively funded fellowships from the MRC and other charities – a cross-sectional retrospective survey of trainees undertaking research training in the West Midlands

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How does the outcome of research training fellowships funded via the NHS compare with that from competitively funded fellowships from the MRC and other charities – a cross-sectional retrospective survey of trainees undertaking research training in the West Midlands

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Abstract

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Objectives - This study aimed to investigate the impact of research training funded via the NHS on medical trainees compared to traditional clinical research training fellowships (CRTF).

Design, Setting and Participants– online survey of 221 clinical trainees who had completed a period of research during their clinical training between 2009-2015 in the West Midlands

Main outcome measures – research outcomes

Results – Overall response rate was 59%, of whom 72 participants were funded by CRTFs and 51 funded by the NHS. Although, Participants with CRTFs were more likely to be awarded a higher degree compared to those on NHS administered funding (66/72 CRTFs , 37/51 NHS, p=0.005), similar proportions of NHS and CRTF funded Participants entered clinical lecturer posts on completing initial research training (8/51 NHS and 16/72 CRTF, p=0.37). 77% of participants had 3 or more publications (CRTF 59, NHS 39 p>p=0.72). Fifty seven participants had completed clinical training; similar proportions of CRTF and NHS funded trainees had research included in their consultant contract (12/22 NHS and 14/26 CRTF, p=0.96) or were appointed to academic posts (3 of 25 NHS funded, 6 of 32 CRTF p>0.05). 95% of Participants would recommend to colleagues and 82% of Participants felt the research experience improved their provision of clinical care with no difference between CRTF and NHS funded participants (p=0.49). Continuing to participate in clinical work during the research reduced reports of trainee difficulty on returning to clinical work (23/108 continued clinical work vs 12/22 no clinical work, p=0.001).

Conclusion - Research training funded by the NHS provides a quality experience and contributes to the clinical academic capacity within the UK. More needs to be done to support NHS Participants to successfully achieve a higher degree.

Strengths and limitations of this study

- **The study systematically identified all clinical trainees from the West Midlands undertaking research using a prospectively collected database**
- **The study uses conferment of degree, progression to further academic appointments, number of publications and participants' perception of impact on clinical care as measures of success.**
- **The study uses a retrospective questionnaire based design**
- The study defines as NHS funding all sources of research training funding , other than self-funding and CRTFs when trainees self-identified as funded by the NHS. The study is unable to identify these sources of funding in more detail. Trainees in receipt of clinical research training fellowships were asked to identify whether their funding was from MRC, CRUK, NIHR, Wellcome Trust or other charities.
- **Due to the characteristics of medical trainees in the West Midlands the study may not be widely generalizable.**

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Introduction

Effective translation of scientific discoveries into clinical practice has a major impact on improving medical care. By bringing a clinical perspective, academic clinicians are ideally placed to identify a need for more scientific evidence in patient care and to incite new scientific questions. Clinical academics play a significant role in medical research, especially in shortening the time to translation between basic research and clinical practice (1, 2). In order to follow a clinical academic career path, junior doctors (trainees) are required to undertake a period of dedicated biomedical research training with the aim of attaining a higher degree, such as a PhD or MD. Funding is available from a variety of different sources. Organisations such as the Medical Research Council (MRC), National Institute of Health Research (NIHR), and medical charities fund clinical research training fellowships (CRTFs), of 2-3 years duration. Approximately 350 of these CRTFs are awarded per year through open competition (3). CRTFs provide excellence in research training and successfully obtaining a competitive CRTF is predictive of progression to a clinical academic leadership role (3-5), although a recent review reported that only one third of people completing a CRTF progress to more senior academic posts (5).

Research fellow training is also funded by alternative sources in the UK which are administrated through the National Health Service (NHS). The money to fund these fellows is often provided from local hospital charitable funds and locally held research funds provided by industry to individual consultants, fellows are then employed via the NHS. The process for a trainee to secure these fellowships differs from that undertaken for CRTFs; the funding decision is generally made at a local level within the NHS, the research project may be funded without undergoing robust peer-review and appointment is often via closed procedures. Little is reported about the experience of these trainees, the quality of their research and career outcomes, or their satisfaction with the research training provided.

The GMC quality review of academic training in 2014 provided a detailed insight into the views of trainees undertaking research training (6). Although most trainees had a positive view of their research training, there was no assessment of whether funding source impacted on this. The GMC review identified concerns from both trainees and their supervisors regarding trainees' potential loss of clinical skills and the processes for supporting their return to clinical practice following a period of research training. It did not investigate whether trainees perceived their clinical practice benefitted from the research experience.

To build upon the previous research, we aimed to systematically survey all trainees within the Health Education England West Midlands clinical training programme who undertook a period of research training. We aimed to compare the experience and outcomes of trainees funded by the NHS with those funded through CRTFs using an on-line questionnaire. In addition, we aimed to investigate the trainees' satisfaction with the research and how the research training impacted on their return to clinical training.

Methods

The Survey

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An on-line questionnaire was sent to West Midland's trainees who had undertaken a period of research training and subsequently returned to clinical training between 2009 and 2015. The questionnaire was administered from January to May 2016. Four reminders were sent to encourage participation. Trainees were identified from records held by the Local Education and Training Board, which were collected prospectively when trainees applied for approval to take time "Out of Programme" for research (OOPR). The study protocol was approved by the University of Worcester Research Ethics Committee and all Participants provided informed consent prior to completing the survey.

The Questions

The survey questions covered three areas: *trainee characteristics, including funding source, experience during research training* and *progress following completion of research training* (see Appendix 1 for full questionnaire). The aim of the survey was to gather mainly quantitative data but also allowed Participants to clarify or qualify their responses by the addition of free text answers. The questionnaire was designed to allow comparison between Participants who self-identified as being in receipt of NHS funding for their research training, and those who obtained competitive CRTFs. We did not specifically ask trainees where funding came from when defined as NHS funded. Those in receipt of CRTFs were asked to identify whether their funding was from MRC, CRUK, NIHR, Wellcome Trust or other charities. We also aimed to assess the overall value of the research experience. This included satisfaction with the outcome of their research and the support they received from their academic supervisor; we did not ask whether the academic supervisor was employed by a Higher Education Institute or the NHS, although many supervisors work across both sectors. Participants were also asked to quantify the influence they perceived their research training has had on their career or future career choice and if they felt there had been any impact on the quality of the clinical care they provided on return to clinical practice. Finally, Participants were asked about their progress following research experience on return to clinical training (Full questionnaire appendix 1). The survey was piloted in 5 trainees, for facility of completion and excluding ambiguous questions, prior to contacting the wider trainee population.

Data Analysis

The questions and measurement scales used in the questionnaire were largely adopted from previous studies that also measured career choice(5) and participant satisfaction (National Student Survey, 2016), in order to provide content reliability and validity. The level of internal consistency of the items in the satisfaction scales was acceptable at 0.77 as measured by Cronbach's Alpha test. For the purposes of this study Participants who identified NHS funding but then progressed to CRTFs were considered to be NHS funded. Self-funding Participants were excluded from the analysis of funding source.

Categorical variables are shown as number (percentage). Differences between groups were analysed by Pearson's chi-square test. Analysis of free text responses was performed using conventional content analysis(7)to identify themes and the number of Participants mentioning each recurrent theme was counted.

Results

Survey Response rates and Characteristics of Participants

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Two hundred and twenty two Participants completed OOPR training between 2009 and 2015. The overall response rate to the survey was 138/222 (62%), with eight responses removed due to incomplete data, which reduced the final response rate to 130 (58.8%).

The genders, training stages and specialties of the 130 Participants who responded were comparable to the overall West Midlands trainee population who undertook research (table 1). Participants were enrolled in a broad range of secondary care specialties with the majority in hospital medicine (51%) or surgery (26%). One hundred and twenty three (94%) were in specialty training. Ninety two (71%) Participants undertook a period of research training of three years or more. Participants were asked to describe the research they undertook with 52% having some laboratory experience (experimental/translational research) and 30% were involved in running clinical trials. It was notable that although there were fewer women than men undertaking research there were no differences in the gender distribution across the research areas (table 1) defined by the participants (p=0.443).

Responder Population	**Clinical Research Training Fellowships Total =72**	**NHS Funded research training Total =51**	**All Survey respondents Total = 130 (%)**	**Survey non respondents Total= 91 (%)**	**p=**
Gender					0.710
Men	45 (62%)	37 (72%)	86 (66%)	58 (63%)	
Women	27 (38%)	16 (28%)	44 (34%)	33(37%)	
Training Level					0.287
ST1-2	3 (4%)	3 (6%)	7 (5%)	4 (4%)	
ST3-4	29 (40%)	19 (37%)	48 (37%)	25 (27%)	
ST5-6+	40 (56%)	29 (57%)	75(58%)	62 (68%)	
Specialty					0.648
Anaesthetics	2 (3%)	3 (6%)	5 (4%)	2 (2%)	
Medicine	40 (56%)	24 (47%)	67 (51.5%)	53 (59%)	
Obstetrics and gynaecology	5 (7%)	7 (14%)	15 (11.5%)	6 (7)%	
Paediatrics	4 (6%)	4 (8%)	8 (6%)	3 (3%)	
Psychiatry	1 (1%)	0 (0%)	1 (1%)	1(1%)	
Surgery	20 (27%)	13 (25%)	34 (26%)	26 (28%)	
Years in research median [IQR]	3 [3,3]	3 [2,3]	3 [2, 3]		
Research Area					
Applied health research [M:F]	8 [3:5]	4 [0:4]	16 (12%) [8:7]		

Experimental [M:F]	24 [14:10]	17 [11:6]	40 (31%) [25:16]		
Clinical trials [M:F]	19 [13:6]	18 [12:6]	40 (31%) [28:12]		
Translational [M:F]	21 [15:6]	12 [9:3]	34 (26%) [25:9]		

Table 1. Responder Profile

Comparisons are made between the whole population who responded and did not respond

Abbreviations: ST, specialty training level; M, male; F, female

Funding Source

Seventy two Participants (55%) held competitively funded CRTFs (11 from the Wellcome Trust, 12 from MRC, 11 NIHR and 38 other charities) and 51 Participants (39%) reported the NHS as a source of funding, three of whom subsequently obtained CRTFs (1 MRC, 2 other). Seven Participants identified as self-funding. There was no difference in the funding sources between men and women (p=0.395) or associated with specialty (p=0.91). The majority of Participants (58%) undertook research in the later years of clinical training (ST 5-6 or above); there was no association between stage of training and funding source (p=0.89). There was no difference in duration of research (p=0.76) or area of research (p=0.69) when comparing funding source.

Motivation

Participants were asked about their motivation to undertake the research training and were provided with three options to select; improving career prospects, developing new skills and wishing to pursue an academic career. Responders were able to select all responses that were applicable, or add a free text response. The majority of participants (68%) cited more than one reason for undertaking research training. The commonest motivating factors for Participants to undertake research training were a desire to develop new skills and improve NHS career prospects (Figure 1). Of those who selected improving NHS career prospects, 40% also reported that they wished to pursue an academic career. Participants funded through CRTFs were more likely to report wanting an academic career as motivation for undertaking research than those funded by the NHS (44/72 CRTFs cf 20/51 NHS p=0.017). Thirteen participants reported additional reasons which include three wishing to experience an academic career (2 CRTF, 1 NHS), two to provide better care (1 CRTF, 1 NHS), two to delay CCT (both CRTF), one advised by mentors (NHS), three to understand mechanism of disease better (2 CRTF and 1 NHS), one as it provided flexibility to spend more time with a young family (NHS) and one to provide the opportunity to work overseas (CRTF).

Research training success

One hundred and seven (82%) Participants were awarded a higher degree following their research training (66 PhD, 31 MD, 10 masters level qualification). At the time of the questionnaire 23 Participants had not been awarded a higher degree but eight planned to submit a thesis in the future

and three were resubmitting after corrections had been addressed. Of the others, two NHS funded Participants reported that they had not registered with a university for a higher degree, two did not have sufficient funding to complete their research (1 NHS and 1 CRTF) and six Participants did not provide an explanation. Participants with a CRTF were more likely to have been awarded a degree than those with NHS funding (66/72 CRTFs , 37/51 NHS, p=0.005) (table 2).There was no difference in the type of degree undertaken based on funding (45/66 PhDs CTRF cf 20/37 PhDs NHS, p=0.259) and no difference between those awarded a degree and their specialty (p=0.76) or stage of training (p=0.91).

One hundred and seven participants (82%) were satisfied with their research supervisor. Participants who were not awarded a higher degree were more likely to report dissatisfaction or were neutral about the support received from their research supervisor although this did not reach statistical significance (7/23 [30%] vs 16/107 [15%]; p=0.078). Only four Participants provided additional information on why they were dissatisfied, two identified supervisor's lack of competence in the area of research, and two identified supervisor absence or supervisor's lack of time to supervise. There was no difference with supervisor satisfaction reported by Participants when comparing CRTF and NHS funding (table 2)

Participants were asked about publication record (0, 1-2, 3-4 or ≥5 publications), only two Participants reported no publications, both were recipients of CRTFs; 77% of Participants reported three or more publications with no difference between those funded by CRTF or NHS (table 2).

Ninety five per cent of the Participants reported that they would recommend a period of research training to colleagues. (table 2).

Impact of research training on career

Participants were asked about the impact of the research training on their career choice; 92% of participants felt that it had an impact, with 69 of 130 participants describing the impact as very or having extreme impact. Participants who were awarded a PhD were more likely to wish to pursue a formal clinical academic role whereas participants undertaking an MD were more likely to wish to pursue an NHS career with research content (30/66 PhD cf 7/31 MD who desired a formal clinical academic career, p=0.031).

Eighty five (69%) Participants have continued to participate in research activity following completion of their research; of whom 24 (28%) progressed into a clinical lecturer post following completion of their research training (8/51 NHS and 16/72 CRTF, p=0.37). There was no difference between funding sources and continued participation in research (table 2). At the time of the questionnaire 57 participants had finished clinical training and were employed at consultant level, nine had progressed to further academic positions (3 of 25 NHS funded, 6 of 32 CRTF p=0.49) and 26 participants in clinical posts had research included as part of their consultant programmed activities (12/22 NHS and 14/26 CRTF p=0.96)

Participants were asked whether their research training improved their provision of clinical care. They were then provided with six options to describe the impact the research experience may have

had with the opportunity to provide their own free text answer. Participants were allowed to register more than one answer (Figure 2). One hundred and six (82%) participants felt that their OOPR experience had improved the quality of clinical care they provide. The most frequently stated areas of improvement included better understanding of evidence-based medicine and improved critical assessment of complex problems.

	CRTF Funders (n.72)	NHS (n.51)	Self-Funded (n=7)	p
Degree Awarded	66 (92%)	37 (73%)	4 (57%)	0.005
Publications 3 or more	57 (79%)	39 (76%)	5 (71%)	0.72
Satisfaction with Supervisor Support	59(82%)	42 (82%)	6 (86%)	0.95
Participated in research on return to clinical work	53 (73%)	30 (59%)	5 (71%)	0.085
Clinical Academic as Long Term Career Choice on return to work	22 (31%)	11 (22%)	2 (29%)	0.27
Continued clinical work during research	57 (79%)	45 (88%)	6 (86%)	0.19
Struggle on return to work	21(30%)	12 (24%)	2 (29%)	0.48

Table 2. Analysis by funding support
Abbreviations: CRTF, clinical research training fellowship; NHS, National Health Service

Maintenance of Clinical Skills and Return to the Clinical Workplace

One hundred and eight (83%) reported that they continued to undertake some clinical work during their research training and all of these individuals felt that continuing with clinical work helped them to some extent with their return to clinical practice. The type of clinical work undertaken was on-call duties only (n=25 [24%]), clinics only (n=40 [37%]) or both (n=43 [48%]). There were no differences between funding source in clinical commitment (NHS 45/51 participants, CRTF 57/72 p=0.19). There

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was no association between continuing clinical work and being awarded a degree (p=0.246) (table 3).

	None	Clinic only	On-call only	Both on-call and clinic
PhD	14	24	9	19
MD	2	10	7	12
MSc	4	4	0	2
No degree	2	2	9	10

Table 3 Number of participants continuing in clinical activity during research training

Fifty nine (45%) Participants reported feeling somewhat or significantly isolated from clinical peers whilst undertaking their research. Feelings of isolation were less common in those who continued clinical work compared to those who did not, although this was not statistically significant (42% vs 61%, p=0.059).

Thirty five participants (27%) reported that they struggled following return to clinical work after their research training, with a reduction in clinical skills being the biggest concern (26/35 Participants), followed by concerns about re-integration into the clinical team/environment (17/35 Participants). Other themes identified by participants included; a lack of clinical supervision (2 Participants) and difficulty balancing the workload of completing their thesis submission and clinical training (3 Participants). Participants who undertook clinical work during research training were significantly less likely to struggle on returning to work than those who did not undertake clinical work (23/108 continued clinical work vs 12/22 no clinical work, p=0.001).

Discussion

Although it is well established that CRTFs provided by the MRC and charities are important in the capacity development of clinical academics (3-5) the role of the NHS in this regard has not been previously investigated. A third of Participants in the West Midlands were funded through the NHS to undertake formal research training. The research experience of Participants supported by funding administered by the NHS is positive and has a similar impact on future careers, in the short term, to those supported by CRTFs. Overall, 28% of Participants progressed to a clinical lecturer role, of whom one third had received funding from the NHS. Participants who were recipients of CRTFs had higher rates of degree conferment (90%) than those funded from the NHS (68%). Despite this there was no difference in the proportions of NHS and CRTF funded Participants continuing to participate in research following return to clinical work and they had similar success in achieving three or more publications. This is the first study to provide evidence that research training for doctors funded through the NHS is important in building a research active clinical workforce.

Trainee perception of the impact of research training on their clinical abilities has not previously been reported. Participants reported that they felt the experience enhanced their clinical performance and 95% would recommend a period of research training. This perception is supported by recent findings that scholarly activity, as measured by publication record, is associated with better clinical performance(8). It has been suggested that research and clinical practice both require the skills of time management, efficiency, diligence and effective teamwork(9). This is supported by

our trainee perceptions that these skills are enhanced by research training. Evidence also suggests that research active NHS Trusts have lower mortality rates for acute admissions(10) and research engagement has a beneficial impact on healthcare performance(11). The skills identified as being enhanced by our participants may contribute to this improved performance. The NHS funds over a third of research training opportunities for doctors within the West Midlands and this study provides support for the continuation of that funding for development of a research active future medical workforce.

Strengths and limitations

Most previous studies have looked at CRTF funding schemes (3, 4). The 2015 MRC report attempted to look at a wider range of schemes in partnership with NIHR, Cancer Research UK, British Heart Foundation and the Wellcome Trust and to look at outcomes from those who failed to get funding through these schemes(5). However, the response rate to the study was poor with only 36% of invitees responding, of whom 72% of the responders had been awarded a fellowship. It is difficult to understand outcomes of those who did not receive a CRTF from this MRC led study. Data in this study on participants who benefitted from NHS administered funding is particularly novel. The present study benefitted from a systematic approach, inviting all participants who had completed OOPR within the West Midlands to participate in the study. Although this survey is limited by its questionnaire methodology, response rates were comparable to other studies addressing career outcomes for academic trainees(12, 13) and represented the wider community undertaking research training in the West Midlands. Although, demographics were similar between responding and non-responding trainees it is unknown whether funding source or other outcomes differed in those who failed to complete the survey. The study may also have a geographical bias as the study was undertaken in a single geographical training area, the West Midlands which has a slightly lower percentage of licensed female doctors (41%) and higher proportion of licensed doctors who are non-UK graduates relative to the UK average(14). As the study was retrospective in nature, it is possible that responses were affected by recall bias when trainees completed the survey.

Implications

The smaller proportion of NHS funded Participants having a higher degree conferred is disappointing. This may reflect differences in the qualities of successful applicants for NHS and CRTF funding or the rigorous peer review and interview process that is required before award of CRTFs. CRTFs are highly competitive with many schemes reporting only a 10-20% success rate. A recent study reported that medical trainees enrolled on PhD programmes at two research intensive universities had high levels of previous research experience(12); we did not examine previous research experience in our study. We did not identify any association between continuing clinical work and being awarded a higher degree. Using clinic or on-call commitment only or combined clinic and on-call commitment as a surrogate measure of work load there was no association between different clinical workloads and failure to be awarded a higher degree. Data collected in this study did not allow us to identify the reasons for the lower rate of degree awards to NHS research fellows, although there was a trend for trainees who were not awarded a higher degree to report dissatisfaction with their research supervisor. Consideration should be given by those who approve OOPR training to ensure that research projects are appropriately peer reviewed and supervised prior to approval if the trainee is not funded via a CRTF.

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Participants were very positive about their research training experience, with 95% recommending such experience to colleagues. However, returning to the workplace following a period of OOPR was identified as an area where improvements could be implemented. Despite the high number of participants reporting that OOPR had improved the quality of the clinical care they provide, a significant number also responded that they struggled when returning to the workplace. Those participants who maintained clinical contact during research training were less likely to struggle on return to work. It is recognised that clinical skills decline with time away from practice (15) and the GMC, in their recent quality review of academic training, note a requirement for clear return to clinical practice processes for those returning to clinical training from research (6). It is essential that those overseeing clinical training develop return to work packages that are tailored to the needs of participants. These should be developed, in accordance with the Joint Royal Colleges of Physicians Training Board and Academy of Medical Royal Colleges guidance, towards the end of research training with a focus on keeping in touch activities, agreement on learning and training needs and a record of re-introduction to clinical activities overseen by strong supervisory activity that ensures competence (16). This needs to be communicated to trainees. Research supervisors must also have the time and competencies to support Participants, as 70% of Participants not awarded a higher degree expressed dissatisfaction or neutral satisfaction with their research supervision. Due to the nature of the survey it is difficult to comment more on this issue.

Conclusion and further research

The results of this study provide strong evidence that research training is a valuable entity to almost all participants who undertake this experience, with 95% of participants stating they would recommend research training to other doctors. NHS employer funding provides an important source of capacity development for clinical academics and this report supports continuation of that funding stream. Further research is required to understand the reasons behind lower degree conferment for those funded by the NHS and the support required to improve this.

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Footnotes

Contributors CM and LH developed the questionnaire. CM collected the data. All authors (CM, MM, RS, LH) conceived the data analysis plan and later made substantive contributions to the interpretation of the findings and the writing of this article. CM and LH conducted the quantitative data analysis and reporting. CM, MM, RS and LH wrote the first and subsequent drafts. All authors (CM, MM, RS, LH) critically reviewed and edited drafts and approved the final version of the manuscript. They also had full access to all of the data (including statistical reports and tables) in the study and can take responsibility for the integrity of the data and the accuracy of the data analysis. The study guarantor is LH.

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Competing interests All authors have completed the ICMJE uniform disclosure form. CM, RS and LH declare that their salary is, in part, paid for by Health Education England in the West Midlands; no other financial relationships with any organisations that might have an interest in the submitted work in the previous three years; no other relationships or activities that could appear to have influenced the submitted work.

Ethics approval: The study protocol was approved by the University of Worcester Research Ethics Committee and all Participants provided informed consent prior to completing the survey.

Provenance and peer review Not commissioned; externally peer reviewed.

Data sharing statement No additional data are available

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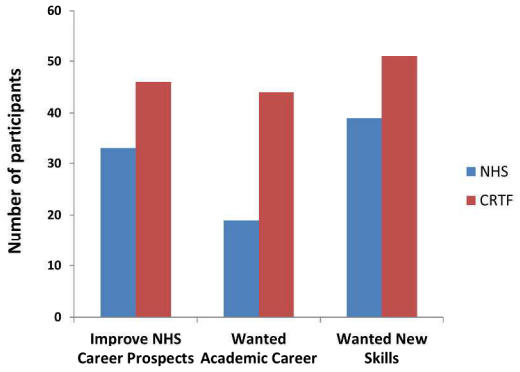
Figure Legends

Figure 1.

Reported motivation for undertaking research training by NHS funded and CRTF participants.

Figure 2.

Aspects of clinical care that Participants felt had improved following OOPR



Reported motivation for undertaking research training by NHS funded and CRTF participants.

254x190mm (300 x 300 DPI)

Aspects of clinical care that Participants felt had improved following OOPR

254x190mm (300 x 300 DPI)

OOPR Survey 2016

Welcome to the OOPR Survey

Dear Participant,

You have previously taken time Out of Programme to undertake a period of Research (OOPR). We are interested in why you did this and the outcome or benefits you feel this may have had in relation to your career, research skills and clinical practice.

We would greatly appreciate your completion of this questionnaire to help us understand what motivates trainees to undertake a period of OOPR, and what you feel are the perceived and actual benefits of this for your future career.

Some of the questions ask about your personal view of various aspects of your experience, and we recognise that for some people these may be sensitive questions. Please be reassured that any information you provide in this questionnaire will only be seen by the research team, and will never be shared with anyone else in a way that could enable them to identify you.

Completion time for the questionnaire is approximately 15 minutes.

Many thanks for your participation.

Professor Lorraine Harper
Associate Dean for Academic Programmes at Health Education West Midlands
Head of Clinical Academic Training, University of Birmingham

OOPR Survey 2016

In completing this questionnaire, you agree to the following:

1. I understand the research aims

2. The research process has been fully explained and I understand what my participation will involve

3. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving reason

4. I agree to the use of [anonymised quotes/aggregated results] in publications

5. I understand and agree to how my responses will be used and stored

6. I agree to take part in the study

OOPR Survey 2016

Background Information

1. Your Name

* 2. What is your gender?

- Female
- Male

3. What is your Age?

OOPR Survey 2016

4. What was your year of graduation?

* 5. What is your current specialty area?

* 6. What motivated you to undertake OOPR? Choose all that apply.

- [ ] To improve NHS career prospects
- [ ] Wanted an academic career
- [ ] Wanted to develop new skills

Other (please specify)

OOPR Survey 2016

* 7. Stage of training when OOPR

- ST1-2
- ST3-4
- ST5-6

* 8. Length of OOPR undertaken

- 1 year
- 2 years
- 3 years

Other (please specify)

OOPR Survey 2016

* 9. Who funded your OOPR? Tick more than one option if split funded

- [ ] Wellcome Trust
- [ ] CRUK
- [ ] MRC
- [ ] Other Charity
- [ ] Self-funded
- [ ] Employer

Other (please specify)

OOPR Survey 2016

OOP Research Experience

* 10. Which clinical discipline was your OOPR experience based in?

* 11. What area was your research in?

Other (please specify)

OOPR Survey 2016

* 12. Did you complete your research?

- Yes
- No

13. Please tell us more about the reason why you 'did not' complete your research

OOPR Survey 2016

* 14. How satisfied were you with the outcome of your research?

Very satisfied	Satisfied	Neither satisfied or dissatisfied	Dissatisfied	Very dissatisfied
○	○	○	○	○

If you were dissatisfied, how could this have been improved?

* 15. How satisfied were you that you completed your research as planned?

Very satisfied	Satisfied	Neither satisfied or dissatisfied	Dissatisfied	Very dissatisfied
○	○	○	○	○

If you were dissatisfied, how could this have been improved?

OOPR Survey 2016

* 16. How satisfied were you with the advice and support from the following:

	Very satisfied	Satisfied	Neither satisfied or dissatisfied	Dissatisfied	Very dissatisfied
Your Supervisor	○	○	○	○	○
Specialty Training Committee	○	○	○	○	○

Please add any additional information you wish to provide regarding the advice and support you received.

* 17. Did you feel isolated from your clinical peers whilst undertaking OOPR?

To a very large extent	To a large extent	Somewhat	To a small extent	To a very small extent
○	○	○	○	○

Please add any additional information you wish to provide here.

OOPR Survey 2016

* 18. Did you ever feel contradictory demands were placed on you? ie. were you asked to give up your protected research time?

Always	Often	Sometimes	Rarely	Never
○	○	○	○	○

Please add any additional information you wish to provide here.

* 19. Did you continue with some clinical work during your OOPR?

- ○ Yes
- ○ No

OOPR Survey 2016

* 20. If you undertook clinical work during your OOPR, was it

- [ ] On-call
- [ ] Clinics

If clinics, please state frequency

* 21. Did continuing with clinical work during your OOPR assist with your return to clinical practice?

To a very large extent	To a large extent	Somewhat	To a small extent	To a very small extent
○	○	○	○	○

OOPR Survey 2016

Progress Following OOPR

* 22. What degree was awarded?

Other (please specify)

OOPR Survey 2016

Progress Following OOPR

* 23. If a degree was not awarded, why?

- Did not submit thesis
- Did not register for degree
- Not associated with a University
- Did not pass at Viva

Other (please specify)

OOPR Survey 2016

* 24. Have you reached CCT?

- Yes
- No

OOPR Survey 2016

* 25. What post do you hold currently?

- Academic Post
- Clinical Post

OOPR Survey 2016

26. Academic Post - Choose One

Other (please specify)

OOPR Survey 2016

27. Clinical Post - Choose one

Other (please specify)

OOPR Survey 2016

* 28. What are your current long term career plans?

- [ ] Clinical post - no teaching or research
- [ ] Clinical post - some teaching responsibility
- [ ] Clinical post - some research time
- [ ] Clinical post - some teaching and research
- [ ] Clinical academic post
- [ ] Undecided

Other (please specify)

* 29. How influential has your OOPR experience been in informing your long term career plans?

Extremely influential	Very influential	Moderately influential	Slightly influential	Not at all influential
○	○	○	○	○

OOPR Survey 2016

30. In what way did your OOPR experience influence your long term career plans?

* 31. Have you participated in research since completing your OOPR?

- Yes
- No

OOPR Survey 2016

* 32. Which best describes your continued research participation?

- [ ] As a Clinical Lecturer
- [ ] Within further training
- [ ] Grant funded
- [ ] Within PAs as a Consultant

Other (please specify)

* 33. How much of your time do you currently spend engaging in research activity?

- ( ) Up to 25%
- ( ) 25 - 50%
- ( ) Over 50%

OOPR Survey 2016

* 34. To what extent did undertaking research as part of your OOPR improve the quality of the clinical care you provide?

Significantly improved	Moderately improved	No impact on clinical care
○	○	○

OOPR Survey 2016

* 35. What aspects of your clinical care were improved? Choose all that apply.

- [ ] Understanding of evidence-based medicine
- [ ] Improved critical assessment of complex problems
- [ ] Improved team working
- [ ] Improved time management
- [ ] Improved communication skills
- [ ] Improved trainee supervision

Other (please specify)

OOPR Survey 2016

* 36. How many publication have you achieved?

1 - 2	3 - 4	5 +
○	○	○

* 37. Did you struggle when you returned to clinical work?

- ○ Yes
- ○ No

OOPR Survey 2016

* 38. In which of the following areas do you feel you struggled? Choose all that apply.

- [ ] Reduction of clinical skills
- [ ] Lack of clinical supervision
- [ ] Reintegration to clinical team/environment

Other (please specify)

OOPR Survey 2016

* 39. How satisfied were you with the support you received upon return to clinical work, with a return to work package?

Very satisfied	Satisfied	Neither satisfied or dissatisfied	Dissatisfied	Very dissatisfied
○	○	○	○	○

If you were dissatisfied with the support you received, how could this have been improved?

* 40. How would you rate the quality of support you received upon your return to clinical work?

Poor	Fair	Good	Very good	Excellent
○	○	○	○	○

How could the quality of support have been improved?

* 41. Would you recommend an Out of Programme to undertake Research to other doctors?

○ Yes

○ No

Please provide any additional information you wish to provide regarding your answer.

42. Please provide any additional information in relation to your OOPR experience you wish to add. (this information will be treated in the strictest confidence)

OOPR Survey 2016

Thank you for taking the time to complete this questionnaire.

If you have any questions relating to this questionnaire please contact Charlotte Maybury at c.maybury@bham.ac.uk

BMJ Open

How does the outcome of research training fellowships funded via the NHS compare with that from competitively funded fellowships from the MRC and other charities – a cross-sectional retrospective survey of trainees undertaking research training in the West Midlands

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Primary Subject Heading:	Medical education and training
Secondary Subject Heading:	Medical education and training
Keywords:	MEDICAL EDUCATION & TRAINING, academic training, research funding

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How does the outcome of research training fellowships funded via the NHS compare with that from competitively funded fellowships from the MRC and other charities – a cross-sectional retrospective survey of trainees undertaking research training in the West Midlands

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Word count 3471

Abstract

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Objectives - This study aimed to investigate the impact of research training funded via the NHS on medical trainees compared to traditional clinical research training fellowships (CRTF).

Design, Setting and Participants– online survey of 221 clinical trainees who had completed a period of research during their clinical training between 2009-2015 in the West Midlands

Main outcome measures – research outcomes

Results – Overall response rate was 59%, of whom 72 participants were funded by CRTFs and 51 funded by the NHS. Although, Participants with CRTFs were more likely to be awarded a higher degree compared to those on NHS administered funding (66/72 CRTFs , 37/51 NHS, p=0.005), similar proportions of NHS and CRTF funded Participants entered clinical lecturer posts on completing initial research training (8/51 NHS and 16/72 CRTF, p=0.37). 77% of participants had 3 or more publications (CRTF 59, NHS 39 p>p=0.72). Fifty seven participants had completed clinical training; similar proportions of CRTF and NHS funded trainees had research included in their consultant contract (12/22 NHS and 14/26 CRTF, p=0.96) or were appointed to academic posts (3 of 25 NHS funded, 6 of 32 CRTF p>0.05). 95% of Participants would recommend to colleagues and 82% of Participants felt the research experience improved their provision of clinical care with no difference between CRTF and NHS funded participants (p=0.49). Continuing to participate in clinical work during the research reduced reports of trainee difficulty on returning to clinical work (23/108 continued clinical work vs 12/22 no clinical work, p=0.001).

Conclusion - Research training funded by the NHS provides a quality experience and contributes to the clinical academic capacity within the UK. More needs to be done to support NHS Participants to successfully achieve a higher degree.

Strengths and limitations of this study

- The study systematically identified all clinical trainees from the West Midlands undertaking research using a prospectively collected database
- The study uses conferment of degree, progression to further academic appointments, number of publications and participants' perception of impact on clinical care as measures of success.
- The study uses a retrospective questionnaire based design
- The study defines as NHS funding all sources of research training funding , other than self-funding and CRTFs when trainees self-identified as funded by the NHS. The study is unable to identify these sources of funding in more detail. Trainees in receipt of clinical research training fellowships were asked to identify whether their funding was from MRC, CRUK, NIHR, Wellcome Trust or other charities.
- Due to the characteristics of medical trainees in the West Midlands the study may not be widely generalizable.

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Introduction

Effective translation of scientific discoveries into clinical practice has a major impact on improving medical care. By bringing a clinical perspective, academic clinicians are ideally placed to identify a need for more scientific evidence in patient care and to incite new scientific questions. Clinical academics play a significant role in medical research, especially in shortening the time to translation between basic research and clinical practice (1, 2). In order to follow a clinical academic career path, junior doctors (trainees) are required to undertake a period of dedicated biomedical research training with the aim of attaining a higher degree, such as a PhD or MD. Funding is available from a variety of different sources. Organisations such as the Medical Research Council (MRC), National Institute of Health Research (NIHR), and medical charities fund clinical research training fellowships (CRTFs), of 2-3 years duration. Approximately 350 of these CRTFs are awarded per year through open competition (3). CRTFs provide excellence in research training and successfully obtaining a competitive CRTF is predictive of progression to a clinical academic leadership role (3-5), although a recent review reported that only one third of people completing a CRTF progress to more senior academic posts (5).

Research fellow training is also funded by alternative sources in the UK which are administrated through the National Health Service (NHS). The money to fund these fellows is often provided from local hospital charitable funds and locally held research funds provided by industry to individual consultants, fellows are then employed via the NHS. The process for a trainee to secure these fellowships differs from that undertaken for CRTFs; the funding decision is generally made at a local level within the NHS, the research project may be funded without undergoing robust peer-review and appointment is often via closed procedures. Little is reported about the experience of these trainees, the quality of their research and career outcomes, or their satisfaction with the research training provided.

The GMC quality review of academic training in 2014 provided a detailed insight into the views of trainees undertaking research training (6). Although most trainees had a positive view of their research training, there was no assessment of whether funding source impacted on this. The GMC review identified concerns from both trainees and their supervisors regarding trainees' potential loss of clinical skills and the processes for supporting their return to clinical practice following a period of research training. It did not investigate whether trainees perceived their clinical practice benefitted from the research experience.

To build upon the previous research, we aimed to systematically survey all trainees within the Health Education England West Midlands clinical training programme who undertook a period of research training. We aimed to compare the experience and outcomes of trainees funded by the NHS with those funded through CRTFs using an on-line questionnaire. In addition, we aimed to investigate the trainees' satisfaction with the research and how the research training impacted on their return to clinical training.

Methods

The Survey

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An on-line questionnaire was sent to West Midland's trainees who had undertaken a period of research training and subsequently returned to clinical training between 2009 and 2015. The questionnaire was administered from January to May 2016. Four reminders were sent to encourage participation. Trainees were identified from records held by the Local Education and Training Board, which were collected prospectively when trainees applied for approval to take time "Out of Programme" for research (OOPR). The study protocol was approved by the University of Worcester Research Ethics Committee and all Participants provided informed consent prior to completing the survey.

The Questions

The survey questions covered three areas: *trainee characteristics, including funding source, experience during research training* and *progress following completion of research training* (see Appendix 1 for full questionnaire). The aim of the survey was to gather mainly quantitative data but also allowed Participants to clarify or qualify their responses by the addition of free text answers. The questionnaire was designed to allow comparison between Participants who self-identified as being in receipt of NHS funding for their research training, and those who obtained competitive CRTFs. We did not specifically ask trainees where funding came from when defined as NHS funded. Those in receipt of CRTFs were asked to identify whether their funding was from MRC, CRUK, NIHR, Wellcome Trust or other charities. We also aimed to assess the overall value of the research experience. This included satisfaction with the outcome of their research and the support they received from their academic supervisor; we did not ask whether the academic supervisor was employed by a Higher Education Institute or the NHS, although many supervisors work across both sectors. Participants were also asked to quantify the influence they perceived their research training has had on their career or future career choice and if they felt there had been any impact on the quality of the clinical care they provided on return to clinical practice. Finally, Participants were asked about their progress following research experience on return to clinical training (Full questionnaire appendix 1). The survey was piloted in 5 trainees, for facility of completion and excluding ambiguous questions, prior to contacting the wider trainee population.

Data Analysis

The questions and measurement scales used in the questionnaire were largely adopted from previous studies that also measured career choice(5) and participant satisfaction (National Student Survey, 2016), in order to provide content reliability and validity. The level of internal consistency of the items in the satisfaction scales was acceptable at 0.77 as measured by Cronbach's Alpha test. For the purposes of this study Participants who identified NHS funding but then progressed to CRTFs were considered to be NHS funded. Self-funding Participants were excluded from the analysis of funding source.

Categorical variables are shown as number (percentage). Differences between groups were analysed by Pearson's chi-square test. Analysis of free text responses was performed using conventional content analysis(7)to identify themes and the number of Participants mentioning each recurrent theme was counted.

Results

Survey Response rates and Characteristics of Participants

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Two hundred and twenty two Participants completed OOPR training between 2009 and 2015. The overall response rate to the survey was 138/222 (62%), with eight responses removed due to incomplete data, which reduced the final response rate to 130 (58.8%).

The genders, training stages and specialties of the 130 Participants who responded were comparable to the overall West Midlands trainee population who undertook research (table 1). Participants were enrolled in a broad range of secondary care specialties with the majority in hospital medicine (51%) or surgery (26%). One hundred and twenty three (94%) were in specialty training. Ninety two (71%) Participants undertook a period of research training of three years or more. Participants were asked to describe the research they undertook with 52% having some laboratory experience (experimental/translational research) and 30% were involved in running clinical trials. It was notable that although there were fewer women than men undertaking research there were no differences in the gender distribution across the research areas (table 1) defined by the participants (p=0.443).

Responder Population	Clinical Research Training Fellowships Total =72	NHS Funded research training Total =51	All Survey respondents Total = 130 (%)	Survey non respondents Total= 91 (%)	p=
Gender					0.710
Men	45 (62%)	37 (72%)	86 (66%)	58 (63%)	
Women	27 (38%)	16 (28%)	44 (34%)	33(37%)	
Training Level					0.287
ST1-2	3 (4%)	3 (6%)	7 (5%)	4 (4%)	
ST3-4	29 (40%)	19 (37%)	48 (37%)	25 (27%)	
ST5-6+	40 (56%)	29 (57%)	75(58%)	62 (68%)	
Specialty					0.648
Anaesthetics	2 (3%)	3 (6%)	5 (4%)	2 (2%)	
Medicine	40 (56%)	24 (47%)	67 (51.5%)	53 (59%)	
Obstetrics and gynaecology	5 (7%)	7 (14%)	15 (11.5%)	6 (7)%	
Paediatrics	4 (6%)	4 (8%)	8 (6%)	3 (3%)	
Psychiatry	1 (1%)	0 (0%)	1 (1%)	1(1%)	
Surgery	20 (27%)	13 (25%)	34 (26%)	26 (28%)	
Years in research median [IQR]	3 [3,3]	3 [2,3]	3 [2, 3]		
Research Area					
Applied health research [M:F]	8 [3:5]	4 [0:4]	16 (12%) [8:7]		
Experimental	24	17	40 (31%)		

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[M:F]	[14:10]	[11:6]	[25:16]		
Clinical trials [M:F]	19 [13:6]	18 [12:6]	40 (31%) [28:12]		
Translational [M:F]	21 [15:6]	12 [9:3]	34 (26%) [25:9]		

Table 1. Responder Profile

Comparisons are made between the whole population who responded and did not respond

Abbreviations: ST, specialty training level; M, male; F, female

Funding Source

Seventy two Participants (55%) held competitively funded CRTFs (11 from the Wellcome Trust, 12 from MRC, 11 NIHR and 38 other charities) and 51 Participants (39%) reported the NHS as a source of funding, three of whom subsequently obtained CRTFs (1 MRC, 2 other). Seven Participants identified as self-funding. There was no difference in the funding sources between men and women (p=0.395) or associated with specialty (p=0.91). The majority of Participants (58%) undertook research in the later years of clinical training (ST 5-6 or above); there was no association between stage of training and funding source (p=0.89). There was no difference in duration of research (p=0.76) or area of research (p=0.69) when comparing funding source.

Motivation

Participants were asked about their motivation to undertake the research training and were provided with three options to select; improving career prospects, developing new skills and wishing to pursue an academic career. Responders were able to select all responses that were applicable, or add a free text response. The majority of participants (68%) cited more than one reason for undertaking research training. The commonest motivating factors for Participants to undertake research training were a desire to develop new skills and improve NHS career prospects (Figure 1). Of those who selected improving NHS career prospects, 40% also reported that they wished to pursue an academic career. Participants funded through CRTFs were more likely to report wanting an academic career as motivation for undertaking research than those funded by the NHS (44/72 CRTFs cf 20/51 NHS p=0.017). Thirteen participants reported additional reasons which include three wishing to experience an academic career (2 CRTF, 1 NHS), two to provide better care (1 CRTF, 1 NHS), two to delay CCT (both CRTF), one advised by mentors (NHS), three to understand mechanism of disease better (2 CRTF and 1 NHS), one as it provided flexibility to spend more time with a young family (NHS) and one to provide the opportunity to work overseas (CRTF).

Research training success

One hundred and seven (82%) Participants were awarded a higher degree following their research training (66 PhD, 31 MD, 10 masters level qualification). At the time of the questionnaire 23 Participants had not been awarded a higher degree but eight planned to submit a thesis in the future and three were resubmitting after corrections had been addressed. Of the others, two NHS funded

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Participants reported that they had not registered with a university for a higher degree, two did not have sufficient funding to complete their research (1 NHS and 1 CRTF) and six Participants did not provide an explanation. Participants with a CRTF were more likely to have been awarded a degree than those with NHS funding (66/72 CRTFs , 37/51 NHS, p=0.005) (table 2).There was no difference in the type of degree undertaken based on funding (45/66 PhDs CTRF cf 20/37 PhDs NHS, p=0.259) and no difference between those awarded a degree and their specialty (p=0.76) or stage of training (p=0.91).

One hundred and seven participants (82%) were satisfied with their research supervisor. Participants who were not awarded a higher degree were more likely to report dissatisfaction or were neutral about the support received from their research supervisor although this did not reach statistical significance (7/23 [30%] vs 16/107 [15%]; p=0.078). Only four Participants provided additional information on why they were dissatisfied, two identified supervisor's lack of competence in the area of research, and two identified supervisor absence or supervisor's lack of time to supervise. There was no difference with supervisor satisfaction reported by Participants when comparing CRTF and NHS funding (table 2)

Participants were asked about publication record (0, 1-2, 3-4 or ≥5 publications), only two Participants reported no publications, both were recipients of CRTFs; 77% of Participants reported three or more publications with no difference between those funded by CRTF or NHS (table 2).

Ninety five per cent of the Participants reported that they would recommend a period of research training to colleagues. (table 2).

Impact of research training on career

Participants were asked about the impact of the research training on their career choice; 92% of participants felt that it had an impact, with 69 of 130 participants describing the impact as very or having extreme impact. Participants who were awarded a PhD were more likely to wish to pursue a formal clinical academic role whereas participants undertaking an MD were more likely to wish to pursue an NHS career with research content (30/66 PhD cf 7/31 MD who desired a formal clinical academic career, p=0.031).

Eighty five (69%) Participants have continued to participate in research activity following completion of their research; of whom 24 (28%) progressed into a clinical lecturer post following completion of their research training (8/51 NHS and 16/72 CRTF, p=0.37). There was no difference between funding sources and continued participation in research (table 2). At the time of the questionnaire 57 participants had finished clinical training and were employed at consultant level, nine had progressed to further academic positions (3 of 25 NHS funded, 6 of 32 CRTF p=0.49) and 26 participants in clinical posts had research included as part of their consultant programmed activities (12/22 NHS and 14/26 CRTF p=0.96)

Participants were asked whether their research training improved their provision of clinical care. They were then provided with six options to describe the impact the research experience may have had with the opportunity to provide their own free text answer. Participants were allowed to

register more than one answer (Figure 2). One hundred and six (82%) participants felt that their OOPR experience had improved the quality of clinical care they provide. The most frequently stated areas of improvement included better understanding of evidence-based medicine and improved critical assessment of complex problems.

	CRTF Funders (n.72)	NHS (n.51)	Self-Funded (n=7)	p
Degree Awarded	66 (92%)	37 (73%)	4 (57%)	0.005
Publications 3 or more	57 (79%)	39 (76%)	5 (71%)	0.72
Satisfaction with Supervisor Support	59(82%)	42 (82%)	6 (86%)	0.95
Participated in research on return to clinical work	53 (73%)	30 (59%)	5 (71%)	0.085
Clinical Academic as Long Term Career Choice on return to work	22 (31%)	11 (22%)	2 (29%)	0.27
Continued clinical work during research	57 (79%)	45 (88%)	6 (86%)	0.19
Struggle on return to work	21(30%)	12 (24%)	2 (29%)	0.48

Table 2. Analysis by funding support
Abbreviations: CRTF, clinical research training fellowship; NHS, National Health Service

Maintenance of Clinical Skills and Return to the Clinical Workplace

One hundred and eight (83%) reported that they continued to undertake some clinical work during their research training and all of these individuals felt that continuing with clinical work helped them to some extent with their return to clinical practice. The type of clinical work undertaken was on-call duties only (n=25 [24%]), clinics only (n=40 [37%]) or both (n=43 [48%]). There were no differences between funding source in clinical commitment (NHS 45/51 participants, CRTF 57/72 p=0.19). There

was no association between continuing clinical work and being awarded a degree (p=0.246) (table 3).

	None	Clinic only	On-call only	Both on-call and clinic
PhD	14	24	9	19
MD	2	10	7	12
MSc	4	4	0	2
No degree	2	2	9	10

Table 3 Number of participants continuing in clinical activity during research training

Fifty nine (45%) Participants reported feeling somewhat or significantly isolated from clinical peers whilst undertaking their research. Feelings of isolation were less common in those who continued clinical work compared to those who did not, although this was not statistically significant (42% vs 61%, p=0.059).

Thirty five participants (27%) reported that they struggled following return to clinical work after their research training, with a reduction in clinical skills being the biggest concern (26/35 Participants), followed by concerns about re-integration into the clinical team/environment (17/35 Participants). Other themes identified by participants included; a lack of clinical supervision (2 Participants) and difficulty balancing the workload of completing their thesis submission and clinical training (3 Participants). Participants who undertook clinical work during research training were significantly less likely to struggle on returning to work than those who did not undertake clinical work (23/108 continued clinical work vs 12/22 no clinical work, p=0.001).

Discussion

Although it is well established that CRTFs provided by the MRC and charities are important in the capacity development of clinical academics (3-5) the role of the NHS in this regard has not been previously investigated. A third of Participants in the West Midlands were funded through the NHS to undertake formal research training. The research experience of Participants supported by funding administered by the NHS is positive and has a similar impact on future careers, in the short term, to those supported by CRTFs. Overall, 28% of Participants progressed to a clinical lecturer role, of whom one third had received funding from the NHS. Participants who were recipients of CRTFs had higher rates of degree conferment (90%) than those funded from the NHS (68%). Despite this there was no difference in the proportions of NHS and CRTF funded Participants continuing to participate in research following return to clinical work and they had similar success in achieving three or more publications. It is recognised that completion of a higher degree may not be a reliable surrogate marker of future engagement in research and prospective studies investigating the outcome of research training based on funding source is required to better understand the real impact on longterm research engagement by clinicians. This is the first study to provide evidence that research training for doctors funded through the NHS is important in building a research active clinical workforce.

Trainee perception of the impact of research training on their clinical abilities has not previously been reported. Participants reported that they felt the experience enhanced their clinical

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performance and 95% would recommend a period of research training. This perception is supported by recent findings that scholarly activity, as measured by publication record, is associated with better clinical performance(8). It has been suggested that research and clinical practice both require the skills of time management, efficiency, diligence and effective teamwork(9). This is supported by our trainee perceptions that these skills are enhanced by research training. Evidence also suggests that research active NHS Trusts have lower mortality rates for acute admissions(10) and research engagement has a beneficial impact on healthcare performance(11). The skills identified as being enhanced by our participants may contribute to this improved performance. The NHS funds over a third of research training opportunities for doctors within the West Midlands and this study provides support for the continuation of that funding for development of a research active future medical workforce.

Strengths and limitations

Most previous studies have looked at CRTF funding schemes (3, 4). The 2015 MRC report attempted to look at a wider range of schemes in partnership with NIHR, Cancer Research UK, British Heart Foundation and the Wellcome Trust and to look at outcomes from those who failed to get funding through these schemes(5). However, the response rate to the study was poor with only 36% of invitees responding, of whom 72% of the responders had been awarded a fellowship. It is difficult to understand outcomes of those who did not receive a CRTF from this MRC led study. Data in this study on participants who benefitted from NHS administered funding is particularly novel. The present study benefitted from a systematic approach, inviting all participants who had completed OOPR within the West Midlands to participate in the study. Although this survey is limited by its questionnaire methodology, response rates were comparable to other studies addressing career outcomes for academic trainees(12, 13) and represented the wider community undertaking research training in the West Midlands. Although, demographics were similar between responding and non-responding trainees it is unknown whether funding source or other outcomes differed in those who failed to complete the survey. The study may also have a geographical bias as the study was undertaken in a single geographical training area, the West Midlands which has a slightly lower percentage of licensed female doctors (41%) and higher proportion of licensed doctors who are non-UK graduates relative to the UK average(14). As the study was retrospective in nature, it is possible that responses were affected by recall bias when trainees completed the survey.

Implications

The smaller proportion of NHS funded Participants having a higher degree conferred is disappointing. This may reflect differences in the qualities of successful applicants for NHS and CRTF funding or the rigorous peer review and interview process that is required before award of CRTFs. CRTFs are highly competitive with many schemes reporting only a 10-20% success rate. A recent study reported that medical trainees enrolled on PhD programmes at two research intensive universities had high levels of previous research experience(12); we did not examine previous research experience in our study. We did not identify any association between continuing clinical work and being awarded a higher degree. Using clinic or on-call commitment only or combined clinic and on-call commitment as a surrogate measure of work load there was no association between different clinical workloads and failure to be awarded a higher degree. Data collected in this study did not allow us to identify the reasons for the lower rate of degree awards to NHS research fellows,

although there was a trend for trainees who were not awarded a higher degree to report dissatisfaction with their research supervisor. Consideration should be given by those who approve OOPR training to ensure that research projects are appropriately peer reviewed and supervised prior to approval if the trainee is not funded via a CRTF.

Participants were very positive about their research training experience, with 95% recommending such experience to colleagues. However, returning to the workplace following a period of OOPR was identified as an area where improvements could be implemented. Despite the high number of participants reporting that OOPR had improved the quality of the clinical care they provide, a significant number also responded that they struggled when returning to the workplace. Those participants who maintained clinical contact during research training were less likely to struggle on return to work. It is recognised that clinical skills decline with time away from practice (15) and the GMC, in their recent quality review of academic training, note a requirement for clear return to clinical practice processes for those returning to clinical training from research (6). It is essential that those overseeing clinical training develop return to work packages that are tailored to the needs of participants. These should be developed, in accordance with the Joint Royal Colleges of Physicians Training Board and Academy of Medical Royal Colleges guidance, towards the end of research training with a focus on keeping in touch activities, agreement on learning and training needs and a record of re-introduction to clinical activities overseen by strong supervisory activity that ensures competence (16). This needs to be communicated to trainees. Research supervisors must also have the time and competencies to support Participants, as 70% of Participants not awarded a higher degree expressed dissatisfaction or neutral satisfaction with their research supervision. Due to the nature of the survey it is difficult to comment more on this issue.

Conclusion and further research

The results of this study provide strong evidence that research training is a valuable entity to almost all participants who undertake this experience, with 95% of participants stating they would recommend research training to other doctors. Research funded through the NHS provides an important source of capacity development for clinical academics and this report supports continuation of that funding stream. Further research is required to understand the reasons behind lower degree conferment for those funded by the NHS and the support required to improve this.

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Footnotes

Contributors CM and LH developed the questionnaire. CM collected the data. All authors (CM, MM, RS, LH) conceived the data analysis plan and later made substantive contributions to the interpretation of the findings and the writing of this article. CM and LH conducted the quantitative data analysis and reporting. CM, MM, RS and LH wrote the first and subsequent drafts. All authors (CM, MM, RS, LH) critically reviewed and edited drafts and approved the final version of the manuscript. They also had full access to all of the data (including statistical reports and tables) in the study and can take responsibility for the integrity of the data and the accuracy of the data analysis. The study guarantor is LH.

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Competing interests All authors have completed the ICMJE uniform disclosure form. CM, RS and LH declare that their salary is, in part, paid for by Health Education England in the West Midlands; no other financial relationships with any organisations that might have an interest in the submitted work in the previous three years; no other relationships or activities that could appear to have influenced the submitted work.

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Ethics approval: The study protocol was approved by the University of Worcester Research Ethics Committee and all Participants provided informed consent prior to completing the survey.

Provenance and peer review Not commissioned; externally peer reviewed.

Data sharing statement No additional data are available

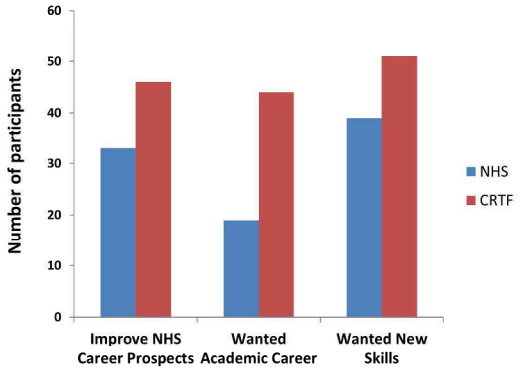
Figure Legends

Figure 1.

Reported motivation for undertaking research training by NHS funded and CRTF participants.

Figure 2.

Aspects of clinical care that Participants felt had improved following OOPR



Reported motivation for undertaking research training by NHS funded and CRTF participants.

254x190mm (300 x 300 DPI)

Aspects of clinical care that Participants felt had improved following OOPR

254x190mm (300 x 300 DPI)

OOPR Survey 2016

Welcome to the OOPR Survey

Dear Participant,

You have previously taken time Out of Programme to undertake a period of Research (OOPR). We are interested in why you did this and the outcome or benefits you feel this may have had in relation to your career, research skills and clinical practice.

We would greatly appreciate your completion of this questionnaire to help us understand what motivates trainees to undertake a period of OOPR, and what you feel are the perceived and actual benefits of this for your future career.

Some of the questions ask about your personal view of various aspects of your experience, and we recognise that for some people these may be sensitive questions. Please be reassured that any information you provide in this questionnaire will only be seen by the research team, and will never be shared with anyone else in a way that could enable them to identify you.

Completion time for the questionnaire is approximately 15 minutes.

Many thanks for your participation.

Professor Lorraine Harper
Associate Dean for Academic Programmes at Health Education West Midlands
Head of Clinical Academic Training, University of Birmingham

OOPR Survey 2016

In completing this questionnaire, you agree to the following:

1. I understand the research aims

2. The research process has been fully explained and I understand what my participation will involve

3. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving reason

4. I agree to the use of [anonymised quotes/aggregated results] in publications

5. I understand and agree to how my responses will be used and stored

6. I agree to take part in the study

OOPR Survey 2016

Background Information

1. Your Name

* 2. What is your gender?

- Female
- Male

3. What is your Age?

OOPR Survey 2016

4. What was your year of graduation?

* 5. What is your current specialty area?

* 6. What motivated you to undertake OOPR? Choose all that apply.

- [ ] To improve NHS career prospects
- [ ] Wanted an academic career
- [ ] Wanted to develop new skills

Other (please specify)

OOPR Survey 2016

* 7. Stage of training when OOPR

- ST1-2
- ST3-4
- ST5-6

* 8. Length of OOPR undertaken

- 1 year
- 2 years
- 3 years

Other (please specify)

OOPR Survey 2016

* 9. Who funded your OOPR? Tick more than one option if split funded

- [ ] Wellcome Trust
- [ ] CRUK
- [ ] MRC
- [ ] Other Charity
- [ ] Self-funded
- [ ] Employer

Other (please specify)

OOPR Survey 2016

OOP Research Experience

* 10. Which clinical discipline was your OOPR experience based in?

* 11. What area was your research in?

Other (please specify)

OOPR Survey 2016

* 12. Did you complete your research?

- Yes
- No

13. Please tell us more about the reason why you 'did not' complete your research

OOPR Survey 2016

* 14. How satisfied were you with the outcome of your research?

Very satisfied	Satisfied	Neither satisfied or dissatisfied	Dissatisfied	Very dissatisfied
○	○	○	○	○

If you were dissatisfied, how could this have been improved?

* 15. How satisfied were you that you completed your research as planned?

Very satisfied	Satisfied	Neither satisfied or dissatisfied	Dissatisfied	Very dissatisfied
○	○	○	○	○

If you were dissatisfied, how could this have been improved?

OOPR Survey 2016

* 16. How satisfied were you with the advice and support from the following:

	Very satisfied	Satisfied	Neither satisfied or dissatisfied	Dissatisfied	Very dissatisfied
Your Supervisor	○	○	○	○	○
Specialty Training Committee	○	○	○	○	○

Please add any additional information you wish to provide regarding the advice and support you received.

* 17. Did you feel isolated from your clinical peers whilst undertaking OOPR?

To a very large extent	To a large extent	Somewhat	To a small extent	To a very small extent
○	○	○	○	○

Please add any additional information you wish to provide here.

OOPR Survey 2016

* 18. Did you ever feel contradictory demands were placed on you? ie. were you asked to give up your protected research time?

Always	Often	Sometimes	Rarely	Never
○	○	○	○	○

Please add any additional information you wish to provide here.

* 19. Did you continue with some clinical work during your OOPR?

- ○ Yes
- ○ No

OOPR Survey 2016

* 20. If you undertook clinical work during your OOPR, was it

- [ ] On-call
- [ ] Clinics

If clinics, please state frequency

* 21. Did continuing with clinical work during your OOPR assist with your return to clinical practice?

To a very large extent	To a large extent	Somewhat	To a small extent	To a very small extent
○	○	○	○	○

OOPR Survey 2016

Progress Following OOPR

* 22. What degree was awarded?

Other (please specify)

OOPR Survey 2016

Progress Following OOPR

* 23. If a degree was not awarded, why?

- Did not submit thesis
- Did not register for degree
- Not associated with a University
- Did not pass at Viva

Other (please specify)

OOPR Survey 2016

* 24. Have you reached CCT?

- Yes
- No

OOPR Survey 2016

* 25. What post do you hold currently?

- Academic Post
- Clinical Post

OOPR Survey 2016

26. Academic Post - Choose One

Other (please specify)

OOPR Survey 2016

27. Clinical Post - Choose one

Other (please specify)

OOPR Survey 2016

* 28. What are your current long term career plans?

- [ ] Clinical post - no teaching or research
- [ ] Clinical post - some teaching responsibility
- [ ] Clinical post - some research time
- [ ] Clinical post - some teaching and research
- [ ] Clinical academic post
- [ ] Undecided

Other (please specify)

* 29. How influential has your OOPR experience been in informing your long term career plans?

Extremely influential	Very influential	Moderately influential	Slightly influential	Not at all influential
○	○	○	○	○

OOPR Survey 2016

30. In what way did your OOPR experience influence your long term career plans?

* 31. Have you participated in research since completing your OOPR?

- Yes
- No

OOPR Survey 2016

* 32. Which best describes your continued research participation?

- [ ] As a Clinical Lecturer
- [ ] Within further training
- [ ] Grant funded
- [ ] Within PAs as a Consultant

Other (please specify)

* 33. How much of your time do you currently spend engaging in research activity?

- ( ) Up to 25%
- ( ) 25 - 50%
- ( ) Over 50%

OOPR Survey 2016

* 34. To what extent did undertaking research as part of your OOPR improve the quality of the clinical care you provide?

Significantly improved	Moderately improved	No impact on clinical care
○	○	○

OOPR Survey 2016

* 35. What aspects of your clinical care were improved? Choose all that apply.

- [ ] Understanding of evidence-based medicine
- [ ] Improved critical assessment of complex problems
- [ ] Improved team working
- [ ] Improved time management
- [ ] Improved communication skills
- [ ] Improved trainee supervision

Other (please specify)

OOPR Survey 2016

* 36. How many publication have you achieved?

1 - 2	3 - 4	5 +
○	○	○

* 37. Did you struggle when you returned to clinical work?

- ○ Yes
- ○ No

OOPR Survey 2016

* 38. In which of the following areas do you feel you struggled? Choose all that apply.

- [ ] Reduction of clinical skills
- [ ] Lack of clinical supervision
- [ ] Reintegration to clinical team/environment

Other (please specify)

OOPR Survey 2016

* 39. How satisfied were you with the support you received upon return to clinical work, with a return to work package?

Very satisfied	Satisfied	Neither satisfied or dissatisfied	Dissatisfied	Very dissatisfied
○	○	○	○	○

If you were dissatisfied with the support you received, how could this have been improved?

* 40. How would you rate the quality of support you received upon your return to clinical work?

Poor	Fair	Good	Very good	Excellent
○	○	○	○	○

How could the quality of support have been improved?

* 41. Would you recommend an Out of Programme to undertake Research to other doctors?

○ Yes

○ No

Please provide any additional information you wish to provide regarding your answer.

42. Please provide any additional information in relation to your OOPR experience you wish to add. (this information will be treated in the strictest confidence)

OOPR Survey 2016

Thank you for taking the time to complete this questionnaire.

If you have any questions relating to this questionnaire please contact Charlotte Maybury at c.maybury@bham.ac.uk