TEN YEARS ON: ADAPTING AND EVOLVING TO NEW CHALLENGES IN DEVELOPING TOMORROW'S HEALTH RESEARCH LEADERS

NIHR TRAINEES COORDINATING CENTRE

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CONTENTS

SUMMARY

NIHR has invested substantially in training over the last 10 years, and has made a major contribution to the biomedical and health research workforce landscape in England. Our explicit aim has been to attract, develop and retain the best research professionals, building research capacity through skills development, mentorship and dedicated career pathways.

Changes in healthcare needs and technological advances, as well as changes in the nature of the academic workforce, make it now timely and important for the NIHR to review the past, and look proactively at future training needs. This report synthesises and reviews the evidence from the last 10 years, identifies new and evolving challenges; and, in response, sets out a vision underpinned by a series of recommendations.

The Past & Present

There are over 5,000 current 'trainees' across the NIHR, system with wide variation in their selection, funding and support. We have observed some confusion about terminology such as the use of term 'fellowship' and 'trainee'

NIHR training programmes are competitive and attract large numbers of trainees and the fill rates for posts within the Integrated Academic Training (IAT) remain high. The vast majority of trainees are medical with a skewing towards the 'golden triangle'. There are also under-represented disciplines such as pharmacy. As training awards become more senior the gender split changes to favour men, and for IAT attrition is particularly apparent for women at the postdoctoral level. Success rates are similar between geographical locations but vary between professions. For example, nurses and non-healthcare professions are less successful than allied health professions, doctors and dentists.

Career progression is a largely positive story with the vast majority of IAT trainees continuing on the academic track and when questioned trainees highlight the value of opportunities for research funding, personal mentorship and tailored careers guidance.

Broadly, bridging schemes appear to work well, however this is not always the case, for example, we were disappointed to see poor academic progression for non-medical professions from the Masters level.

Consultation revealed widespread support for the comprehensive nature and breadth of NIHR training, and our commitment to diversity and engagement/support for trainees. However, concerns were raised about some under-represented groups suggesting more support is needed at the transition points where progression can be challenging. Lack of support from hosting organisation was also a concern. There

was consensus that programmes and schemes should be simplified and made more flexible and also appetite for greater engagement with infrastructure and industry.

Consultation also highlighted skills shortages including "big data" or bioinformatics, health technology, clinical trials, interdisciplinary working, implementation, dissemination and health economics and for future health challenges key areas included social care, public health, aging, and multimorbidity.

The Future

Our recommendations for the future are based on the evidence collected and on the consultation, and are designed to understand and address current and emerging challenges, as well as developing a framework to allow us to address future challenges. The key recommendations in this report build on NIHR's 'response mode' approach to training, which has been effective at building research capacity in the broadest sense but has also led to imbalances in the training portfolio. We propose a move to include a strategic approach (in addition to the response mode model) by introducing priority areas which will be linked to health challenges, e.g. dementia, technical challenges such as bioinformatics and service challenges such as social care.

The recommendations are categorised into two domains:

Structures and Organisation

a) Integration of all current academic training and higher career personal awards into a new academic structure, *The NIHR Academy* which will host all academic training and career development activity.

b) Development and delivery of an *NIHR Academy Strategy* ensuring that the NIHR Academy both meets the needs of the wider research community and other key stakeholders now and in the future, and is fully and dynamically linked with NIHR and DH strategy

People and Careers

a) Simplify current programmes and schemes and build in the capacity for them to be fully flexible to meet the changing needs of the workforce interested in academic career development and the evolution of science ("intelligent career models")

b) In addition to response mode, we develop a portfolio management approach to ensure that our programmes will address skills and discipline gaps identified both during the review and in the future

We also make a series of further recommendations that impact heavily on NIHR but also involve other agencies:

Building on the successes and challenges for the HEE/NIHR Integrated Clinical Academic (ICA) Programme and the barriers and enablers for the health professionals that progress through it, we will take forward r**ecommendations in partnership with HEE who fund the ICA programme viewed alongside NIHR's broader vision for this important group**.

To develop academic skills in the broader NHS workforce and to create opportunities for those skills to be utilised, we recommend a **working group be convened to draft a strategy for developing academic skills and realising research opportunity for clinicians**.

There is clear attrition for women at the intermediate career stages but the issues are not just related to parenthood and further understanding of gender related issues would form the basis for future

approaches. We will **establish a cross-funder approach to address gender issues which build on evidence and understanding through a systematic review**.

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1. INTRODUCTION

Research training is integral to the NIHR mission. For 10 years the NIHR has received substantial investment from the Department of Health to help individuals realise their potential and become tomorrow's research leaders, whilst collectively building national research capacity. NIHR training has aspired to advance all areas of health science. By integrating training pathways with awards from other funding bodies, such as the MRC and Wellcome Trust, the NIHR has also had the capability to influence training in biomedicine and the life sciences across the health sciences spectrum. Together, the goal has been improvements in career development and research conclusions that shape the health and care systems.

The NIHR was launched in 2006 under the banner 'improving the health and wealth of the nation through research'. The following decade has been marked by changing healthcare needs and enormous technological advance. This makes it timely and important for the NIHR to review the past, and look proactively at future training needs. The goal is to evolve and adapt for the next 10 years building on the strengths of the past. It is vital that NIHR's career development structures and activities effectively meet the needs of patients and the public, the health and life sciences industry, and the UK economy.

In March 2016 the NIHR Strategy Board agreed that the NIHR Dean for Trainees and the NIHR Trainees Coordinating Centre (TCC) should take forward a strategic review of training to inform its future vison. The process has involved wide consultation amongst stakeholders, gathered expert opinion and established a range of working groups (Appendix 1 and Appendix 2). The product is this report which synthesises and reviews the evidence from the last 10 years, identifies new and evolving challenges; and, in response, sets out a vision underpinned by a series of recommendations.

2. THE FIRST 10 YEARS

NIHR investment in training and career development has increased steadily over the last ten years with a rapid expansion in the number of trainees and training opportunities. Our explicit aim has been to attract, develop and retain the best research professionals, and to build research capacity through skills development, mentorship and dedicated career pathways. The focus has largely been on health research but with important interactions with other funders such as the MRC and Wellcome Trust. The approach was designed to drive up quality through competitive processes and build capacity quickly by working in response mode, with a small amount of prioritisation to shape the emerging portfolio.

NIHR training programmes have been developed and managed by the Trainees Coordinating Centre (TCC) and have also been established in the NIHR's Infrastructure supported by the Infrastructure Training Forum. In the last year, these two strands of training have been amalgamated so that infrastructure training is now part of TCC's management structure. This will allow NIHR to take forward a more holistic approach to training, streamline opportunities and add value.

Training provided by TCC-managed Programmes

Many of the NIHR training programmes have been developed and delivered by the NIHR Trainees Coordinating Centre (TCC), which was established at the inception of NIHR in 2006. There are currently 21 annual schemes judged by 20 expert review and interview panels. In addition to managing awards, TCC has provided ongoing training and trainee support including annual events such as the NIHR Trainees Meeting and Summer School, educational workshops and other opportunities for mentorship and leadership development.

NIHR, through TCC, makes training awards to researchers whose work focuses on people and patient-based applied health research. The research must be relevant to the NHS in England, public health and

social care, focused on the current and future needs of patients and the public and expected to have an impact within five years of its completion. Where NIHR invests directly in research projects, it does not fund basic research or work involving animals and/or animal tissue.

There are a large range of awards available at different levels and to suit different work arrangements, different professions and career paths. Many of the training programmes were developed in partnership with other funders and NHS organisations including Health Education England (HEE). Posts funded through the NIHR Integrated Academic Training Programme (IAT), for example, support all doctors and dentists in England and cover research that is basic, translational as well as applied and clinical. The IAT Programme therefore is important for a range of funding organisations and not just NIHR.

The 21 funding schemes that are currently operated and managed by TCC are organised into five separate training programmes:

- *NIHR Fellowships*
- *NIHR Research Professorships*
- *HEE/NIHR Integrated Clinical Academic Programme (ICA) (health professions other than medicine and dentistry)*
- *NIHR Research Methods Programme*
- *NIHR Integrated Academic Training (IAT) (medical/dental)*

The first four are personal award schemes currently advertised annually by TCC in response mode. Trainees are responsible for their own applications using NIHR's standard form and online portal. Each scheme has specific eligibility criteria, such as the amount of research time post-PhD. Not all schemes have operated throughout the 10-year period. Newer schemes have emerged with the intention of redressing capacity shortfalls, either by topic area or career stage.

Figure 1. NIHR Training Programmes

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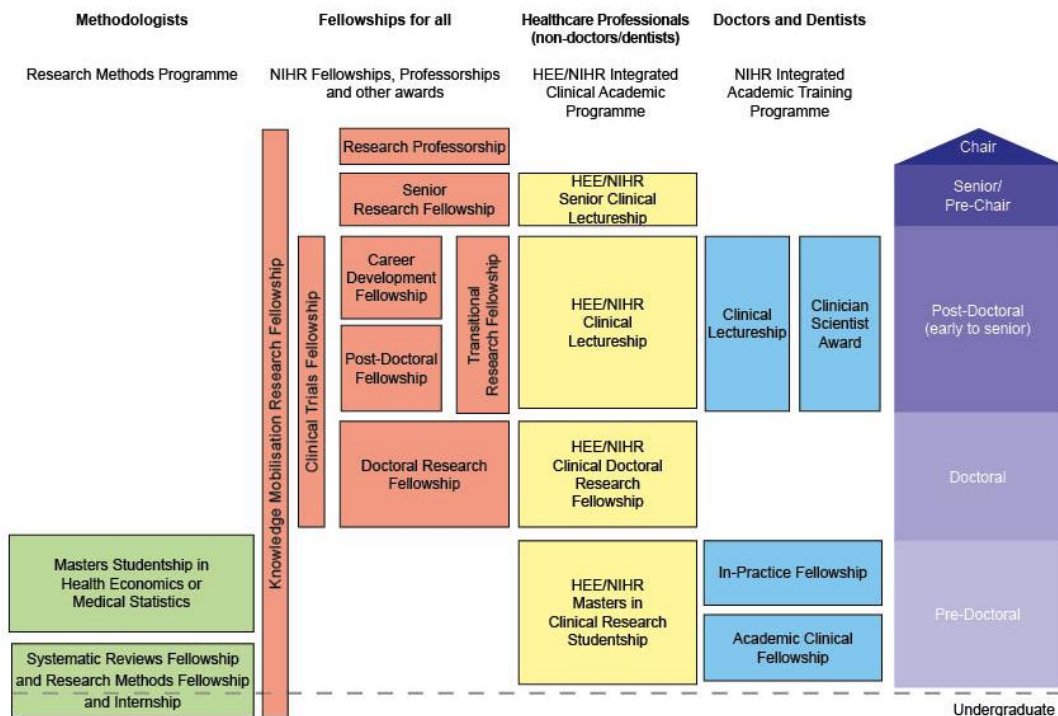
The number of trainees and fellows in all programmes has now reached steady state. Figure 1 summarises the NIHR training schemes managed by TCC and further details can be found in Appendix 3 and on the NIHR website: http://www.nihr.ac.uk/training.

NIHR Fellowships Programme

NIHR Fellowships support outstanding individuals to become the health research leaders of the future by buying out their salary costs, meeting their training and development costs and contributing to the project research costs. Applications are open to all individuals who propose to undertake people or patient based clinical and applied health research. The programme was established in this format in 2008 comprising of four levels of award. Additional award schemes such as the Transitional Research Fellowship, were introduced to address specific needs.

NIHR Research Professorships

Research Professorships were introduced in 2011 and are designed to support outstanding research leaders during the early part of their careers, promoting translational research, as well as strengthen research leadership and research capacity in areas critical to accelerating the transfer of research ideas into improved health. The award provides funding for 5 years at professorial level and is the highest level award managed at TCC. A maximum of two nominations per HEI are accepted and where two nominees are put forward for consideration, at least one of these must now be female to address previous concerns about gender balance. Up to 5 awards are made per year.

HEE/NIHR Integrated Clinical Academic (ICA) Programme

The ICA Programme provides a range of opportunities for registered non-medical healthcare professionals to develop careers that combine clinical research and research leadership with continued clinical practice and professional development. There are five levels of awards and the programme is funded by HEE and managed by the NIHR. The current format of the programme was established in 2015 and has developed from previous schemes funded by the Department of Health and HEE from 2009-2014.

NIHR Research Methods Programme

The NIHR Research Methods Programme is designed to support the development of individuals with expertise in research methods including medical statistics, health economics, clinical trial design, operational research, and modelling. The programme was established in 2009 and now consists of 4 schemes, with the addition of the Systematic Review scheme in 2015.

NIHR Integrated Academic Training (IAT) Programme

The IAT programme, developed in response to the Walport Report (2005)[1], is a dedicated clinical academic career pathway. The intention has been to integrate a research-orientated pathway with clinical training of all doctors and dentists and with fellowship programmes operated by the NIHR and other funders, notably the MRC and Wellcome Trust. The IAT programme is currently managed by allocation of posts to specific clinical specialties through medical schools (with the ability to create match-funded places), in partnership with HEE (to ensure continuing clinical training).

IAT provides academic opportunities for doctors and dentists undertaking specialty training through the Academic Clinical Fellowship (ACF) and Clinical Lecturer (CL) and largely supports personal salary with

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[1] Walport, 2005. Medically- and dentally-qualified academic staff: Recommendations for training the researchers and educators of the future. http://www.ukcrc.org/wp-content/uploads/2014/03/Medically_and_Dentally-qualified_Academic_Staff_Report.pdf

some specified training programmes included for ACFs. ACF and CL posts are, in part, clinical training posts and must be managed to fit in with clinical training rotas. ACFs support trainees to undertake 25% research training and 75% clinical training for up to 3 years, whereas CLs are 4 year posts and support 50% research and 50% clinical. The NIHR fully funds both the academic and clinical elements of approximately 250 ACFs and 100 CLs each year through the Local Offices of HEE.

Trainee Support

The application process for personal awards has built-in bespoke training plans to address individual needs as well as financing attendance at meetings, conferences and other career development support. In addition, the TCC has provided a range of other opportunities, such as the NIHR Annual Trainees Meeting, trainee fora and workshops, bursaries for additional career development, a leadership programme for NIHR trainees and training in systematic reviews and in patient and public involvement. The range of extra support on offer is highly valued by trainees and an important feature of NIHR's core function to attract, develop and retain the future leaders of NIHR research.

The NIHR Annual Trainees Meeting has run since 2007 and become a flagship event for the trainees managed by the TCC. NIHR-funded trainees from the Infrastructure and School for Primary Care Research are also eligible to attend. The event runs over two days and includes plenary and workshop sessions with the aim of both inspiring the trainees and providing useful additional skills training. An evening dinner and poster sessions also provide good opportunities for networking.

"The trainee event was brilliant from start to finish: motivating; practical and enjoyable. I would definitely recommend it to colleagues."

A bespoke leadership training programme has been provided for NIHR-funded trainees since 2008 with over 200 trainees participating to date. Many of these trainees have gone on to senior academic positions. Mentorship programmes have also been provided for clinical academic trainees on the IAT and ICA programmes. These programmes are provided by external organisations with expertise in the area, e.g. the Academy of Medical Sciences runs the NIHR Mentorship programme for doctors/dentists.

The Scale of TCC Training Activity

In 2006, there were 450 individuals with active awards and by 2015 this had grown to 2,296. The annual growth in numbers is given in Figure 2.

Figure 2. Number of active and awarded trainees per calendar year 2006-2015
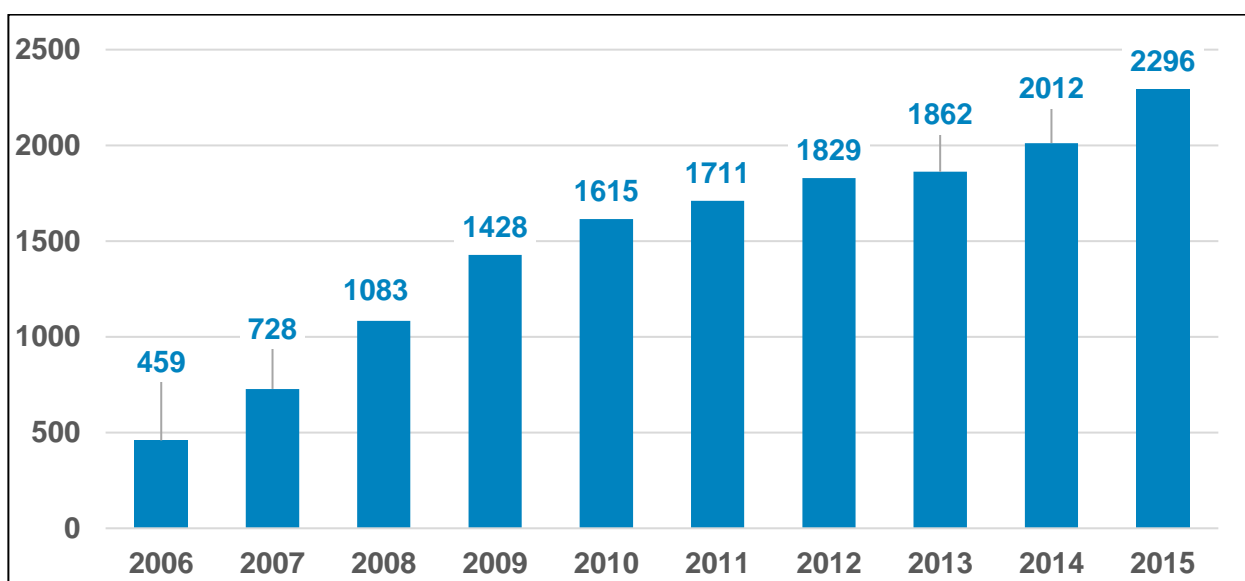
Training provided through NIHR Infrastructure

The NIHR has created a research infrastructure which includes the Biomedical Research Centres (BRCs), Collaborations for Leadership in Applied Health Research and Care (CLAHRCs) and Patient Safety Translational Research Centres (PSTRCs), all of which undertake high quality research but also have a responsibility to build research capacity. This infrastructure offers an opportunity to expose NIHR-supported trainees to the world-class facilities and expertise that produces health researchers who are prepared and skilled for successful clinical and non-clinical academic careers.

The scale of the training is significant with over 3,000 trainees being supported. Of these around a quarter are either fully or partially funded by the NIHR infrastructure. The remainder are supported by NIHR funded supervisors or are simply using NIHR facilities.

The infrastructure organisations provide excellent training environments, but there is challenge in making them function as a holistic training system rather than a collection of individual training environments. To facilitate a joined-up approach to training across the infrastructure, NIHR made the appointment of a 'Training Lead' in each organisation a contractual requirement. The training leads develop a local training strategy, act as an active member of the training forum and ensure that trainees are given access to the wider training they need to thrive as a successful academic.

The 'NIHR Infrastructure Training Forum' was established in 2010 to bring together the Training Leads and has been responsible for the:

- launch of a NIHR Infrastructure Doctoral Training Exchange Scheme
- development of the NIHR Infrastructure Doctoral Research Training Camp
- creation of NIHR Advocates for academic training in the non-medical professions
- development of collaborative training between centres and units.

Infrastructure Doctoral Training Camp

The NIHR annual Infrastructure Doctoral Training Camp is a three-day annual event for NIHR Trainees from the BRCs, CLARHCs, PSTRCs and Schools. This is an important opportunity for early career researchers and attendance is by invitation only. Now in its eighth year, this challenging event offers workshops, guest speakers who have established research careers as well as poster presentations and opportunities for networking and mentoring.

"The NIHR training camp was a whirlwind of networking, inspiration and expert advice, which I shan't forget in a hurry. Now to write that next fellowship application…" PhD student, GOSH

Infrastructure Doctoral Training Exchange (IDTE)

The IDTE allows doctoral trainees supported by NIHR to spend time in other parts of the infrastructure to network, train in a specific technique or collaborate with other researchers/specialists in their topic area. The scheme is specifically designed to optimise and enhance the trainees' experience of undertaking a PhD/MD as well as their CVs.

Training provided through other parts of NIHR

There are a significant number of other training posts that are at least part-funded by NIHR, who may be early career researchers or undertaking higher degrees. For instance, TCC manages the contract for research capacity building by the School for Primary Care Research. Individuals can also be funded via NIHR Infrastructure awards where there is not a formal remit for academic research capacity development, such as Clinical Research Facilities. For the most part, these researchers have worked

within a translational remit but are not clinicians. Other individuals have been funded through NIHR research awards, such as the Health Technology Assessment (HTA) Programme.

3. REVIEWING THE EVIDENCE FROM THE LAST 10 YEARS

NIHR training information and data limitations

TCC's research management and information system (TCC*i*) contains a 10 year data set which is comprehensive enough to allow for meaningful evaluation, and provides the basis for the key findings in this review. However data analysis has sometimes been hampered by gaps in information due to relatively poor data collection in the early years and inconsistent data collection across the NIHR system. For TCC-managed personal awards, this data set is the most robust and so much of the analysis focuses on these awards. For IAT, some information is held by local partnerships and is not always accessible in a format that is useful. For trainees in the Infrastructure and elsewhere in the NIHR system, data sets are much more limited which underlines the need for comprehensive data collection and greater consistency going forward.

Mapping

NIHR trainees are distributed widely across the NIHR system. Those managed by TCC are easily defined and we know and collect a considerable amount of information about them. Elsewhere in the system, trainees are less well understood and it has not always been clear who we should include under the banner of an 'NIHR trainee', particularly when deciding who is eligible for additional support. The first piece of work before embarking on data analysis was to define who is in scope for this review and we therefore undertook a mapping project which reports at Annex 1.

The project looked at the number and career levels for formal training awards, how trainees are recruited, funded and what type of support trainees have access to including mentorship and leadership training.

The project identified a wide range of individuals (over 5,000) across all parts of the NIHR system but there was also wide variation in their selection, funding and support. The project also underlined the need to improve the consistency of data collection as part of the reporting process for future analysis and to support evaluation.

Key Findings:

- The majority of trainees supported by the NIHR are either undertaking TCC-managed awards or are in the NIHR Infrastructure, recruited via a formal competitive process. Most have access to the support of a mentor or leadership programme
- The level of funding varies between schemes and also between individuals within a scheme. Support ranged from funding the full stipend, fees and research costs, to trainees not receiving funding from the NIHR, but who may be within the NIHR-funded infrastructure or whose supervisor may be funded by the NIHR
- The term 'training' is being interpreted in different ways across the NIHR and there is confusion about terminology such as the use of the terms 'fellowship' and 'trainee'
- There was a lack of access to information about individuals and no consistent use of unique identifiers such as ORCID or trainees being required to complete Researchfish
- Formal research training was offered by different organisations. However, during consultation it became clear that in addition to formal research training some organisations are offering more informal, short term, locally responsive bridging grants and funding for pump priming.

Applications and success rates

The number of NIHR trainees has risen steadily over the last 10 years as new schemes have been introduced and funding increased. Importantly, application numbers have also risen as we have been able to attract more applicants to NIHR training. The number of applications for personal awards has increased from 154 in 2006/7 with a 19% success rate to 545 in 2015/16 with a success rate of 21%, making NIHR awards amongst the most competitive in England. ACFs also attract high numbers of applicants and for general practice there are more applicants for GP ACFs than for non-academic GPs. HEE are now exploring how the ACF model can be built upon to attract more GPs into the NHS.

Application numbers and success rates vary when broken down by region, gender and professional background with the bulk of applications and awards coming from and being made to trainees in the 'golden triangle' and Russell Group. Medicine is the largest professional group and although there is a higher proportion of women up to the doctoral level the proportion of men becomes more dominant as awards become more senior.   Again, data analysis is largely focussed on personal awards where the data sets are richer. Information about ACFs and CLs is different to personal awards and broken down by HEE regions and by specialties within medicine and dentistry. Data from the NIHR Infrastructure is limited and some initial analysis has been conducted on the most recent available annual report dataset.

Key Findings

- Overall more females have applied for and held personal awards than males at roughly a 60:40 ratio. The gender split changes to favour men as awards become more senior. This is a consequence of application numbers rather than success rates which are equal for both sexes
- For IAT, attrition is particularly apparent for women. Approximately 50% of pre-doctoral ACFs are female which drops to 34% for the post-doctoral CLs. The reasons for this attrition are unclear
- Application numbers for personal awards are greatest from the 'golden triangle' and Russell Group institutions but success rates are similar for all settings There has been a moderately higher success rate for Russell Group institutions over both 'golden triangle' and other settings over the ten years. When this is broken down into three timeframes the success for institutions outside the 'golden triangle' and Russell Group can be seen to increase from 16% in 2007-2010 to 22% in 2014-2016 perhaps as a result of the increasing research capacity and capability generated during the lifetime of NIHR
- Medical trainees put forward the largest number of applications but success rates vary between professions – dentists are the most successful although application numbers are small, whereas, nurses and non-healthcare professions are not so successful. For ICA, the lower success for nurses is a particular concern
- IAT fill rates are high and in line with non-academic specialty posts. Fill rates for ACFs have been consistent at approximately 95% but for CLs fill rates improved over time (approximately 70% increasing to over 85% from 2012) as more trainees progress from the early stages of the pathway
- Application numbers for ACFs and CLs were unavailable for all specialties but we see a consistently higher application ratio for the ACF GP positions compared to the standard GP competition
- Applications from GPs for the IPF scheme show higher success rates for those settings where the host institution is a member of the School for Primary Care Research. There is no effect on success rate for the personal awards schemes overall however.

NIHR training portfolio

TCC has operated schemes mostly in response mode with a small amount of prioritisation in IAT through its competition. This has built substantial capacity over the 10 year period but without prioritisation, there are sections of the portfolio where NIHR support appears to be on the low side. Although schemes have evolved in response to feedback from the academic community and trainees themselves, this approach is rather *ad hoc* and builds on anecdote rather than evidence.

We have examined the portfolio of existing active awards in relation to career level, professional background/specialty, geography, gender, health category, research activity and skills training. This has identified areas in a number of domains that may require further investment including areas of research and professional groups.

Key Findings:

- For personal awards, the numbers for each level decrease as awards become more senior resulting in a 'pyramid' which is a normal consequence of attrition as trainees make career choices that move them outside research. However, for ICA, the pyramid has a particularly broad base due to the very large number of Masters Students being supported. In the NIHR infrastructure the vast majority of trainees are undertaking a PhD
- Medical trainees are by far the largest group and represent 40% of the total for personal awards. They are also more likely to be located in 'golden triangle' and Russell Group institutions
- NIHR Research Professors are predominantly male, medical and based in London. In the last round, NIHR invited 2 nominations per institution where at least one must be a women. This relatively simple approach has encouraged more applications from women, from which 3 have been recommended for funding
- Allied health professions (AHPs) are well represented compared to nursing and midwifery but further breakdown shows wide variation between the AHP groups
- Within other health professionals we see under-represented disciplines such as pharmacy
- The number of IAT posts vary by specialty with paediatrics, general surgery and general psychiatry consistently supporting high numbers. Other specialties are less well supported. This year's competition has prioritised a new research theme 'acute care' which will promote academically vulnerable specialties such as intensive care and emergency medicine
- The portfolio of professions within infrastructure is quite different with higher numbers of non-clinical scientists and very low numbers of clinicians outside medicine. Dentistry, in particular is poorly supported
- When the data from personal awards, IAT and infrastructure are combined the vast majority of trainees are located in the 'golden triangle' which is, in part, a consequence of the significant number of trainees in the infrastructure and a formula allocation for IAT that favours institutions that already have attracted NIHR funding such as the BRCs. For ICA, the 'golden triangle' is less dominant
- Outside the 'golden triangle' and Russell Group institutions, the range of professions are more evenly distributed and less dominated by medicine.
- Generic health, mental health and cancer are the three most awarded health categories and represent the highest financial spend. When compared to the NHS spend the portfolio for personal awards aligns reasonably well
- Research activity for personal awards is predominantly focused on treatment evaluation, disease management, detection and services as would be expected for the NIHR remit

- There is variation in the training being requested, for example, there is a lack of training for trainees interested in clinical trials which TCC is addressing in collaboration across the NIHR.

Career progression barriers and facilitators

The remit of NIHR is to develop academic careers over the longer term. TCC is therefore focusing on career tracking to determine whether programmes are attracting good people and developing leaders, looking at the enablers and barriers to career progression and identifying where there is significant attrition. TCC have collected the next career destinations of awardees of some of its programmes, but this only gives an early indication of the direction of travel for individual careers. Destination data for trainees in the infrastructure has not been routinely collected but will be an important focus for future work. A career tracker survey has been developed and released in 2016 within the online reporting tool, Researchfish. This will start to allow the consistent collection of longitudinal data and the evaluation of trends in career progression.

Key Findings:

- Next destination data for ACFs, In Practice Fellows (GPs and GDPs) and CLs has provided a good indication of the impact of these posts on the IAT pathway for doctors and dentists with the majority of award holders carrying straight on with a clinical academic track
- Many of those who initially take up a clinical post return to an academic path in the future
- The collection of destination data for personal award is ongoing, but for the intermediate Clinician Scientist award, over 95% progress to academic posts including professorial chairs
- For the ICA programme, progression from the Masters level to the doctoral level is disappointing but this improves significantly as trainees move from a clinical doctorate into an academic role
- Surveys of previous award holders have highlighted the importance of research funding, personal mentorship and tailored careers guidance in facilitating aspiring clinical academics to progress
- A survey of ACFs highlighted a number of commonly cited barriers to a clinical academic career, which included: organisational support, balancing clinical and academic commitments, personal, and financial areas. These barriers and facilitators are commonly cited by clinical academic award holders, as represented in cross-funder studies in which NIHR was involved and external evaluations[2,3]
- A published evaluation of 10 years of the ACF scheme highlighted its success as an attractive, visible route for early career clinicians to clinical academia, enabling them to be more successful for doctoral level research awards and to continue in a clinical academic career[4]

Responses from consultation

At the beginning of this review, TCC consulted widely with key stakeholders including the trainees themselves. Questions for consultation and a summary of responses are at Appendix 2. Further consultation through the Advisory Panel (membership at Appendix 1), the Dean's Advisory Panel (DAP)

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[2] A Cross-Funder Review of Early-Career Clinical Academics: Enablers and Barriers to Progression, November 2015 http://www.mrc.ac.uk/documents/pdf/review-of-early-career-clinical-academics/ (accessed August 2016).

[3] Goldacre MJ, Lambert TW, Goldacre R, et al. Career plans and views of trainees in the Academic Clinical Fellowship Programme in England. *Med. Teach* 2011;33:e637-643

[4] Clough S, Harris-Joseph H, Fenton J et al. What impact has the NIHR Academic Clinical Fellowship (ACF) scheme had on clinical academic careers in England over the last 10 years?: A retrospective study. *BMJ Open* 2017. **7:**e015722. doi: 10.1136/bmjopen-2016-015722

and a subgroup of DAP which oversees the NIHR IAT Programme helped to shape the recommendations. We asked the following:

1. Which aspects of NIHR's research training pathways do you think have worked best over the last 10 years and could be potentially expanded and why?
2. Which aspects of NIHR's research training pathways would benefit from refinement, downsizing, combining or discontinuing and why?
3. What areas of training in the health and social care sector are not covered adequately at the moment and what ideas for potential solutions do you have?
4. This exercise is focussed on the next ten years; which aspects of health and social care research are emerging and will most likely need fresh attention from NIHR's research training pathways?
5. Do you have any other comments on NIHR training or its interactions with the wider health and social care sector?

Key Findings:

- There was widespread support for:
  - the breadth of training which comprehensively offers support for all professions
  - NIHR's commitment to diversity
- Concerns were raised about some under-represented groups
- NIHR engagement and support for trainees were seen as a real positive and respondents suggested these activities could be expanded
- There was a desire for a greater focus on under-represented groups to achieve a more representative balance of trainees
- More support is needed at the transition points where progression is more challenging with bridging support particularly welcome
- Lack of support from hosting organisation was highlighted, particularly where trainees move between sectors
- There was support for greater engagement with infrastructure and industry
- There was general agreement that programmes and schemes could be simplified and made more flexible
- Some eligibility requirements were seen as too restrictive
- There was a suggestion that schemes with low application numbers should be reconfigured or consolidated
- The most common skills shortages reported by respondents included "big data" or bioinformatics, health technology, clinical trials, interdisciplinary working, implementation and dissemination and health economics
- The most common responses in relation to future health challenges were social care, public health, aging and multimorbidity
- There were suggestions for greater engagement and collaboration across the NIHR system, NHS Trusts and with organisations outside the NHS
- The remit for training needed greater clarification

4. RECOMMENDATIONS FOR A FUTURE VISION

NIHR has a critically important role in developing research capacity. Although a major focus of our capacity development work is in applied and clinical research focussing on the needs of patients and the public, a number of our career development programmes also support a broader spectrum of research,

including basic science, so that we are able to underpin the work of our partners such as the MRC, Wellcome Trust and other funders. The people we train will be future leaders contributing knowledge, understanding and importantly, providing the evidence base for the health and care system We need to attract the best people and create an environment in which they will thrive.

This document sets out the 15-20 year vision for academic training in the NIHR underpinned by principles and recommendations. It builds on the evidence presented in the previous section, including responses from an extensive consultation exercise.

Vision
Our vision is of a modern NIHR academic faculty that has/is:

- The key skills to meet future challenges
- Balance in terms of discipline:
    - clinical profession
    - clinical discipline
    - non-clinical professions
    - research methods
- Balance in terms of demographics
    - geography
    - gender
- Attractive, intelligent and genuinely flexible career opportunities
- Attracting outstanding individuals
- High quality training and support
- Clear routes for progression
- Working in partnership to benefit the health and care system

Underpinning Principles
The following principles underpin the recommendations for future training and are essential for successful implementation:

- NIHR training is maintained in terms of its budget and is prioritised as an important component of health research relevant to the prosperity of the health and care systems
- NIHR should continue with its current remit in respect of training, which does not include direct funding of animal or basic mechanistic research
- NIHR should maintain its strong relationships with other funders such as MRC and Wellcome Trust and stakeholders which is vital if we are to overcome historical challenges to training and career development such as gender issues. Significant headway has been made recently on cross-funder working with the higher education sector, NHS England and Health Education England
- NIHR fully endorses the cross-funder 'principles and obligations' document[5] which sets out best practice for institutions and clinical trainees in receipt of nationally competitive funding for clinical academic research training
- Continuation and further development of the strong culture of career development within NIHR will, we believe, pay dividends. In addition to further development of mentorship and leadership

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[5] UK clinical academic training in medicine and dentistry: principles and obligations
https://www.nihr.ac.uk/funding-and-support/documents/IAT/ClinicalPrinciples_and_Obligations_170112.pdf

training there should be development of specific skills "literacy" to address the rapid changes in the technology base of modern clinical care.

Recommendations

We make a comprehensive series of recommendations. These are based on the evidence collected and the consultation and are designed to address current and emerging challenges, as well as developing a framework to allow us to address future challenges. The recommendations are categorised into two domains: **Structures and Organisation** and **People and Careers**. It is important that recommendations are operable. Therefore, where there is a need for action purely by NIHR, we have already taken steps to ensure the capacity and capability for implementation. More broadly, we make a series of additional recommendations that impact heavily on NIHR but also involve other agencies and suggest ways in which these recommendations could be enacted.

Structures and Organisation

Key Recommendations:

c) Integration of all current academic training and higher career personal awards into a new academic structure, *The NIHR Academy* which will host all academic training and career development activity.

d) Development and delivery of an *NIHR Academy Strategy* ensuring that the NIHR Academy both meets the needs of the wider research community and other key stakeholders now and in the future, and is fully and dynamically linked with NIHR and DH strategy.

The term 'trainee' is unhelpful in several ways. It has created confusion (doctors in specialty training are also referred to as trainees) and can imply young or inexperienced researchers. This may be true for early stage award holders but it is not a helpful description for individuals at later career stages such as senior NIHR personal awardees who are principal investigators running research groups. Research Professors, although part of the career development continuum, are not considered to be trainees and therefore not part of this collective group of individuals managed by TCC.

This also impacts on the title 'NIHR TCC', which has not instigated a sense of membership amongst the broad range of NIHR personal awardees. Although NIHR TCC is largely administrative it works strategically with partners and DH to build research capacity in the NHS and beyond. The name does not fully describe the NIHR career development function it provides. The following specific recommendations are therefore made:

1. The NIHR training activity should be coordinated under a new entity called the **NIHR Academy** to replace the NIHR TCC and the term 'NIHR Trainee' should be replaced with **NIHR Academy Members**. Research staff supported by the NIHR to contribute to studies will become **Associates** of the NIHR Academy

2. The current TCC will become the **Executive** for the NIHR Academy. The existing Dean for NIHR Trainees will become the **Dean for the NIHR Academy** supported by the Executive and a new **Associate Dean for the NIHR Academy** with responsibility for full integration of training across the NIHR system

3. An **NIHR Academy Strategy Group** be developed within the NIHR Academy, a key function of which will be the development of a formal **NIHR Academy Strategy** which will link directly to the broader NIHR strategy. An annual **NIHR Academy Forum** will bring key stakeholders in

> implementation and the Strategy Group together to review the previous year's activity and link the next year's activity to current strategic priorities

Individuals whose career development is funded through the NIHR Infrastructure and NIHR Research Programmes are not currently well linked into broader career development activity. The mapping exercise undertaken as a part of this review has provided a robust insight into this group and identified inconsistencies in selection and approaches to trainee support.

> 4. A **Guide to the NIHR Academy** will be developed to support appointment and ongoing management of NIHR Academy Members in the NIHR infrastructure. **Criteria will be established for individuals who are not fully funded by NIHR to be eligible for NIHR Academy Membership.** Individuals who are not eligible but are part of the research training ecosystem may become **Associates**

A key part of the NIHR training offering to date has been the career development support that we offer. NIHR supports people to be successful in their career rather than just allocating funding. This career development support is a key and distinctive part of what we do and will continue. At present different types of trainees at the same level receive different types of support delivered through different structures. As we move to the NIHR Academy model this will become increasingly anomalous.

> 5. **Career support activities are harmonised** across all programmes open to all Members of the NIHR Academy

NIHR TCC has not invested in a formal process for analysis and evaluation of funding schemes beyond trainee and panel feedback and annual assessment of gender balance. In 2006, programmes were immature and data were limited. Schemes evolved through dialogue with partners relying on anecdotes rather than evidence. 10 years on, data sets are substantial and although the review exercise has identified weaknesses in the data it has also emphasised the importance of high quality, continuous data collection to facilitate evidence-based decisions about career development needs and responses. Monitoring of career progression in particular, has revealed valuable insights although this is not always at the individual level as research itself can progress through teams that are able to support different stages (AMS Team Science report[6]). It is important that the momentum is not lost.

> 6. **Continual data collection** and career progression should be tracked annually on an individual basis

NIHR Senior Investigators currently contribute to training and career development in an *ad hoc* way. There is an opportunity to explicitly link the NIHR status of this group of field leaders to career development of the next generation of researchers. As we have an increasing number of "graduates" and "alumni" of our programmes there is also a significant opportunity to allow/encourage people who have benefited from NIHR career development support to contribute to the development of the next generation.

> 7. **Bring SIs into the NIHR Academy** as senior figures to contribute to the development of the next generation. Academy 'alumni' to be also given the opportunity to contribute to career development

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[6] Improving recognition of team science contributions in biomedical research careers. March 2016
https://acmedsci.ac.uk/file-download/38721-56defebabba91.pdf

People and Careers

Key recommendations:

e) Simplify current programmes and schemes and build in the capacity for them to be fully flexible to meet the changing needs of the workforce interested in academic career development and the evolution of science ("intelligent career models").

f) In addition to response mode, we develop a portfolio management approach to ensure that our programmes will address skills and discipline gaps identified both during the review and in the future.

The key recommendations in this report build on NIHR's 'response mode' approach to training, which has been effective at building research capacity in the broadest sense but has also led to imbalances in the training portfolio. We propose a move to include a strategic approach (in addition to the response mode model) by introducing priority areas which will be linked to health challenges, e.g dementia, technical challenges such as bioinformatics and service challenges such as social care. Priorities will be identified during the implementation phase but will also build on the consultation to date. The process for identifying priority areas in the future will be robust and transparent.

Personal Awards

The current personal award offerings/fellowships are complex and duplicate across schemes. There are also a number of niche areas being supported through bespoke schemes which increases the administrative burden and cost. This can be confusing and counter-productive especially for trainees choosing which options best support their career. Consultation supports simplification and disinvestment in schemes that fail to attract or progress trainees.

8. Whilst retaining the function of the individual schemes, personal awards be amalgamated into a single flexible **Personal Awards Programme** with 3 tiers. The programme will operate in response mode for the majority of awards, but will also support strategic themes with specific skills development (for example, leadership, entrepreneurship, economics and bioinformatics)

Integrated Academic Training (IAT)

The NIHR IAT Programme for medical and dental clinicians has become embedded over the last ten years and is widely considered to be successful. Studies on career progression and surveys of ACFs and CLs has revealed the importance of the ACF in propelling doctors and dentists towards a successful career but has also identified serious problems with attrition for women.

The IAT model also represents a key tool for expanding capacity in priority areas. Allocation by formula is valuable and helps to support academic strengths locally but risks lowering competitiveness. It is recommended that a number of changes are made to the programme to ensure a closer link with strategic priorities in NIHR and to address underrepresented areas and the future health challenges identified through consultation. The IAT pathway will also address strategic themes with changes to allocation.

9. Modify the current **balance** between the allocation of IAT posts via "formula" (where decisions about speciality are made at the local partnership level) and "competition" where the area is decided centrally by NIHR. The majority of posts will still be via the formula but complemented by an increase in competition posts which will be aligned to NIHR Strategic Priorities as well as areas where capacity remains weak

10. Develop **IAT "research themes"** for competition posts where research is linked to complex challenges and IAT posts can be held in different speciality areas e.g. 'Older People and Complex Health Needs' as a priority research area potentially linked to Elderly Care Medicine, Rheumatology or Neurology as a clinical speciality

CLs are currently positioned within the specialty training period for most doctors and dentists. However, greater flexibility to span CCT (Certificate of Completion of Training) will better prepare CLs for intermediate fellowships which now tend to operate post-CCT. Developing an 'intelligent' model for IAT that will provide flexibility to undertake CLs at the later stages of clinical training will also lessen career insecurity for LTFT (less than full time) trainees at a time of young families and the move to academic and clinical independence. Given the drop off in the number of female CLs we believe this will be particularly welcome for women.

11. Allow **NIHR CL posts** (including badged/match-funded) **to span CCT**

Life Sciences Industry

NIHR maintains a strong interest in working with the life sciences industry but, to date, has not explicitly funded training programmes linked to industry. There is appetite to work collaboratively and develop skills and support research that aligns with life sciences interests.

12. Provide opportunities for working with/in or meeting the needs of **the life science industry** through partnership within the new Personal Awards Programme and the research themes of IAT

Capacity Building

Capacity building in key areas that are under-filled or emerging as new challenges has always been an important component of NIHR's training and career development function. However, current investment in meeting priorities for capacity development is undertaken on a largely *ad hoc* basis often at a local level. This has run the risk of placing fellows in isolated small units without critical mass, compounding the capacity issue. We have been encouraged by the capacity building function within the NIHR School for Primary Care Research where we see very good trainee career progression (e.g. from the School to the NIHR In-Practice Fellowship scheme) and see value in promoting similar models elsewhere in areas of need. Bringing people together through structures that support networking will, in our view, build capacity that is likely to be sustainable in the longer term.

13. Develop a small number of networking structures **– 'NIHR Incubators'** to support capacity building and multidisciplinary career development in priority areas where critical mass is low. These will be multi-site, virtual structures linked to existing NIHR Schools or *de novo* structures in priority areas (such as bioinformatics). Site location will take account of local expertise and critical mass as well as need for geographical coherence. NIHR Incubators will be expected to collaborate and share career development resources

Decisions about research areas are frequently made by individuals in light of the perceived attractiveness of research areas to funding bodies. This can have the effect of reinforcing already strong areas and limiting development in less academically active areas which are frequently also those with the greatest needs. Analysis undertaken as part of this review revealed high success rates for personal awards and high fill rates for ACFs and CLs across all regions suggesting success is not limited by geography. We

believe that steps can be taken to increase the 'flow' of Members along the development pathway in areas of priority without reducing quality.

> 14. NIHR Incubators provide targeted high level career development support for a limited number of pre-doctoral posts in priority areas where **progression to PhD will be 'run-through'** (subject to proportionate review at transition to ensure quality maintenance). A proportion of ACFs allocated through competition will also be allocated to NIHR Incubators to ensure further critical mass

Bridging schemes and seed-corn funding have proved to be particularly effective at allowing trainees to gain bespoke skills and experience in different settings (e.g. the 6 month Clinical Trials Fellowship and initiatives in the School for Primary Care Research) or for preparing trainees for the next stage of their career. This is particularly helpful in optimising career progression which is largely positive but there are some notable exceptions, e.g. ICA Masters. Furthermore, inconsistent approaches and poor linkage between NIHR Infrastructure/Research Programmes and the Training Programmes managed by TCC remain. For example, the NIHR Transitional Research Fellowship although designed to support trainees moving from basic or experimental science research to applied health or clinical research has not been widely used. Mechanisms to attract under-represented professions such as pharmacy will be key if we wish to build research capacity in multimorbidity/polypharmacy.

> 15. Provide targeted **'seed-corn' funding** (on a matched-funding basis with universities and other partners) to support pre-recruitment activity (e.g. vacation studentships, intercalation bursaries, internships as relevant to the different professional groups) in priority areas or for 'hard to reach groups' such as pharmacy and social care

> 16. Explore a **bridging scheme** for Members who fall between schemes. RCF would represent one potential funding route

ACFs already benefit from a Research Training Programme which can be tailored to meet the needs of individual fellows and plans are also being developed to increase the scientific 'literacy' of CLs and equivalent NIHR posts. The development of bespoke training opportunities to foster disruptive thinking will provide fellows with the key emerging skill sets identified through consultation.

> 17. Extend the availability of bespoke training programmes to include all post-doctoral level NIHR Academy Members. NIHR Incubators will play a key role in delivery in their relevant areas

The capacity for ACFs and other pathway posts to alter workforce balance is ultimately limited by the availability of high quality individuals who wish to apply for them. Decisions about clinical and research are frequently made at undergraduate and early post-graduate level. Altering the behaviour of potential Academy Members to increase entry into priority areas will require input at a career stage earlier than that currently covered by NIHR.

> 18. Work with existing stakeholders (e.g. AMS/Wellcome Trust given their INSPIRE programme) and in new settings (non-medical professions and potential methodology undergraduates) to increase awareness of academic career opportunities in priority areas

Further Recommendations

In the course of the review, its consultation and evidence synthesis additional issues and opportunities for development have been identified. These lie outside the direct remit of the review but the review makes additional recommendations as to how the issues raised may be addressed.

The evidence suggests that the increase in HEE and NIHR research training opportunities for non-medical clinicians has been effective, with high levels of competitiveness amongst these professionals. However, concern remains among actual and potential trainees from these professions around long term career opportunities and the extent to which the NHS values them. This raises potential issues around recruitment and long-term sustainability of the HEE/NIHR ICA pathway. The issues are similar to those faced by the medical trainees prior to the establishment of the IAT Programme with poor progression between some of the career stages and lack of institutional support. Consultation as part of this review also emphasised the need for more interdisciplinary support. Despite the challenges, implementation of ICA in 2008 has catalysed change and examples of best practice exist that can be built upon. **This review has looked in depth at the successes and challenges for the HEE/NIHR ICA Programme and the barriers and enablers for the health professionals that progress through it. Recommendations will be taken forward in partnership with HEE who fund the ICA programme and viewed alongside NIHR's broader vision for this important group.**

1. A cross-funder review group led by HEE and NIHR be established to address career pathways for academic non-medical clinicians, how those pathways intersect with the NHS, whether an equivalent pathway to the ACF/CL pathway would be appropriate and how NIHR investment in NHS structures can be used to leverage improvement in career pathways

There is a need for, and interest in, developing academic skills in the broader NHS workforce (i.e. clinicians who do not perceive themselves to be on an academic career path but who offer important skills, insights and capacities to the national research effort) and the opportunity for them to utilise those skills. A number of organisations, including the Royal Colleges have highlighted this as a priority area and are interested in developing innovative partnership schemes. There is a consensus that whilst capability in this area increases (as research-trained clinicians return to NHS practice) capacity is reducing with changes in working patterns. Future capacity to deliver NIHR research and to deliver on the government Industrial Strategy relating to Biomedicine will require that this issue be addressed.

2. A working group be convened to draft a strategy for developing academic skills and realising research opportunity for clinicians

The demographic balance of the higher pathways remains a significant concern, with a significant loss of, in particular, women, at post-doctoral level. Information gathering for the review indicates that although we aspire for flexibility in funding pathways in practice we have only limited flexibility and the challenge of developing an academic career at the same time as a clinical career and parenthood can prove impossible. There is clear attrition for women at the intermediate career stages and consideration should be given to allowing post-doctoral awards on a fully-flexible personal bursary basis. Contracts to require employers to honour continuous service such as parental leave are already being implemented but the issues are not just related to parenthood and further understanding of gender-related issues would form the basis for future approaches.

3. Establish a **cross-funder approach to address gender issues** which build on evidence and understanding through a systematic review

5. APPENDICES

APPENDICES AND ANNEX

TEN YEARS ON: ADAPTING AND EVOLVING TO NEW CHALLENGES IN
DEVELOPING TOMORROW'S HEALTH RESEARCH LEADERS

NIHR TRAINEES COORDINATING CENTRE

JULY 2017

The following list of supporting documents will open as separate files.

Annex 1: NIHR Training mapping report

Appendix 1: Groups

Appendix 2: Consultation questions and responses

Appendix 3: Overview of training programmes managed by TCC