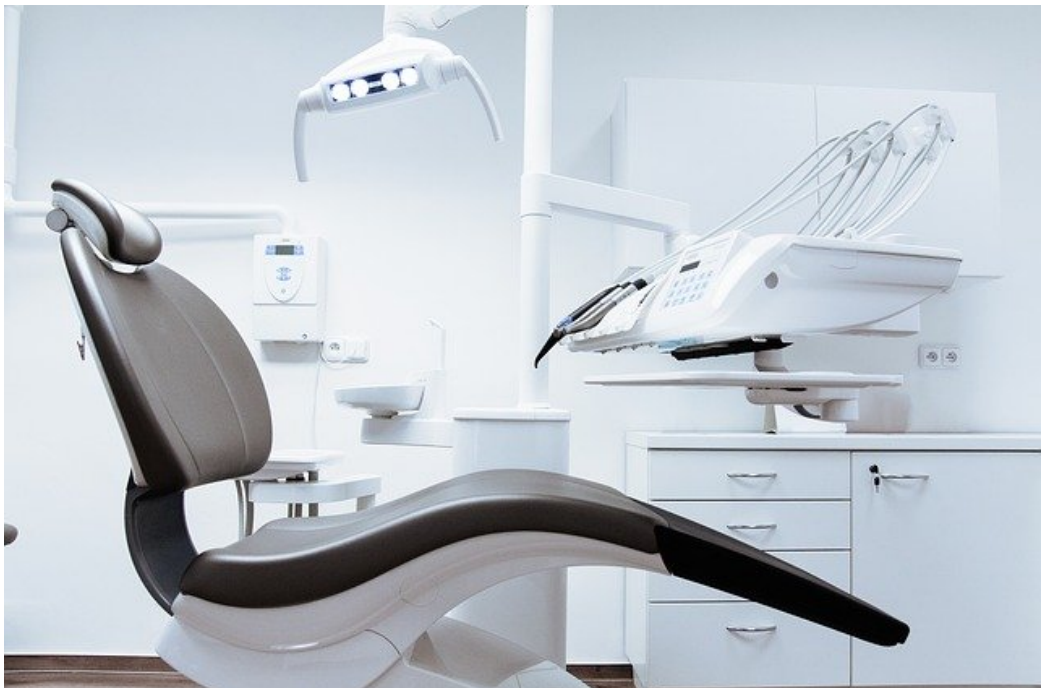
Inequalities in UK clinical academic careers: a systematic review and qualitative study

A short report adapted from:
"From the sticky floor to the glass ceiling and everything in between: a systematic review and qualitative study focusing on gender inequalities in Clinical Academic careers"



University of York
The University of Manchester
Hull York Medical School
Queen Mary University of London

Short project report
November 2020

Principal Investigators:
Professor Gabrielle Finn
Dr Jess Morgan

DOI: 10.13140/RG.2.2.14667.92966

Prepared for:
NIHR Academy, Academy of Medical Sciences, Cancer Research UK, Health Education England, Medical Research Council, Wellcome Trust.

NIHR | National Institute for Health Research
The Academy of Medical Sciences
Cancer Research UK
NHS Health Education England
UKRI Medical Research Council
wellcome

.

Contact:

Professor Gabrielle Finn, gabrielle.finn@manchester.ac.uk
Dr Jess Morgan, jess.morgan@york.ac.uk

DOI: 10.13140/RG.2.2.14667.92966

Keywords

Academic, BAME, bias, clinical academic, clinician, COVID-19, dentist, dentistry, discrimination, doctor, ethnicity, evaluation, funding, gender, health, integrated academic training, interventions, medicine, qualitative, quantitative, synthesis, systematic review, underrepresented, women

Video summary

A video summary of the findings of this study is available at:
https://youtu.be/isuC8P8CBXA

Table of Contents

List of tables

List of figures

Project team

Principal Investigators:

Professor Gabrielle Finn, University of Manchester
Dr Jessica Morgan, University of York

Research team

Systematic review:
Mrs Jennifer Brown, University of York
Mr Connor Evans, University of York
Dr Gary Raine, University of York
Professor Lesley Stewart, University of York
Dr Eleonora Uphoff, University of York

Interviews and audio diaries:
Dr Amelia Kehoe, Health Professions Education Unit, University of York
Dr John Buchanan, Queen Mary University London, Bart's Health NHS Trust
Dr Abisola Balogun-Katung, Health Professions Education Unit, University of York
Dr Paul Tiffin, University of York, Tees, Esk and Wear Valleys Foundation NHS Trust
Ms Ellie Taylor, University of Hull
Dr Paul Crampton, Health Professions Education Unit, University of York

Acknowledgements

The research team is grateful to the funders for their financial support. We wish to thank all those who promoted the study and assisted with recruitment, specifically including Women in Academic Medicine and the British Medical Association. The authors also appreciate the insight of the project steering group at the Clinical Academic Training Forum. Thanks go to the administrative team who supported the grant and to the internal project steering group for their support. Most importantly, we would like to thank all our participants for their contribution to this study and sharing their narratives and time so generously. The researchers acknowledge and thank those involved in the grant application. Thanks to Health Watch York for their contribution. The authors of this report wish to thank the following for their contributions:
Recruitment support: Dr Carmen Soto, The British Medical Association
Public and Patient Involvement: Hazel Qureshi, Health Watch York
Project support: Mrs Samantha McDermott and Mr Oliver Short, University of York
Contribution to funding application: Dr Jimmie Leppink, University of York
Dental advisor: Dr Brian Nattress, University of Leeds, Health Education Yorkshire and Humber

Disclaimer

This report presents independent research funded [QRTB-2019-014 / C71037/A29824] by the NIHR Academy, Academy of Medical Sciences, Cancer Research UK, Health Education England, Medical Research Council, and Wellcome Trust. The views and opinions expressed by authors in this report are those of the authors and do not necessarily reflect those of the funders.

Short report

This report is a shortened version of the full report (which presents more detailed methods, exhaustive data, discussion and appendices), and focusses on the implementational aspects of the research. The full report is available the funders or authors.

Abstract

Background: The advancement of excellent healthcare requires a strategic funder approach to develop and retain talented, research-focused healthcare professionals who can balance clinical and academic activities effectively for the benefit of patient care. Unfortunately, there are many inequalities in clinical academia, often based upon protected characteristics. The aim of this study was to (a) conduct a systematic review to explore barriers, facilitators, and existing interventions within Clinical Academic (CA) careers and, (b) collect qualitative data to explore the lived experiences of CAs across the career trajectory.
Methods: The systematic review used comprehensive literature searches to identify relevant quantitative and qualitative studies involving qualified doctors and dentists at any stage of a CA career. Abstract screening was supported by machine learning tools. Full text screening was performed in duplicate; and risk of bias assessed. Outcomes were study defined; results of quantitative data were described narratively, and qualitative studies synthesised using a thematic approach. The qualitative phase involved (a) semi-structured interviews with 104 CAs and (b) audio-diary and written diary data provided by 30 participants over an 8-month period. Diary data collection coincided with the COVID-19 pandemic. Data were thematically analysed before being subjected to an additional text-mining stage. Further, data were triangulated through the observation of funding panels and seeking expert opinion.
Findings: 239 studies were included in the review of barriers and facilitators, 141 in the review of interventions, and seven in both reviews. Within the interventions review, 28 studies contributed to the quantitative synthesis, 17 to the qualitative synthesis, and two to both. Most studies were from North America. There were few high quality, well-reported studies. Most quantitative evidence was from multi-faceted academic training programmes, which may increase recruitment to academia among clinicians. Findings are less clear for retention and other outcomes such as participation in research and obtaining research funding. Studies reported benefits of supportive relationships for CAs, including peers and senior mentors. The qualitative data from this study broadly pertained to eight major themes: identity; motivation to pursue; barriers; enablers; myths and the hidden curriculum; interventions; advice and top tips; prescriptive and descriptive biases. Across the data, there was evidence of discrimination based upon protected characteristics; there were several instances where this contributed to CAs leaving the research environment. A lack of protected time for research was a persistent issue, as well as navigating working in two competing environments. Discrimination was well documented, particularly on the basis of protected characteristics such as gender, sexuality, maternal status, and ethnicity.
Conclusions: The findings provide comprehensive evidence that CAs struggle to navigate their career pathway and balance clinical duties with conducting research. Existing evidence is limited by rigour and reporting, but there are important lessons to be learned. Research funders should commit to evaluating any future interventions to address inequalities in the CA workforce. Successful interventions are likely to be comprehensive multi-faceted programmes of training, in which relational and supportive factors are key.

Introduction

A Clinical Academic (CA) is a clinician who is professionally trained, registered, and generally actively practising, and also employed to conduct research and/or teaching. There are structured pathways to becoming a CA, as well as more opportunistic and informal routes to the career. In the UK, bodies such as the National Institute for Health Research (NIHR), Cancer Research UK (CRUK) and Wellcome have affiliated programmes that fund training pathways, schemes, and research projects. Such formal pathways are often composed of fellowships, such as doctoral and postdoctoral (advanced) fellowships, as well as Clinical Academic Lectureships (CALs) or Clinical Lectureships (CLs). These fund the academic time of the award holder whilst they continue with their clinical training in their chosen field. There are also more senior posts and awards available for experienced mid- and late-career CAs. These include senior investigator awards and funded Professorships. Some funders offer integrated academic training pathways, where a trainee tends to remain with the same funder across a certain span of their career trajectory, through doctoral studies to postdoctoral research. Other CAs may move between funders at various points. Some clinicians take opportunities as they arise to engage in research and teaching on an ad-hoc basis, perhaps building up academic time via external grant funding or provided by Higher Education Institutions.

Table 1: Example of the NIHR Integrated Academic Training Pathway for (i) Medicine and (ii) Dentistry. * = Clinical Training Levels

Integrated Academic Training Pathway	University	Foundation programme	Specialist training			Senior positions
			In practice fellowship	Personal training fellowships	Clinician 5-year award	
(i) Medicine	Medical School: MB, Intercalated BSc, MD/PhD, Graduate entry medicine	Academic foundation programme: FY1-FY2	Academic clinical fellowship 1-3*	Clinical lectureship 4-6*	Certificate of Completion of training (CCT)	Research professor Senior lecturer Senior clinical fellowship Continued professional development Consultant research sessions
(ii) Dentistry	Dental School: BDS, Intercalated BSc, DDS/ PhD, Graduate entry dentistry	Foundation and core training: DF1 or DCT 1-3	Academic Clinical fellowship 1-3*	Clinical lectureship 4,5*	Certificate of Completion of Specialty Training (CCST)	

The CA career pipeline is often described as “leaky”, whereby researchers are lost from the profession as they are unable to progress along the trajectory. Women and Black Asian Minority Ethnic (BAME) individuals are the least likely to progress. In a study conducted by Lopes and colleagues (2019), less than two-thirds of previous academic clinical fellows already on the CA pathway planned on continuing in this career. Evidence suggests that roughly a third of post holders progress to a junior postdoctoral clinical lectureship or senior CA (Lopes et al, 2019). Studies have shown factors responsible for high dropouts include work-life balance, securing funding, uncertainties about career progression, mentorship and obtaining career guidance (Ranieri et al., 2015, Lyons et al., 2010).

The glass ceiling is well documented in many careers, including clinical academia (Williams, 2004, Williams, 2005, Carnes et al., 2008) and is described as a barrier, usually affecting women and members of marginalised groups, that prevents their professional advancement. These groups include those from Black Asian Minority Ethnic (BAME) backgrounds or Lesbian, Gay, Bisexual, Transgender, Queer, Intersex, Asexual and other genders on the spectrum (LGBTQIA+). People belonging to such groups are less likely to reach positions of prestige and are more likely to work in positions that are not permanently contracted, known as non-tenure track. Although the glass ceiling is a metaphor, it is demonstrative of a complex struggle and interplay that appears to persist, despite efforts to shine the spotlight on inequalities experienced by underrepresented groups. This is particularly true within clinical academia (Brown et al., 2020a). More recently, the medical literature has been using the term 'the sticky floor' which describes the position of women in (academic) medicine where fewer are promoted and fewer are given institutional resource at the start of their careers to set them on their way (Zhuge et al., 2011, Carnes et al., 2008).

This multi-phasic study sought to explore barriers and facilitators to CA careers, with a focus on inequalities based upon gender and ethnicity. Funders and institutions globally have tried interventions to overcome such barriers with varying levels of success. The evidence for such interventions is also considered within this study.

Research aims and questions

The commissioned aims of this project were to:

1. Understand the experiences of CA careers from a representative sample of those within CA pathways from trainee to senior CA, including those who may have left or never embarked on a formal, structured CA pathway;
2. Identify, critically appraise, and synthesise the literature on barriers and facilitators to progression throughout a CA career across medicine and dentistry, notably female careers, and support this with participant narratives;
3. Identify the key factors affecting career decisions and perceptions of how attractive CA careers are considered to be, by both those who have chosen to pursue them as careers and those who have not;
4. Identify, critically appraise, and synthesise the literature on existing interventions to inform enhancement of CA pathways and development of new ones that may be relevant in UK settings.

The research questions were:

1. What are current and recent trainees' experiences of CA careers; how do they conceptualise a CA career?
2. What are key factors impacting career decisions and perceptions of how attractive CA careers are considered to be?
3. What factors influence the decision to become a CA, maintain a CA career and how do these factors change over time?
4. What are the main reasons for leaving a CA career?
5. How do clinical training demands affect research activity at different CA career transition points, and is the impact different for different types of research?
6. What are facilitators and barriers to progression through a CA career across medicine and dentistry?
7. What factors affect access to clinical academia?
8. How do prescriptive and descriptive biases impact upon careers in clinical academia?

9. What existing or new interventions aimed at helping clinicians to pursue, and or transition across CA career pathways may have potential in UK settings?
10. What existing or new interventions could help to reduce attrition in CA careers?
11. How can organisations support trainees and CA in their career decisions and academic pathways?
12. How do medicine and dentistry compare in terms of the aforementioned facilitating and hindering factors, interventions and attrition?

Please note in the full report we address each of these aims and questions. Within the current report, we have prioritised the aims and questions which focus on interventions. A summary by research question is also provided in the full report.

Methods

The study included a systematic review and qualitative exploration utilising in-depth, semi-structured interviews and audio-diaries.

Stakeholder engagement

The research team consulted with the funders, the Clinical Academic Training Forum (CATF) and policy makers at funding organisations to scope issues and provide context. The study steering group included Patient and Public representation, provided by Health Watch York and contributed to the study design and interpretation.

Ethics

Ethical approval the study was obtained from the Hull York Medical School Ethics Committee (ref: 19 32). A subsequent amendment was approved for completion of online consent forms, due to the onset of the COVID-19 pandemic.

Systematic review

The systematic review followed a pre-specified protocol that was registered (https://osf.io/mfy7a) and published (Brown et al., 2020a). Systematic searches of five databases were conducted by an experienced information specialist in October 2019. We included studies of doctors, dentists, and/or those with a supervisory role in their careers, including those with and without CA careers. Outcomes were as defined in individual studies and related to success rates of joining or continuing a CA career, including but not limited to success in gaining funding, proportion of time spent in academic work, and numbers of awards/higher education qualifications, as well as experiences of professionals within the CA pathway. Studies reporting quantitative and/or qualitative data were included.

Titles and abstracts were screened used a two-stage process, incorporating use of a machine learning algorithm. Full text screening was undertaken independently, and in duplicate, by two researchers. Data extraction followed a staged approach and is summarised in narrative and tabular form within the full report.

Given the extensive number of studies identified, only those studies most likely to contribute to answering the specific research aims, that is quantitative studies of interventions with a control group and qualitative studies, were included in the final synthesis. These were quality assessed, using the Cochrane risk of bias tool for randomised controlled trials (Higgins et al., 2011), the Newcastle-Ottawa tool for non-randomised studies (Wells et al., 2014), the

Qualitative Assessment and Review Instrument (QARI) for qualitative studies (Joanna Briggs Institute, 2014), the Mixed Methods Appraisal tool (MMAT) for mixed methods studies (Hong et al., 2018) and the RAMESES II Quality Standards for Realist Evaluation (Wong et al., 2017). Given the heterogenous nature of the studies identified, narrative synthesis of quantitative data was performed. Qualitative data were synthesised using thematic analysis.

Interviews and audio-diaries

To maximise recruitment, a multi-pronged approach was utilised to recruit a stratified sample. Recruitment methods involved:

1. Personal email invites sent to a purposive sample of participants known to the research team or the steering committee,
2. Advertisements through a dedicated Twitter account established for the project (@GenderClinical),
3. 'Snowballing' by participants,
4. Email circulars to past and present applicants facilitated by the funding bodies,
5. Emails to associations, networks support groups and collectives related to clinical academia and for CAs with specific protected characteristics,
6. Emails to specific marginalised and underrepresented groups such as transgender and BAME medical and dental associations

The qualitative arm of this study utilised semi-structured interviews with doctors and dentists who had various experiences of CA pathways. These included:
(1) Those who had successfully navigated clinical academia and remain active,
(2) Those who had attempted to pursue a CA career but had been unsuccessful, for example by not securing funding or academic posts,
(3) Those who had given up research due to insurmountable challenges.

In addition, the qualitative protocols were informed by previous research in the field and the developing systematic review. Scoping interviews were conducted face-to-face and via telephone in order to pilot the topic guides, ensuring they were covering the required areas. Scoping interviews followed the normal consenting process.

Interviews were conducted by five researchers (GF, AK, AB, PC, JBu) over a nine-month period (October 2019 – June 2020). All interviews were digitally recorded and transcribed verbatim. Researchers also made field notes during interviews. Although written consent had been obtained prior to the interview, it was also confirmed at the commencement of the interview.

Participants were able to request interviews to be held via telephone or using an online platform (such as Zoom or Skype). Interviews were semi-structured, based upon interview stems informed by the systematic review, the study's theoretical framework and underpinning research questions. Interview stems were adapted depending on the participant demographic.

From January to September 2020, audio-diary data were collected from 30 participants, seven of whom had not participated in the semi-structured interviews. Audio-diary data were collected using voice recordings that were transferred to the team using encrypted WhatsApp files. Audio-diaries enabled participants to report on issues impacting their CA careers in the moment. The diary method enabled researchers to collect 'novel' real-time data.

All data (transcripts) were thematically analysed (Braun et al., 2013, Braun and Clarke, 2006) by a team of researchers (GF, AK, AB, JBu, PC, ET). The six-step process of

thematic analysis was followed: (1) data familiarisation, (2) generating initial codes, (3) searching for themes, (4) reviewing themes, (5) defining and naming themes, and (6) producing the report (Braun and Clarke, 2006, Braun and Clarke, 2013). Both inductive and deductive approaches were taken, with deductive analysis based on existing theory including maternal wall bias, feminist theory and intersectionality (Williams and Segal, 2003, Brown et al., 2020b, Williams, 2004). Authors engaged in a process of negotiation to refine codes and themes, before utilising member checking with a subset of participants. Authors were reflexive, recording reflexive journals and acknowledging their biases and presuppositions. The research team consisted of clinicians and non-clinicians, CAs at varying stages, expert qualitative researchers to novices, females and males, and a mix of ethnicities. The theoretical considerations utilised are delineated within the full report.

Findings

Systematic review

Electronic databases were searched in October 2019 and returned 34,230 records. Following screening, 239 studies were included in the review of barriers and facilitators, 141 in the review of interventions, and seven in both reviews. Of the 148 studies included within the interventions review, 28 contributed to the quantitative synthesis, 17 to the qualitative synthesis, and two to both (Figure 1).

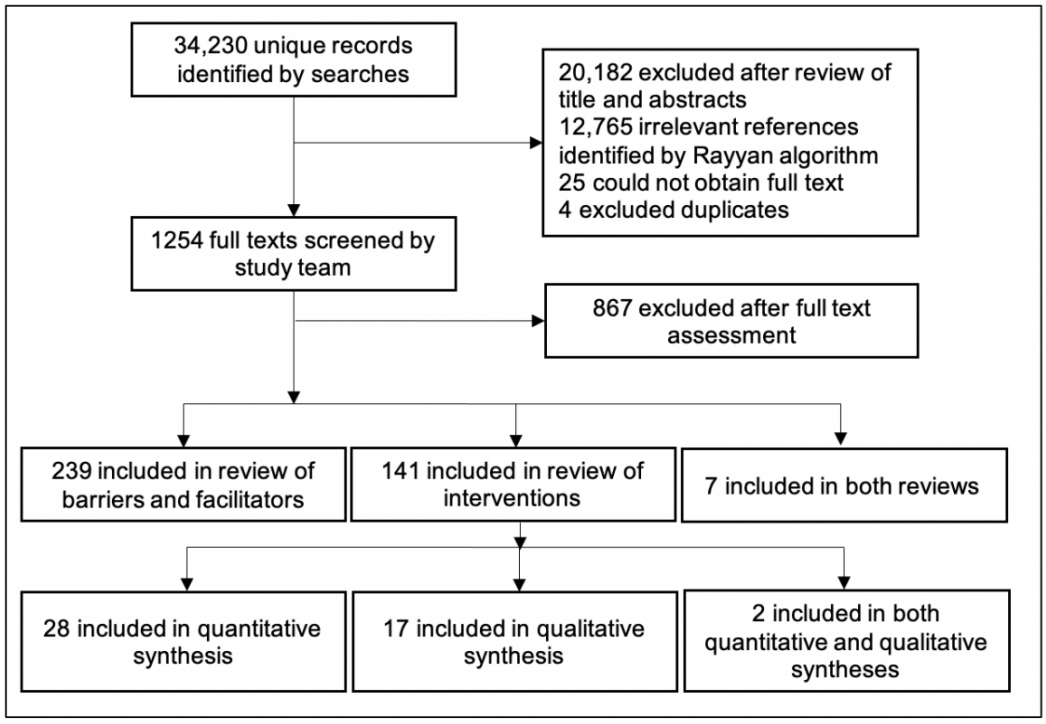


Figure 1: Flowsheet for study selection (for full details of each stage see full report

Barriers and facilitators review

Of the 246 studies that examined barriers and facilitators to CA careers, the majority were quantitative cohort studies (n=156), and most were from North America (n=205). Research focused on individuals from a range of medical specialties and dentistry, and included clinicians of varying grades, although the majority were of clinicians who had completed postgraduate training. Twenty-seven studies focused on a sample of women only, and six studies reported a sample comprising individuals from a minority ethnic background only.

Following discussion with the funders and project steering group, in-depth analysis of this large dataset on barriers and facilitators was not performed but may be explored in future research.

Interventions review

Of the 148 studies of interventions to improve CA careers, the majority were from North America (n=133) and over half were interventions implemented within single institutions (n=83). Most were single-group cohort studies (n=99), and few interventions were targeted at specific populations (n=35).

Thirty studies were included in the quantitative synthesis, and 19 studies were included in the qualitative synthesis. Notably, none of these described interventions for CA dentists. Few were scored as high quality, and many were poorly reported. Both quantitative and qualitative studies lacked methodological rigour and/or did not describe adequately the populations included, the interventions applied and the results from those interventions.

For the purpose of this short report, a discursive summary of the SR findings is presented. For a detailed analysis of the findings, including the studies which contribute to the synthesis, please see the full report which also provides full details of all included studies, including references.

Quantitative synthesis

The full report presents the findings from quantitative studies under eight broad categories relating to clinical academic careers: aspiration, satisfaction, skills & knowledge, funding, research participation, recruitment, retention/promotion, and publication outcomes.

In summary, most quantitative evidence was available for multi-faceted academic training programmes which tended to focus on measures of academic productivity such as publications and grant funding success. There was some evidence to suggest that such programmes may increase recruitment to academia among clinicians and increase short-term publication productivity, but findings were less clear for retention within CA pathways or for other outcomes such as participation in research and obtaining research funding.

Whilst academic training programmes tended to focus on advancing academic skills, productivity and interest for trainees, career development programmes centred on enhancing junior/senior faculty workforce within clinical academia through promotion, retention and recruitment. Studies of career development programmes showed mixed results, with some studies suggesting a benefit and others showing no benefit for recruitment and retention to academia. The same was true for secondary outcomes such as career satisfaction and skills and knowledge development.

There was very limited quantitative evidence relating to research-tailored curricula or support network programmes as interventions to improve CA careers. Intervention programmes that focused specifically on mentorship demonstrated significant benefits related to number of

publications, grant awards achieved and funding success, and promotion of academic staff, whilst outcomes related to journal impact factor were non-significant but still in favour of intervention groups. Outcomes related to recruitment or research participation were not evaluated by these specific programmes.

Few quantitative studies specifically reported the effects of interventions for women or minority groups. Results for recruitment diversity training suggested a positive impact on recruitment in one study (Sheridan et al., 2010). One evaluation showed that implementation of a career development programme was linked to improved recruitment of women (Valantine et al., 2014), but there was no evidence suggesting benefits for other outcomes. There was no evidence of an effect on recruitment of minority groups and one study showed no impact of a career development programme on retention in academia for these groups (Daley et al., 2006).

Qualitative synthesis

Qualitative synthesis identified seven key themes: developing knowledge, skills and confidence in research and scholarship; leadership skills and opportunities; personal characteristics and behaviour of individuals; interactions and relationships; time and competing demands in clinical academia; facilitating programme participation and success; and funding and financial support.

Various career development and academic training programmes successfully improved research/scholarship knowledge and skills of participants, or their understanding of academic careers. A recurrent theme across studies was the development of greater confidence in conducting research-related activities, and in other aspects of their career, by participants who received these interventions; including, for example, greater self-confidence to pursue new opportunities and apply for promotion. Increased confidence was gained in multiple ways such as through networking and other forms of interaction with peers, colleagues, and mentors. Some career development programmes and mentoring relationships resulted in feelings of empowerment, improved positivity and higher levels of motivation. Some studies identified the personal attributes and actions of individuals, including personal ambition, enthusiasm, motivation, self-direction, interest, and commitment to the programme, as factors that could influence the success of interventions.

Consistently, intervention participants benefited from interaction with peers and colleagues, in terms of support, encouragement and assistance, and the opportunity to develop professional collaborations. Peer interaction helped reduce feelings of isolation and fostered a sense of community and belonging. Participants in some studies benefited from ‘peer mentoring’, but how this differed from other forms of peer interaction was often unclear. Opportunities to interact with other women was important to female participants. One study indicated that sponsorship was of benefit to women in terms of career advancement (Lin et al., 2019). Some individuals gained encouragement from hearing how senior CAs had successfully overcome career challenges and achieved success.

Not every study participant experienced beneficial mentoring relationships with senior colleagues, but overall experiences were positive and valued. Mentors provided a broad range of assistance to mentees. Having a team or network of mentors was seen as important for successful outcomes as it allowed mentees to draw on a range of opinions and gain advice from individuals who had different areas of expertise. Individuals’ mentoring needs are likely to develop and change over time as their career progresses.

Several studies suggested that having at least one mentor of the same gender was important to women. Evidence from a single study was mixed on whether it was important for mentor and mentee to both be from an ethnic group underrepresented in medicine

(Guevara et al., 2018). Some respondents believed it was important, whilst others suggested a mentor from any ethnic group was sufficient, if they understood the nature of unconscious bias and could offer relevant advice and support. Some mentees believed they gained more objective and impartial advice from having mentors who work at a different institution to the mentee. There were differing opinions expressed across several studies on the issue of training for mentors.

Findings indicated that issues related to time and competing demands were key factors in shaping individuals' experiences and intervention impact. There was consistent evidence of the importance and benefit of having protected time, particularly in terms of mitigating the negative impact of competing clinical demands on research-related activity. There was also some evidence to suggest that maintaining protected time for research could be difficult in practice. One intervention targeted at junior faculty physician–scientists with substantial caregiving responsibilities, which provided funding for protected research time and hiring staff, appeared to have multiple positive effects including facilitating greater research productivity, an improved work-life balance and retention in academia at critical time points (Jones et al., 2019).

Across studies, having committed, supportive, and experienced programme staff was seen as a key facilitator of programme success. Respondents identified several other factors at a programme, organisational or national level which acted as a facilitator or barrier to success. One study identified several factors that potentially undermined the principles and impact of the Athena SWAN programme in the UK (Caffrey et al., 2016).

Interviews

The qualitative arm of this study utilised semi-structured interviews with 104 doctors and dentists who had various experiences of CA pathways. Interview data broadly pertained to eight major themes, some of which are presented in the figure below: identity; motivation to pursue; barriers; enablers; myths and the hidden curriculum; interventions; advice and top tips; prescriptive and descriptive biases. An overview of all themes and sub-themes is provided in figure 2. The full analysis, with additional exemplary quotes can be found in the full report.

Figure 2: Overview of main interview themes

Table 2: Summary of participant demographics for interview phase

Profession	**Total (n=104)**	**%**
Dentistry	16	15.4
Medicine	88	84.6
Mean Age	40	
Age Range	27 – 74	
Gender		
Female	61	58.7
Male	42	40.4
Prefer not to say	1	1.0
Predominant Clinical Work Area		
Primary	21	20.2
Secondary	39	37.5
Tertiary	41	39.4
Did not disclose	3	2.9
Employment Status (overall)		
Full Time	75	72.1
<Full Time	6	26.9
Did not disclose	1	1
% of hours spent on academic work		
100%	11	10.6
50%	18	17.0
<50%	70	67.3
Did not disclose	5	4.8
Out of programme for research		
No	63	60.6
Not applicable	27	26
Yes	13	12.5
Did not disclose	1	1
Ethnicity		
White	82	78.8
Black	5	4.8
Asian	11	2.9
Arabic	3	2.9
Did not disclose	3	2.9
Marital Status		
Civil partnership	2	1.9
Divorced	4	3.8
Long-term relationship (not married)	15	14.4
Married	72	69.2
Single	11	10.6
Sexuality		
LGBTQIA+	7	6.7
Heterosexual	87	83.7
Did not disclose	10	9.6
Disability		
No	98	94.2
Yes	4	3.8
Prefer not to say	2	2.0
Number of Children/Dependents		
0	35	33.7
1	21	20.2

2	31	29.8
3	10	9.6
4	2	2.9
Did not disclose	4	3.8
Pregnant		
No	84	80.8
Yes	3	2.9
Not applicable	15	14.4
Did not disclose	2	1.9
Current Clinical Academic Career Level		
Doctoral Fellow/ PhD student	20	19.2
Clinical Research Fellow	2	1.9
Academic Clinical Fellow	18	17.3
Academic Clinical Lecturer	17	16.3
No longer an academic	13	12.5
Senior Clinical Lecturer and above (including Deans and Programme Directors)	31	29.8
Did not disclose	3	2.9
Current grade within Clinical Role		
Clinical Fellow	3	2.9
Dental Specialty Registrar (ST1-5)	8	7.7
General Practitioner / General Dental Practitioner	10	9.6
Medical Consultant / Dental Consultant	37	35.5
Medical registrar equivalent (ST4-8)	31	29.8
Medical SHO equivalent (CT1-2, ST1-3)	13	12.5
Out of Programme for Experience	1	1
Did not disclose	1	1
Location		
East of England	3	2.9
Midlands	13	12.5
North East England & Yorkshire	36	34.6
North West of England	5	4.8
Northern Ireland	2	1.9
Scotland	7	6.7
South East of England	21	20.2
South England	7	6.7
South West of England	6	5.8
Wales	3	2.9
Did not disclose	1	1.0
Place primary health qualification awarded		
UK	91	87.5
IMG	6	5.8
EEU	5	4.8
Did not disclose	2	1.9

Themes

Identity: The conceptualisation of a CA was seen as someone who held a clinical role alongside teaching and/or research activities. Participants detailed that there is a lack of

appreciation of the role and remit of CAs. This lack of awareness has implications on a practical level, for example when clinical shift allocations are provided that clash with academic working hours. CAs perceived hostility from colleagues based upon the perception that they are not visible in their clinical or academic environments enough, again the root cause of which was the lack of clarity about the identity of a CA.

There were many examples of imposter syndrome within the community; CAs felt inferior to colleagues and that their achievements were insufficient to identify as a true CA. The constructions of participants' personal and professional identities as CAs revealed valuable insight and explanation as to how these different identities could have an impact on CA progression. Imposter syndrome was frequently exhibited in the form of participants not feeling like a 'real academic/clinician' in the sense that they were split and didn't fully adhere to either identity. Participants cited multiple reasons such as not producing the same level of outputs, feeling like they belonged, or being able to provide support to others in such a role.

Gender, race and ethnicity were identified as intersectional factors which impacted on the ways in which individuals regarded their success and/or failures. Whilst one individual may have experienced positive affirmations in relation to their characteristics, others may have been challenged in different environments, subject to local institutional and organisational biases. Furthermore, academic work is often associated with quantifiable indicators, and without reaching such expectations, it may provide a false economy in the perception of what a CA actually is. The competing nature of not being one or the other was highlighted, along with the lack of understanding from colleagues about the CA role.

"As a CA you're always viewed as a, not a true academic and not a true clinician so that can take a toll on people's personal relationships and mental health, so that can be an element that can be addressed as well." (Interview 38, Male, Medic)

***Motivation to pursue**:* While some CAs reported an opportunistic start to their careers, others reported being inspired by role models and mentors. Previous research exposure, typically intercalation during undergraduate degrees, was the more significant source of motivation for aspiring CAs. The CA career track is attractive to those who prefer a varied portfolio, many cited having two employers to hold some benefit. Many participants focused on the ability to be able to make a difference to patient care, on a broader scale than individual care, and to enhance patient outcomes. Personal motivation, enthusiasm and curiosity for research topics helped individuals to see the bigger picture and encouraged them to want to enhance their knowledge and understanding. Other individual-level reasons included the flexibility afforded by the CA role and the ability to be more autonomous in day-to-day work activities. Role models were discussed, particularly in relation to those with protected characteristics and the positive impact of seeing those from minority groups in successful leadership roles.

"I started to work with one of our professors locally who was absolutely fantastic and she kind of got me interested in research." (Interview 90, Female, Medic)

***Enablers**:* Working within a supportive culture, both clinical and academic, was essential for CAs to be successful in their career. Alongside this, mentorship was one of the most impactful enablers. Several enablers were identified across organisational, team and

individual levels that supported CA careers. CAs accessed various types of support such as workload, financial, pastoral and peer within their various work environments. Organisational support for individual circumstance issues, including maternity and paternity, mental health and job rotation, was especially effective in providing reassurance. The importance of supervisors, role models and mentorship was highlighted, helping to increase confidence and open up opportunities. Advice and guidance experienced through processes such as applications for funding, and career moves, helped to build relationships and forge stronger networks in academic fields. Having protected time in order to conduct research activities, in parallel with clinical work, was a major enabling factor noted by participants. This was also linked to employers and colleagues having an awareness about participants' academic role and their need to be away from the ward on certain days. White male privilege was acknowledged as an enabler for men. However, many women reported that men were aware of their privilege and used it to help support female colleagues. Once participants obtained their first CA post, they felt that the role formed a strong backbone in their careers and helped to drive future success. In addition, funder support and flexibility of funding arrangements helped to alleviate pressures. In addition to being a motivating factor to pursue a CA career, flexibility of the CA role and increased autonomy were also highly influential when CAs were deciding whether to maintain their CA role. Despite the much-needed support, it is important to recognise the role of individual resilience; it takes a great deal of hard work and persistence to pursue a career in academic medicine.

"Enabler wise, I think probably just kind of supportive people that I've worked with in the past, kind of supportive supervisors, that have helped like prepare me for interviews or kind of answer questions as they came up or kind of pushed me to go for things and kind of help build my confidence." (Interview 96, Female, Medic)

Barriers: The balance of working within two fields, academic and clinical, was difficult for CAs. They struggled with competing demands and duplication of effort in relation to appraisal and mandatory training processes. Many barriers related to protected characteristics such as gender and ethnicity. Women were subjected to biases, particularly in relation to their reproductive decision making. These barriers created anxiety for female academics and contributed to their struggle to continue their CA careers over time. Gay men were also subjected to discrimination that was so severe it impacted upon their choice of specialty. Causes of discrimination were difficult to delineate due to the intersectional identities of participants. Some men reported that they believe the tide has changed and they now feel discriminated against, 'it is the wrong time to be a white male'. Other factors included an unsupportive and competitive culture; a paucity of mentors and realistic role models to provide career guidance; microaggressions; lack of support for certain research specialties considered to be unpopular or low priority; financial loss; paucity of jobs within their geographical region; difficulty in juggling both clinical and academic careers; and issues with the process and pipeline. Among dental CAs, a significant barrier that was discussed was the lack of dental research and availability of CA posts. Within both academic and clinical environments there were significant misunderstandings from peers and colleagues about their CA roles and the subsequent lack of affordance given to them to fulfil their roles. Many CAs also reported the role senior figures or trailblazers played in discouraging them from realising their full potential by creating blocks and ensuring that they endured similar struggles they had experienced. The attitude of 'I suffered so why should you have it easy' was prevalent.

> *"I'm married and I would love to have a baby around that age, but then I know that that's the point when all these big fellowships come up and I have been asked actually... 'oh well how are you going to do this research career if you're a woman?' And 'now do you think you'll do it if you have a baby?' And 'don't you think that will affect your ability to do this like, you know, in the long term?'" (Interview 60, Female, Medic)*

Reasons for the attrition of CAs from the workforce and progression was highlighted across motivators, enablers, and barriers. Across all three, we discovered that the importance of guidance and support was pivotal and could either make or break the CA role. The availability of funding and CA roles was highlighted within attrition, as participants often wanted to stay on the pathway but were unable to access their desired job within an appropriate timeframe. Here, the geography and availability of posts within certain regions was discussed as certain specialties and hospitals were seen to provide more support and opportunities. Similarly, the lack of clarity surrounding CA pathways made it very challenging for participants to know how to take the next step. Many participants spoke vehemently about the difficulties of being both 'clinicians' and 'academics' and in effect having to ride two horses. The demands on both these roles are high and juggling prioritisation across from one to the other at various stages provided many barriers. Clinical roles often needed to take precedence due to service demands and patient care; however, the academic demands of outputs were not lessened in the meantime and provided a further source of anxiety.

> *"When the clinical work goes really wrong that's really, really stressful, when bad things happen between partners, that's really stressful but generally now I find most days, the clinical work, although it's a long day, twelve to fourteen hours, when I go home, I can sort of relax after it whereas the academic side of things it's pretty relentless and constant… I think academic work is really stressful and very personally stressful... probably a little bit burnt out to be honest, with the academic side of things, I'm just ready for a break from it." (Interview 71, Female, Medic)*

Myths and the hidden curriculum: Tacit messaging played a significant role in the career decisions of CAs, particularly early career researchers. Organisational culture, principally in relation to research, impacted upon the career aspirations of the organisation in question's members. See Figure 3 and Table 3. Further myths data are available within the full report.

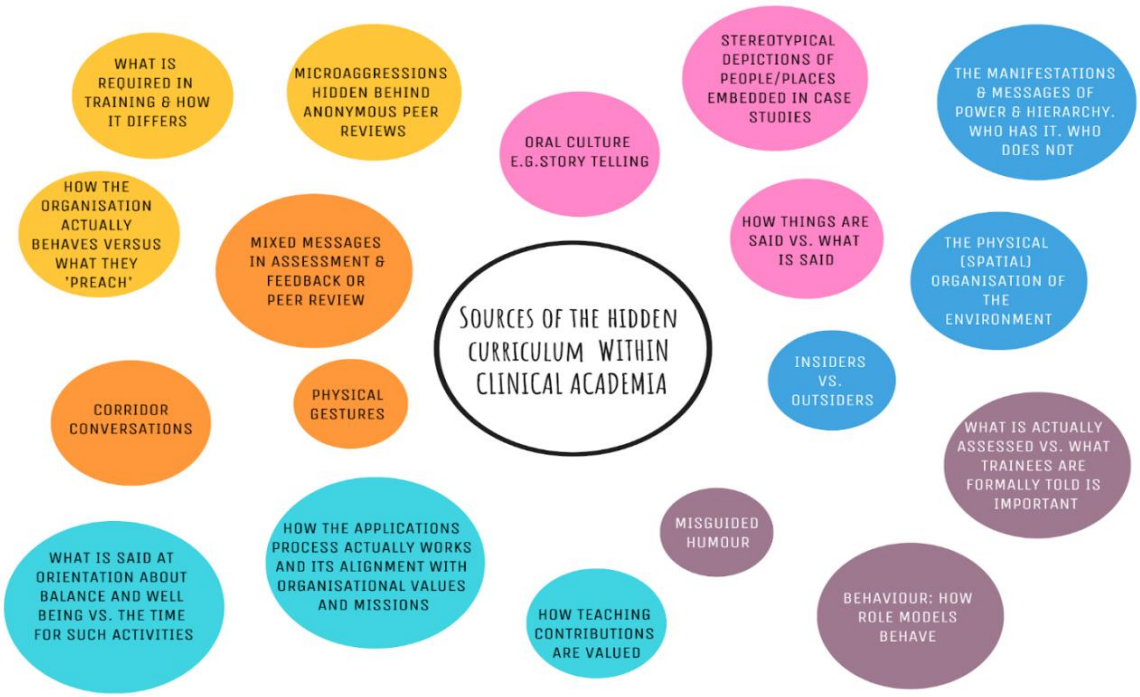


Figure 3: Sources of the hidden curriculum within clinical academia

Table 3: Myths surrounding funding applications corroborated by funders
Myths are grouped into 5 broad categories, based upon what they refer to e.g. personal circumstances.

	A. Application/Interview Process	B. Funder	C. Personal circumstances	D. Type of research	E. Clinical Academic Jobs
1	You can only apply if you have a certain number of years of post-PhD experience	You can't transfer between funders	You can't apply if pregnant	You must pick a disease and stick to it	There aren't really any clinical academic jobs for nurses or midwives
2	Panels only consider journal and impact factor when assessing track record	Funder isn't allowed to give advice in advance of the interview	You must have 30 + first author publications to apply for an advanced fellowship	Medical education research won't be funded	The system is set up for clinical academics to be doctors, and not allied health professionals
3	Interviews are designed to be as stressful as possible	Funders will only fund COVID-19 related research moving forward	You need to move to a different research organisation to	You need a clinical trials unit to do data collection/pilot/feasibility trial	The challenge is on achieving a shared vision for the clinical academic in professions that

			demonstrate independence		have a less well-established research tradition e.g. nursing and midwifery
4	Getting to interview stage guarantees funding	NIHR is only interested in funding medics	Career breaks are not taken into account	At doctoral level - an assumption from some applicants and supervisors that PhD research is an isolated rather than a team activity	It is impossible to move sideways from a consultant post to a senior lecturer post
5	External reviewers do not take into account career breaks when reviewing applications as this gets forgotten due to the volume received	For doctoral fellowships it is incredibly difficult to get academics from different institutions to agree to work together as the PhD fee only goes to one institution. Yet the NIHR wants you to have the best team to support you	f you haven't had success early on then you won't be successful if you apply later in your career	In maternity care, research should be led by doctors	NHS managers can't see what job role a non-medic clinical academic will have in the NHS
6	Less likely to be successful if from an organisation outside the Golden Triangle/Russell group	Funders expect early career researchers to move as much as possible, and see any attempt to stay in the same organisation as a black mark which needs to be explained	You have to have held grants previously to get a grant	Dental research isn't funded	It is difficult moving between the NHS and HEI contractually
7	There is a limit to the number of supervisors that can be included on a fellowship		It is impossible to have a balanced clinical academic career	Academic time can’t be taken in blocks as a standard option	
8	You are never successful on the first go		Funding posts are short so you will need to relocate often		
9	Lack of understanding from some applicants around the ambition that the career trajectory is research leadership / professorship etc		You need to be early in your career do undertake a PhD and mid-career researchers		

			can't start on the funding pathway		
10	Good reviews equate to shortlisting/success		You will not be successful as a clinical academic unless you have an academic department that is strongly linked to a clinical area (and vice versa)		
11	Rejection means I can't apply again and/or I am not good enough		To apply for an NIHR ICA Clinical Doctoral Research Fellowship you have to hold a first or 2:1 first degree		

Interventions: CAs suggested several individual level interventions that they believed could possibly reduce attrition within clinical academia. These interventions included providing them with more support, mentorship and guidance to allow smooth navigation through the CA pathway. CAs placed a high value on having realistic role models and mentors to guide them carefully through key points in their CA career and with identifying and applying for funding for their research. Additionally, CAs identified the need for flexible and longer contracts as well as bridge funding for times when they had to take career breaks. As these critical points during career breaks were when they were most likely to fall off the pathway, they suggested that support was paramount. CAs also believed that longer and more flexible contracts could help with building a more solid career portfolio and continuity on a project not merely based on completing research projects and getting a few publications. Finally, CAs suggested that there was a need for the clinical organisations they worked in to understand their roles and allow for protected research time.

> *"Access to mentoring would, would be really valuable, like in kind of some more structured way of, of trying to help people because it feels like people can kind of reach out and try and find their own mentors at the moment, if they like think of doing that and if they have the confidence to do that and the networks, but in a way I think having a bit more of that, a little bit more formalised, that would be really helpful and it might enable some people that otherwise like wouldn't just set it up for themselves to, to kind of benefit." (Interview 96, Female, Medic)*

Advice and top tips: Seasoned CAs advocated for networking and academic socialisation. Surrounding one's self with like-minded, motivated individuals was key to success. They also recommended finding a niche, finding a mentor and ensuring their research is a 'lights on' activity rather than being conducted in stealth or only after hours as a hobby. See Figure 4, created using direct quotes.

Figure 4: Advice from clinical academics

Prescriptive and descriptive biases: The maternal wall bias, whereby women are discriminated against due to their maternal status, was commonly reported within the study population. Women felt that having children had been detrimental to their careers as they

were not afforded the same opportunities as men and assumptions about their ambitions were made due to their maternal status.

> *"Presumptions that my priorities are not work related, that I have no aspirations, that all females just want babies and to stay at home. I don't want to be a house-wife. I work hard, I have clear career goals but there has never been a conversation about them. The men get mentored and their next position is always lined up. You see adverts on [staff news bulletin] for internal positions available and you can tell which male the advert has been written for in an instant. The perception is that men don't have to worry themselves with family issues or children and are therefore in a better position to take on additional roles." (Interview 24, Female, Dentist)*

Audio-diaries

The audio-diary data presents a unique and important cross-sectional insight into the national CA landscape during the COVID-19 pandemic. Over the period of data collection, 134 diary entries were received. 30 academics participated. There were 23 participants who had been part of the interviews and seven who only participated in the audio-diary phase.

Table 4: Summary of participant demographics for audio-diary phase

Profession	**Total (n=30)**	**%**
Medicine	24	80.0
Dentistry	6	20.0
Mean Age	39	
Age Range	27 - 74	
Gender		
Male	10	33.3
Female	20	66.6
Predominant Clinical Work Area		
Primary	7	23.3
Secondary	11	36.7
Tertiary	12	40.0
Employment Status (overall)		
Full Time	24	80.0
<Full Time	6	20.0
% of hours spent on academic work		
100%	5	16.7
50%	19	63.3
<50%	6	20.0
Out of programme for research		
No	19	63.3
Yes	5	16.7
Not applicable	6	20.0
Ethnicity		
Asian	2	6.7
Indian	2	6.7
Middle Eastern	1	3.3
White Caucasian	24	80.0

Did not disclose	1	3.3
Marital status		
Divorced	2	7.0
Long-term relationship (not married)	2	7.0
Married	23	77.0
Single	3	10.0
Sexuality		
Bisexual	1	3.3
Heterosexual	25	83.3
Did not disclose	4	13.3
Disability		
No	28	93.3
Yes	2	6.7
Number of Children/Dependents		
0	7	23.3
1	6	20.0
2	11	36.7
3	4	13.3
4	2	6.7
Pregnant		
Did not disclose	1	3.3
No	29	96.7
Current Clinical Academic Career Level		
Doctoral Fellow/ PhD student	10	33.3
Academic Clinical Fellow	6	20.0
Academic Clinical Lecturer	6	20.0
Senior Clinical Lecturer and above (including Deans and Programme Directors)	6	20.0
Did not disclose	2	6.7
Current grade within clinical role		
Clinical Fellow	3	10.0
Registrar (Medical / Dental)	16	53.3
General Practitioner (Medical / Dental)	4	13.3
Medical / Dental consultant	6	20.0
Medical researcher	1	3.3
Location		
East of England	1	3.3
Midlands	4	13.3
North East England & Yorkshire	11	36.7
North West of England	2	6.7
South East of England	6	20
South England	4	13.3
Wales	2	6.7
Place primary health qualification awarded		
UK	30	100
Total Number of Diary Entries	134	
Number of Written Entries	26	

The audio-diary data were predominantly related to the impact of the COVID-19 pandemic with themes of; barriers, enablers, fears and uncertainty, and identity and protected characteristics (see Figure 4). Our findings identified numerous perceived barriers to continuing academic activity within the family, academic and clinical contexts. What is clear is that pre-existing barriers to academic activity have become magnified during the COVID-19 outbreak. Although such barriers are not insurmountable, they have been experienced as stressful for the participants, and could adversely impact on their future career. In particular, the restrictions on face-to-face contact, international travel, uncertainties over clinical and academic training and funding extensions, home working, and, in many cases, redeployment to frontline clinical duties were all cited as negative influences on the usual activities of the informants. Both dental and medical academic trainees, who were redeployed to full-time clinical work, described how they felt disadvantaged in comparison to trainees who have

been able to maintain research. This may be a source of future tensions between these groups.

Our data evidenced that women in clinical academia were being disproportionately impacted by the pandemic. Female participants described barriers that directly related to their gender, as well as to their maternal status. Women reported unequal distribution of labour within the home; this resulted in there being less opportunity to conduct research. BAME participants were adversely impacted by concerns for their health due to the higher prevalence of COVID-19 within their ethnicities. Fear and anxiety were inhibitory for all participants; however, the pandemic was fruitful in delivering opportunities for networking and new avenues of research. The pandemic was isolating for many and worryingly, for others, it initiated reflections on terminating their research to resume clinical practice only – typically citing this as the less tortuous path. This intersectionality of participants and associated discrimination experienced was a repeating pattern.

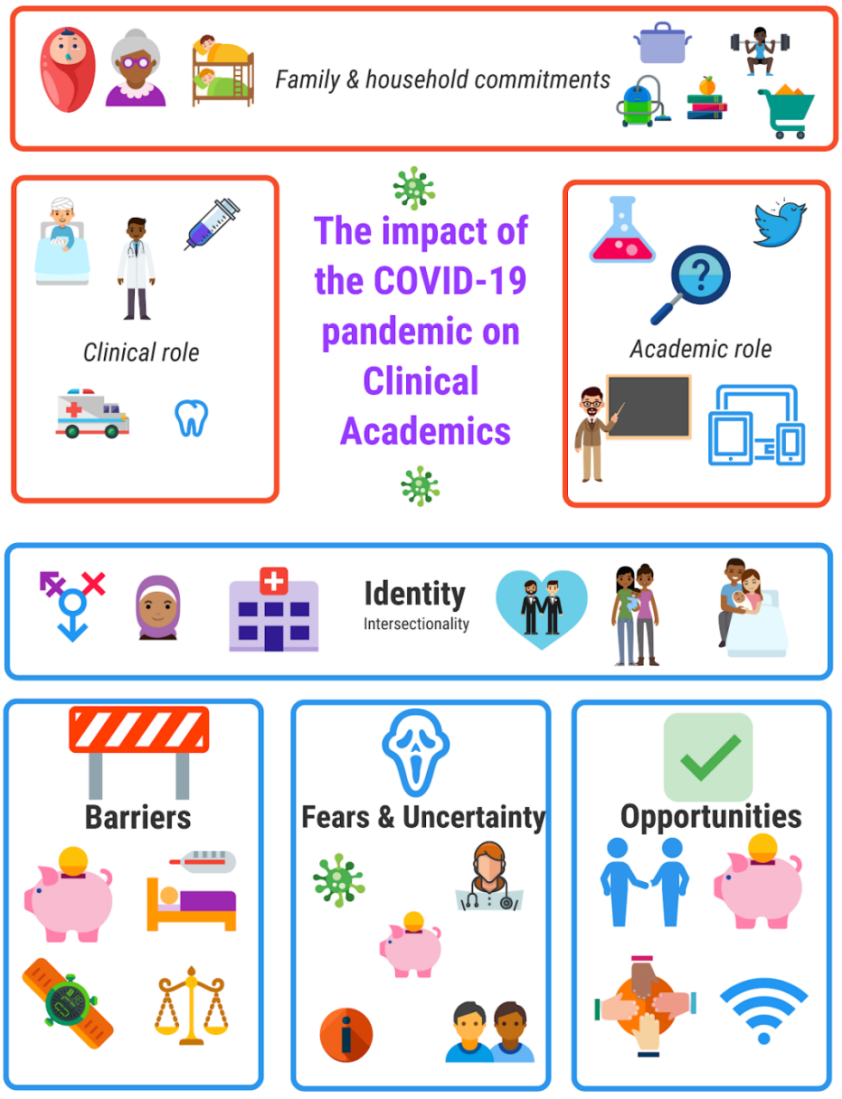


Figure 5: Visual representation of the themes from the audio-diary data

Case studies and text mining

Within the full report, intersectional case studies have been chosen from the interview and audio-diary participants' data analysis. Cases have been chosen to provide insight into the complexities and interplay been the barriers, enablers and protected characteristics previously described. We also conducted a text mining analysis – the details of which are provided within the full report.

Intervention plan

Following data synthesis from the interviews and audio-diaries, we developed an intervention plan (see table below). Participants were specifically asked for suggestions for interventions that would improve their experiences, supporting literature was also considered. This plan suggests interventions based upon the initial narratives of participants. The interventions have been grouped according to higher-level recommendations, each with example interventions beneath. For each intervention outlined, contextual information from the participant voice, an indication of the parties who may take responsibility, the intended audience and professions are provided. Proposed evaluation and performance metrics are provided, including an indication of the perceived complexity of the intervention.

Proposed evaluation and performance metrics are not intended to replace robust studies to assess the efficacy of interventions, rather they are suggestions for monitoring of intervention uptake. There is a need to create research infrastructure in order to facilitate implementation and evaluation of interventions.

The participants in this study were from diverse backgrounds and thus had experiences from a range of funders. We are aware that the outputs from some of the suggested interventions may have been implemented previously by some funders. Thus, we recommend that funders are selective in considering which interventions most suit their needs and their participant demographics. In addition, participants reported not being aware of interventions previously introduced; thus, more robust advertising of interventions is advised.

Before considering the intervention plan, the higher-order recommendations are presented in isolation (Figure 6) and a summary of the interventions is presented in Figure 7. Figure 7nis numerically and colour coded to match the 9 over-arching recommendations.

Figure 6: Nine over-arching recommendations

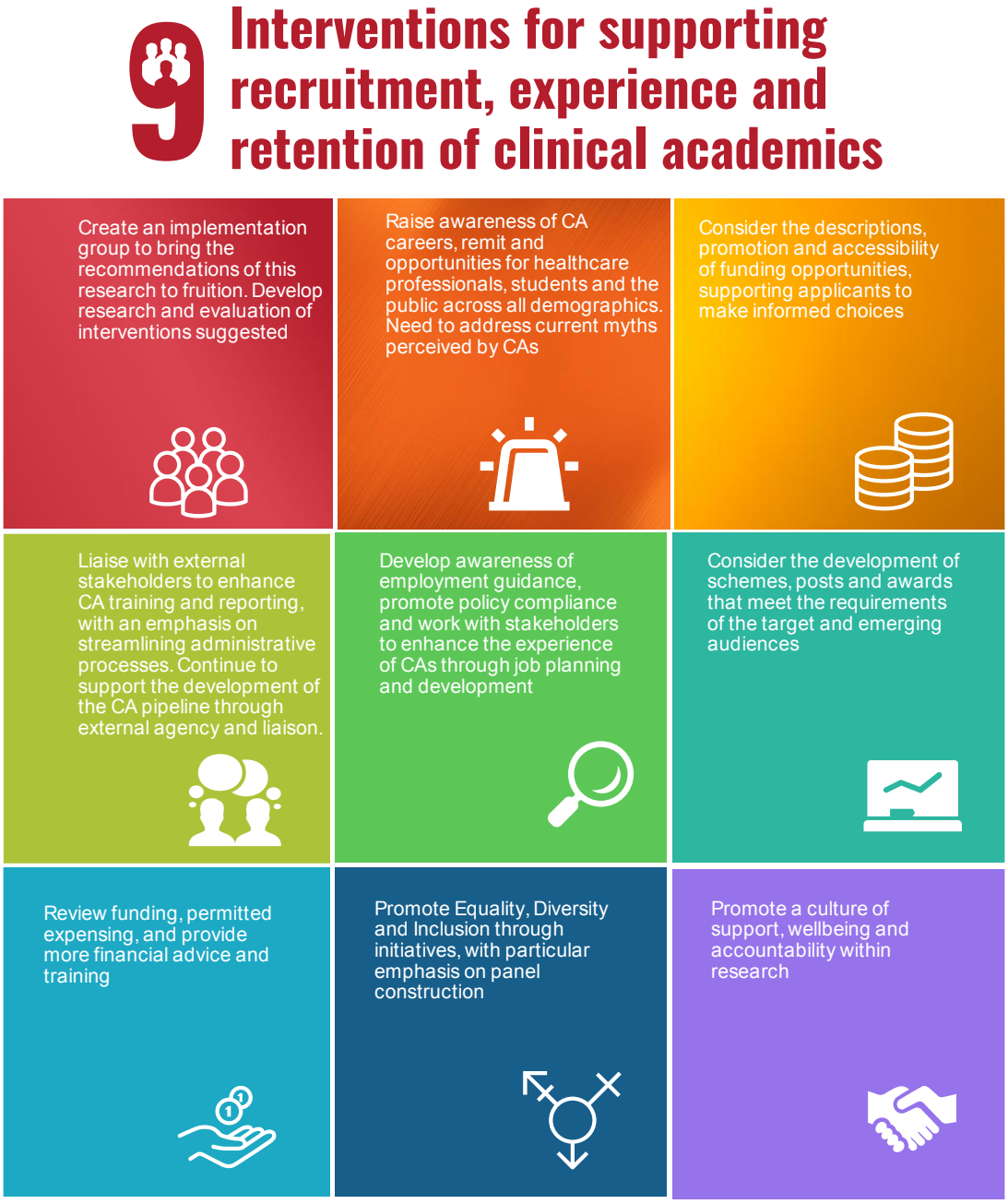


Figure 7: Summary of suggested interventions

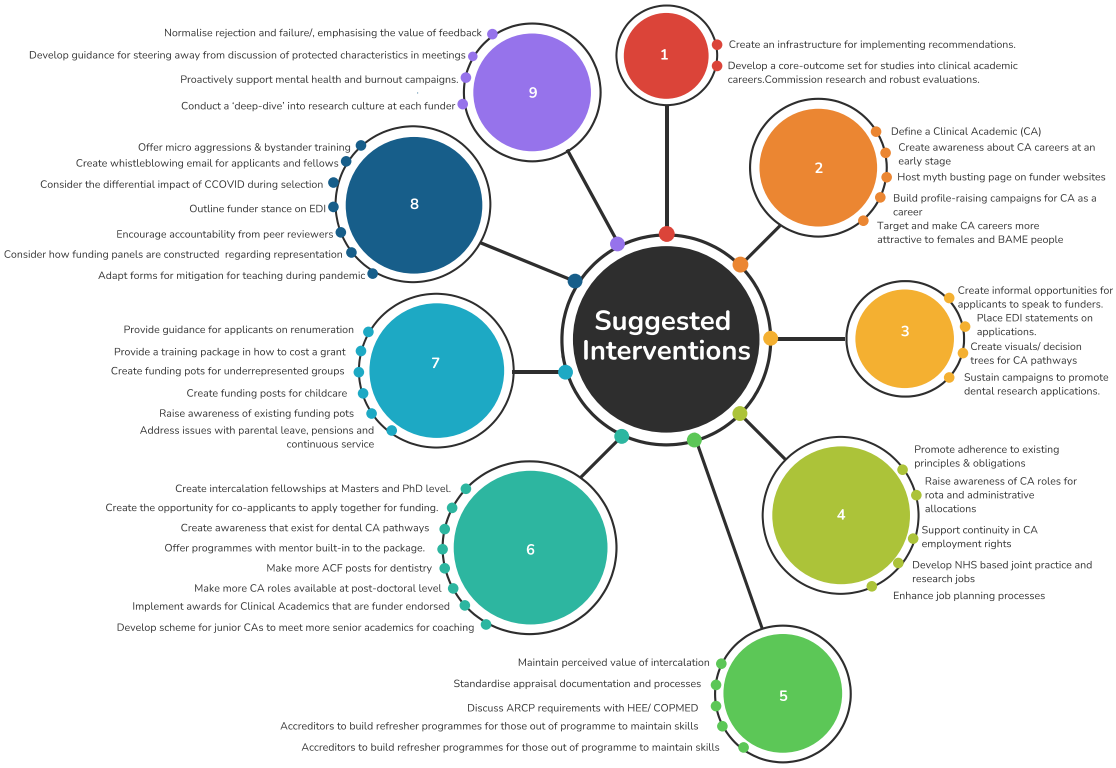


Table 5: Intervention plan

1. Create an implementation group to bring the recommendations of this research to fruition. Develop research and evaluation of interventions suggested.		
Suggested interventions	Create an infrastructure for implementing recommendations.	Develop a core-outcome set for studies into clinical academic careers. Commission research and robust evaluations.
Context / rationale from data	This research has identified interventions that will require a steering group to take ownership of review and implementation.	Lack of evidence for interventions tried by funders. Participants reported a lack of awareness of interventions designed to help them, or if they were aware, they did not appreciate the rationale.
Responsible party & stakeholders	Funder	
Suggested output	Construction of an implementation group that includes major funders and associated stakeholders. Consideration of strategic aims.	Advertise interventions to show applicants the efforts being made. Transparent reporting of interventions that have and haven't worked - academic dissemination via conferences and papers. Advertise on website and marketing materials. Prioritise RCTs, with clearly defined populations, interventions and outcomes. Ensure consultancy (e.g. with educationalists and methodologists) for optimising evaluation and research, including CA involvement (PPIE-like). Ensure interventions follow the 'top-down' model so that the burden of work doesn't fall to those at the bottom.
Intended audience	Applicants Stakeholders Academic institutions Public Clinical workplaces	
Professional group/ specialty (dentists/medics)	All	
Suggested evaluation/ performance metrics	Group instigated Completion of most pertinent interventions	Publications & reports on evidence of efficacy Overt advertising of interventions including more explicit rationale Research and evaluation tenders advertised
Priority of implementation	High	High
Complexity of implementation	Low	Medium

2. Raise awareness of CA careers, remit and opportunities for healthcare professionals, students and the public across all demographics. Need to address current myths perceived by CAs.					
Suggested interventions	Define a Clinical Academic: -qualifications -training pathway -remit -explain dual aspect of role -feature example profiles across range of demographics and backgrounds -triple nature of work (Clinical, Teaching and Research)	Create awareness about clinical academic careers at an early stage (in medical or dental school).	Host myth busting page on funder websites (*See myth busting table provided for content to be included). Ask academic institutions to link to the myth busting pages.	Build profile-raising campaigns for CA as a career (public facing) into existing campaigns and streams of work, such as EDI weeks.	Target and make clinical academia more attractive to people from BAME backgrounds and females Create case studies of CAs covering a range of demographics for use within funder marketing.
Context / rationale from data	There is a lack of understanding with regards to the identity of Clinical Academics. CAs themselves exhibit imposter syndrome or do not identify with the role. Colleagues do not appreciate the dual aspect of the role. Two-way educational process between Trusts and & Academic institution.	CAs felt that pathways and options in CA are not adequately promoted to students at an early stage and so they are mostly clueless about CA and go into academia at a later stage in their career. Intercalation a key theme in early exposure.	Applicants don't seek funding opportunities due to perpetuating myths. Examples: can't apply if pregnant, can't transfer between funders.	Doctors and dentists reported a lack of understanding about what a CA is. Even those who were already CAs were not always aware of their role and identity within the clinical academic world. Peers and colleagues of CAs need to have a better understanding about the role of a CA, hopefully facilitating more support for CAs in practice and making CAs feel appreciated. The public should also be aware of the role of a CA in	CAs from minority backgrounds expressed that they were not initially aware of the ACF, pathway into CA or the roles that exist. Females reported a culture of CA pathways being made more accessible for males and people with no caring responsibilities. Female CAs who work part time or took career breaks report that employment metrics judge them adversely against their full-time academic counterparts. CAs want to see case studies on people who share the same ethnicity as there is a perceived absence of role models. Women want examples of people who have realistic career goals.

				practice and the hard work that they do.	
Responsible party & stakeholders	Funder Academic institutions Clinical workplaces	Funder Academic institutions	Funder	Funder	Funder Academic Institutions Clinical workplaces
Suggested output	Video defining a Clinical Academic. FAQs about Clinical Academics. Beginner's guide to CA. Resources can be shared with HEIs and hosted on funder websites.	CAs go to medical or dental schools to give career talks and create awareness of options available in CA. Signposting the status of faculty in teaching sessions - CAs to provide their background to students. CAs encouraged to give seminars, engage students in their research formally and informally. Provide a CA 'work-experience' where students or foundation clinicians could follow a CA through all aspects of their job over a week (clinic, research, teaching etc). Offer funding to HEIs/ Trusts to set-up CA taster programmes. Scholarships for intercalated programmes (esp. in Dentistry). Fly on the wall videos following CAs (embedded on website and associated social media campaign). How-to-get your foot in the door toolkit.	FAQs and myth busting page on funder webpages. Cross-funder potential. Short videos on social media to debunk common myths.	Clinical academics week culminating in 'International Clinical Academics Day'. NHS poster campaign - public engagement to normalise/ showcase CAs. Specific COVID campaign - these are the people behind the masks in the lab (Clinical genetics etc). Clinical academics showcased at events during various awareness weeks (e.g. Pride week, mental health, specific disease awareness days). Call to arms - Royal Colleges, professional research journals for awareness campaigns, featured profiles and articles. Media campaign showcasing Clinical Academics on popular platforms (e.g. Guilty Feminist podcast, news nights,	Short video/ podcasts demonstrating that women, carers and BAME applicants are wanted in CA regardless of protected characteristics. Profiles of CAs in eminent publications such as BDJ and BMJ. Transparency regarding how funders view employment metrics for LTFT CAs. Short videos or profiles on CAs across broad range of protected characteristics. Focus on BAME and women with children. Jointly hosted website. Advertise and normalise less than full-time working. Obvious signposting of metrics for part time vs full time.

				popular TV documentaries) -specifically include items aimed at younger audiences e.g. Operation Ouch (KS2+).	
Intended audience	Clinical Academics Students Colleagues working with CAs Management (Trusts) Government	Medical or Dental Students Foundation clinicians (doctors and dentists)	Public - all service users Medical or Dental Students Foundation clinicians (doctors and dentists)	Public - all service users Medical or Dental Students Foundation clinicians (doctors and dentists)	BAME and female Medical or Dental Students Prospective BAME and Female Applicants Part-time and career break applicants
Professional group/ specialty (dentists/medics)	All				
Suggested evaluation/ performance metrics	Track access metrics and performance metrics	Track views Programme evaluation (inc. interviews with CAs, students & foundation clinicians)	Track views Feedback surveys Populations polls Market research with general public Collect metrics of those applying	Track views Feedback surveys Populations polls Market research with general public Collect metrics of those applying	Satisfaction surveys Track views Monitor enrolment numbers Monitor attrition levels of individuals with protected characteristics
Priority of implementation	High	High	High	High	High
Complexity of implementation	Low	Low	Medium	Low	Low
3. Consider the descriptions, promotion and accessibility of funding opportunities, supporting applicants to make informed choices					
Suggested interventions	Create clearer visuals and guidance on career paths that can be used by funders, clinical and academic institutions.	Place Equality Diversity and Inclusion statements on applications.	Sustain campaigns to promote dental research applications. Liaise with academic	Consider your accessibility and approachability. Create more informal opportunities for prospective applicants to speak to funders – being able to have a two-way conversation with funders would help applicants enormously rather than email.	

	Create decision trees to guide participants to the correct level of application (trees may be specific to the funder in question).		institutions to promote more overt research culture in dentistry and encourage applications.	Maximise the virtual outreach.
Context / rationale from data	Pathways are confusing for applicants therefore clear visual maps of all stages are required to help participants, especially those who doubt their credentials or who are intimidated by calling funders.	These statements are needed to help overcome myths and assumptions that applicants face.	Dental clinical academics felt there is currently a poor research culture that exists within some dental specialities and that current opportunities were not advertised directly to their professional groups.	Prospective applicants are intimidated by funders and want to meet informally.
Responsible party & stakeholders	Funder Academic institutions	Funder	Funder Academic institutions	Funder Academic institutions
Suggested output	Joint website with clear pathway visuals. Algorithm that helps navigate appropriate level to apply. Generate a decision tree support tool that uses a tree-like model of decisions to recommend an experience appropriate funding pathway (e.g. result is apply for Advanced Fellowship). Trainees can proofread or sense check websites and application forms.	Explicit statements of support for EDI practice needs to be demonstrated to CAs at the beginning of the application form. These statements should also be evident on the funder website. Further EDI reviews and Example intervention ideas can be found at: https://www.ukri.org/research/global-challenges-research-fund/gender-equality-and-international-development-research-and-innovation/	Larger banners and Social media adverts to encourage dental applicants. Funders to do seminars and workshops specific to dental research to encourage applications and collaboration. Encourage dental programmes to include more research components.	Booths at major conferences - taking advantage of virtual ways of working to increase presence and approachability. Seminars at institutions with a Q&A. Senior members to be present on social media - put a face to a name. Social media Q&A opportunities or webinars. Consider interactivity with advertised phonelines and chatbots.
Intended audience	Applicants	Clinical Academics	Dental Clinical Academics	Prospective applicants

Professional group/ specialty (dentists/medics)	All	All	Dentists	All
Suggested evaluation/ performance metrics	Survey Track views	Survey Track views	Monitor dental research applications and collaborations	Satisfaction survey
Priority of implementation	High	High	High	Medium
Complexity of implementation	Low	Low	Low	Low
4. Develop awareness of employment guidance, promote policy compliance and work with stakeholders to enhance the experience of CAs through job planning and development				
Suggested interventions	Promotion of and adherence to the existing principles and obligations documents (issued by NIHR). Support CAs moving between contracts to retain employee rights so there is continuity.	Ensure academic institutions and employers are supportive of clinical work that CAs must also do. Enhance job planning process and ensure that this has effective and supportive clinical and academic involvement.	Raise awareness and train healthcare staff, management, administrative staff and rota clerks on the role and remit of a clinical academic to enable them to create more diligent rota allocation for CAs.	Develop NHS based joint practice and research jobs attached to the clinical pay scale.
Context / rationale from data	Lack of awareness of principles previously published. Some academic institutions do not adhere to the guidance. Used as a workaround for people to maintain NHS privileges (e.g. sick leave entitlement etc) -but may not be viewed in the same way as substantively held HEI posts. CAs reported that whenever they moved, their contracts for training restart as new employees - this	CAs are often given other academic responsibilities within the university that are not part of their CA role. Many feel it is difficult to say no, despite already struggling to manage workload. Some CAs have received negativity about not being present in the academic environment full time, despite practicing clinical work on those days. CAs are not always able to attend academic events due to their clinical rotas. Many CAs report that their clinical responsibilities impinge on their academic time.	Many CAs reported struggling to do their academic work alongside long clinical hours and night shifts. Many also highlighted that their protected time was often filled with clinical duties. CAs sometimes faced negativity from other staff when they were absent from the clinical workplace. ACFs reported that supervisors are not always clear that	NHS employers sometimes struggle to understand the needs of research active clinicians and CAs in the face of demands on clinical services.

	means they lose maternity, sickness and other employment rights.		ACFs role clinically is a supernumerary one i.e. they are not there to provide service.	
Responsible party & stakeholders	Funders Academic institutions (who are direct employers) Clinical workplace	Academic Institution Funder Clinical workplaces BMA/BDA	Clinical Workplace Academic Institutions	NHS Trusts
Suggested output	Guidance/ policy that states that clinicians taking clinical academic posts with HEIs as lead employers should have their previous continuous service with NHS employers recognised for contractual purposes (e.g. for maternity, sick leave entitlements etc). Build awareness in order to change perceptions of Honorary positions as not viewed in the same way as substantive HEI employments for clinical academics. Work with unions, HEIs and trusts to help protect CAs employment rights. Support CAs to keep NHS continuous service. Mindful some find it	Raise awareness of academic institutions about the dual responsibilities of CAs through information leaflets and posters. Develop an expectation of job role document for both CAs and employers. Work with Funders, Trusts, Deaneries, BMA/BDA to promote the importance of effective job planning for CAs.	Those who are doing the rota need to understand the needs of CAs and this needs to be reflected in their rota. Information sheets Online platforms Regular training/induction	Joint job planning with the Director (or equivalent) for R&D for research active clinicians and CAs. NHS Trusts should liaise with partner HEIs over the creation of doctoral fellowships or clinical academic roles that address business critical issues for the Trust that would have strong business cases.

	helpful to have two main employers or flexibility on substantive employer.				
Intended audience	Clinical Academics	Clinical Academics Non-clinical academics Clinical Leads Academic Leads TPDs or rota co-ordinators	Clinical Academics Non-clinical academics Administrative staff	Research active and research aspiring clinicians	
Professional group/ specialty (dentists/medics)	All				
Suggested evaluation/ performance metrics	Feedback surveys Assessment of access to rights Track Views	Feedback – opinion polls Audits Focus groups	Satisfaction surveys Rate of attrition	The proportion of research active clinicians in a Trust (I.e. those with two or programmed activities for research activity)	
Priority of implementation	High	High	Medium	High	
Complexity of implementation	High	High	Medium	High	
5. Liaise with external stakeholders to enhance CA training and reporting, with an emphasis on streamlining administrative processes. Continue to support the development of the CA pipeline through external agency and liaison.					
Suggested interventions	Work with Foundation Programme & Deaneries to maintain perceived value and weighting for Intercalation & the associated qualifications and/or papers. Stress must be placed on the long-term benefits of intercalation.	Discussion regarding Annual Review of Competency Progression (ARCP) requirements with HEE / COPMED and equivalents.	Standardise appraisal documentation/ streamline processes. NHS and academic institutions should try to harmonise these systems for CAs.	Accreditors to build refresher courses for those out of programme to maintain skills sets, particularly craft specialties.	Create more opportunities and posts for early career researchers to get involved in research on an informal basis through the advertising of voluntary positions.
Context / rationale from data	Intercalation encourages future CA endeavour. Ensuring intercalation remains valued is paramount to CA pipeline.	CAs felt that they should follow an alternative curriculum to standard trainees with respect to audits and Quality Improvement (QIPS) projects, particularly as their outputs are not recognised by the process. There should be better understanding of CA outputs	Many CAs have reported duplication of effort and time, particularly noting doing similar appraisal / documentation for	CAs feel that when they are out of a training programme or reduce their clinical work significantly, they are deskilling.	Early career researchers at non-research-intensive institutions did not have projects in order to apply for funding. They requested the opportunity to apply for personal development funding with assigned

		and their value by ARCP panels. HEE need to have more understanding and be sympathetic to the challenges facing CAs during this time. Participants perceive value in face-to-face ARCPs and request clinical and academic representation.	clinical and academic work.		mentors who could help them get a foot on the CA ladder.
Responsible party & stakeholders	CATF / funders	HEE/ COPMED and equivalents Funder	Academic institution Clinical Workplace	HEE Funder	Academic institution Funder
Suggested output	Letter to Foundation Programme and Deaneries from CATF and funders to champion intercalation and its weighting in rankings. Work with UKFPO to build awareness of the value of intercalation.	Provide a contact person to speak to about requirements from HEE. Provide signposting of relevant information on HEE website. Consider face-to-face, in depth ARCPs with clinical and academic representation.	Less work for both employers and CAs.	Create pots of funding to develop refresher courses for specific specialties or funding to access existing courses with some KiT days attached.	Creation of personal development projects for grassroots researchers. Similar 'starter' scheme for students to gain experience.
Intended audience	Stakeholders in Foundation Doctors & Dentists	Applicants	Clinical Academics	Clinical Academics	Clinical Academics Aspiring Clinical Academics
Professional group/ specialty (dentists/medics)	All				
Suggested evaluation/ performance metrics	Monitor decision making by Deanery & FP in weightings for intercalation on foundation applications	Survey Track views Satisfaction and comparison of any ARCP adjustments	Satisfaction surveys	Look at performance data for individuals	Satisfaction surveys Track views Uptake of programme Success in moving on to other CA posts
Priority of implementation	Low	High	High	Medium	Medium
Complexity of implementation	Low	High	Medium	Medium	High
6. Consider the development of schemes, posts and awards that meet the requirements of the target and emerging audiences					

Suggested interventions	Implement awards for Clinical Academics that are funder endorsed.	Make more CA roles available at post-doctoral level.	Create awareness that pathways exist for dental CAs and stamp out myths associated. Specifically create more ACF training posts in dentistry and make them more flexible in terms of research.	Offer programmes with mentor built-in to the package.	Create the opportunity for co-applicants to apply together for funding (e.g. part time and job share).	Create intercalation fellowships at Masters and PhD level. Develop a scheme for junior CAs to meet more senior academics (not just clinical)- sharing advice and career coaching sessions.
Context / rationale from data	CAs felt that CAs were not the recipients of prestigious awards in the same way that clinical excellence is awarded.	CAs reported a 'bottleneck' once they have completed a PhD. There is a lack of posts in certain specialties. Many cannot move location to obtain a post, which is often necessary if they are to continue.	Dental CAs commented how they felt almost second best to their medical counterparts in terms of advancement in research and opportunities that they we offered, but both funder and institution. Some noted that despite their academic institution being a hub for great research, this did not include dental research. Many felt that they were not given the same funding and research development in their CA posts as their counterparts.	Trainees lack the confidence and/or network to approach potential mentors. Support for programmes offering a mentor for the duration for advice on career progression, networking etc. Mentors with shared or relatable experiences. Choice in mentor - compatibility a priority (interpersonal and expertise).	CAs reported that the standard practise of only allowing one applicant was discriminatory and did not mirror employment norms such as part-time working or job share situations.	CAs report the motivation for pursing started during intercalation. Inspiring students earlier on would help maintain the supply for the CA pipeline. CAs and aspiring need to understand how others have navigated their careers, particularly those who have faced rejection/ setbacks.

			Dental CAs reported that there were not as many funding streams within dentistry. There is a need for capacity building and creation of more ACF posts to be able to share fellowship related resources.			
Responsible party & stakeholders	Funder Academic Institution	Funder Clinical workplace Academic Institution	Funder Academic Institutions	Funder Academic Institution	Funder Academic institutions	Funder Academic Institutions
Suggested output	Develop a scheme that rewards CAs for research excellence and also serves to promote the field. Akin to Clinical Academic Oscars - measure of esteem. Awards could centre on themes, have an annual rollout or include special profile-raising awards.	Create more CA posts for those post PhD. Look specifically at the location of where these posts need to be across the UK.	Funders to discuss possibility of offering two separate pathways for doctors and dentists following further collection of data. Funders need to work with academic institutions to support them in raising the profile of their dental research. Create more awareness of ACF posts within dentistry.	Creation of a new scheme with mentor built-in or a system where applicants can flag that they would like to be allocated a mentor. Production of a mentor data-base, kept up to date. Trainees given choice of mentors to suit preferences. Trainees encouraged to select mentors out with their home institution. More strategic advertising of existing offerings, particularly across funders.	Permit more than one applicant to be submitted on a grant (co-authoring applications). Revise scheme regulations to reflect changes.	Offer one-year fellowships for intercalation for health professions students - focus on MRes opportunities. Develop a scheme for junior CAs to meet more senior academics (not just clinical)- sharing advice and career coaching sessions Offer intercalation PhD opportunities for health professions students.

				Development of comprehensive mentor training (e.g., online SCORM package). *We advise robust evaluation across such a package as evidence is mixed (see SR results earlier).		Host seminars where junior or prospective CAs can meet with local senior CAs.
Intended audience	Clinical Academics	Clinical Academics Academic institutions	Clinical Academics Academic institutions	Applicants Established CAs looking to mentor	Clinical Academics	Aspiring Clinical Academics
Professional group/ specialty (dentists/medics)	All	All	Dentists	All	All	All
Suggested evaluation/ performance metrics	Feedback survey Evaluation of impact	Monitor number of CA posts Monitor attrition rates of CAs following PhD level	Satisfaction surveys Monitor uptake of dental CA posts	Metrics on applications and uptake of mentors Programme evaluation (inc. interviews with mentors and mentees) Analysis of outcome measures for those with a mentor Feedback from mentors and mentees	Monitor submissions Feedback surveys	Monitor uptake of fellowships for intercalation by Masters and PhD level students Satisfaction surveys Track views
Priority of implementation	Medium	High	High	High	High	Medium
Complexity of implementation	Low	High	High/Medium	Medium	Medium	Low
7. Review funding, permitted expensing, and provide more financial advice and training						
Suggested interventions	Raise awareness of existing funding pots to bridge gaps between finishing a	Funding pots for childcare for CAs to attend conferences and funder events or to enable a family member attend to provide childcare. Include better	Provide a training package on how to cost a grant.	Create personal funding pots for underrepresented groups (targeting	Provide financial advice for applicants and publish guidance on regulations with regards to employment and remuneration.	

	funded level and applying for the next. Specific guidance on the use of awards for development, skills and enhancement is required.	promotion of existing available funding.	Increase funding opportunities and reduce complexity of funding applications.	women, caregivers and BAME CAs).	Address current issues with contracts including parental leave, pensions and continuous service with stakeholders.
Context / rationale from data	CAs concerned that progress halts while looking for new funding. Request for bridge funding.	CAs who were young parents felt that it is increasingly becoming difficult to get funding to attend conferences and thought that they would be encouraged to attend conferences if they had a pot of money to support their childcare expenses.	Trainees felt assumptions were made that they would automatically know how to cost a grant. Clinical academics reported that the funding applications were few and when available they process was often not straightforward and sometimes complex.	These groups of individuals find it more difficult to obtain money due to particular difficulties these groups of CAs face.	CAs reported variable practice across trusts and institutions with regards to remuneration and employment packages (leave, maternity, sick pay etc). Individuals have faced financial problems due to contracts/ pensions when taking a leave of absence. There is variability across Trusts. Funder letter to advocate for fair treatment of CAs and adherence to employment principles.
Responsible party & stakeholders	Funder	Funder Academic Institutions	Funder Academic Institutions	Funder	Funder Clinical Trusts Academic institutions Department of Health
Suggested output	More explicit explanations of development funding schemes and options for those looking for bridge funding.	Creation of funding pots for childcare. Build claims into travel expenses to make this easier to facilitate. Consider funding additional childcare sessions to enable CA to attend virtual conferences.	Creation of a 'how to' page including costing a grant. Examples of costings for different types of projects. FAQs and pitfalls. Talking head video to make information more accessible. Consider webinars.	Produce a funding stream that is only open to a certain group (this needs to adaptive and depends on collection of real time data illustrating inequality). e.g., BAME women, LGBTQIA+ individuals. Promotion and launch of funding themes could be tied to events such as centenaries,	Funders to have a specific page on their website or a financial advice service that CAs could contact to discuss contract issues that may prevent them from working as a CA e.g. sick pay, continuous service, new employee rights. Funders to have visible advisor who can answer questions. HEIs to recognise continuous service including sick leave. Work to standardise UK wide.

			How-to videos explaining funding applications. FAQ page on funder website.	anniversaries, awareness weeks etc.	Scotland - CAs not entitled to NHS pension scheme if employed by HEIs.
Intended audience	Clinical Academics	Clinical Academics	Applicants Clinical Academics	Clinical Academics	Clinical Academics
Professional group/ specialty (dentists/medics)	All				
Suggested evaluation/ performance metrics	Feedback survey Evaluation of impact	Conference attendance metrics by demographic Survey	Assess costings presented in applications for improvements Tracking and feedback on resource (survey, usefulness markers) Feedback and satisfaction survey on ease of completing and understanding of applications Monitor funding application submissions	Monitor submissions Feedback surveys	Metrics of access on links Satisfaction surveys Track views
Priority of implementation	High	High	Medium	Medium	Medium
Complexity of implementation	High	High	Low	Medium	Medium
8. Promote Equality, Diversity and Inclusion through initiatives, with particular emphasis on panel construction					
Suggested interventions	Consider how funding panels are constructed, and peer reviewers selected. Peer reviewers and panels members to be named on	Create and promote gender balanced panels. Issue statement to HEIs and Clinical stakeholders to outline funder stance on EDI.	Advise HEIs to consider the differential impact of COVID when selecting applicants for competitive and submission limited schemes.	Whistleblowing email address for applicants with accompanying statement to HEIs regarding zero tolerance.	Training on micro-aggressions, prescriptive, descriptive and unconscious biases for all panel members and mandate the training for all successful applicants. Provide a training module on active bystander training for those that

	documentation to promote fairness and accountability. Consider possibility of open peer review.		Add specific section to application forms that permits mitigation for teaching responsibility during pandemic.		witness discriminatory behaviours to promote a culture of 'stand up, speak out'.
Context / rationale from data	All levels of CA felt that they were at the mercy of peer reviewers & that the process was not transparent. Suggestions of how funders are enforcing values based on demographic and social backgrounds.	CAs felt that panels were predominantly made up of white middle-class male. Some female CAs reported being advised not to pursue CA if they want children and were not permitted to apply for fellowships/funding due to having children.	Established and aspiring CAs reported that the pandemic had resulted in a call to arms to teach and transform delivery of provision to online – this has resulted in a reduction in research productivity.	Applicants described actionable discriminatory comments or being refused permission to apply for CA funding based on protected characteristics. Applicants feel powerless in raising these issues.	CAs report a culture of discrimination, bias, micro-aggressions and overt racism and sexism. People not directly impacted often felt helpless and wanted techniques to call out discrimination when they witnessed it.
Responsible party & stakeholders	Funder	Funder Academic Institutions	Funder Academic Institutions	Funder	Funder Academic Institutions
Suggested output	Creating a culture of accountability by recommending the naming of peer reviewers. Feed into sector-wide discussions on best practice. Build awareness of defensible and transparent decision making as a fundamental principle in the sector. Reasons for decisions and who they are made by should be	Ensure panels are representative and diverse. Publish panel metrics annually to be held accountable. Statement with an emphasis on reproductive decision making. Outline expectations and plans to monitor. Advertise zero tolerance approach to discriminatory attitudes and behaviours to potential applicants.	New section on application forms that allow applicants to provide context for their work during the pandemic, specifically with regards to teaching commitments and family responsibilities. HEIs to be reminded of the need to be fair when selecting candidates to put forward for competitive awards that need institutional backing	Email address or anonymous form on website that applicants can use to whistle blow on unethical behaviours at their institution. Needs to be clear the purpose & statement of action in a letter to HEIs.	Develop training on microaggression, discriminatory behaviours and biases and how to identify and avoid them. Create disciplinary panel for perpetrators of microaggressions and discriminatory behaviours. Whistle-blower system for reporting witness or first-hand cases of discriminatory behaviour or microaggressions.

	transparent. Evaluation and research on the reliability (e.g. inter-rater agreement) between peer reviewers and panel members should be conducted and published and reasons for disagreement, or particular weight being put on certain reviews, explored.		– similar section for COVID impact could be added to appraisal documentation.		
Intended audience	Clinical Academics	Clinical Academics Academic institution Clinical employers	Aspiring CAs Applicants	Applicants Academic Institutions	Clinical Academics Funders HEI Government
Professional group/ specialty (dentists/medics)	All				
Suggested evaluation/ performance metrics	Satisfaction survey at the end of a selection process Add panel construction to routinely collected data in order to gather reliability information Satisfaction surveys Track views	Review the construction of panels regularly to ensure representation and diversity Review metrics Feedback surveys	Review performance of scheme applicants – comparative review pre-COVID Feedback survey	Monitor frequency and audit content of emails	Monitor access Feedback surveys Review and monitor data for patterns (hopefully decline in incidents)
Priority of implementation	High	High	High	Medium	High
Complexity of implementation	Low	Low	Medium	Medium	Low
9. Promote a culture of support, wellbeing and accountability within research					

Suggested interventions	Proactively support mental health and burnout campaigns.	Normalise rejection and failure as part of normal career experiences to help create a positive narrative around the feasibility of clinical academia as a career. Emphasis should be placed on the importance of this feedback process and that it is essential to develop strong research ideas.	Issue guidance for career meetings to assist CAs in keeping meetings on track and to steer away from inappropriate topics or personal topics.	Conduct a 'deep-dive' into research culture at each funder. Encourage, or even fund, academic institutions to conduct similar deep-dives.
Context / rationale from data	Burnout and anxiety were high amongst CAs and they felt stigmatised by this. Mental health and burnout were particularly prevalent during and post-pandemic. CAs feel they cannot go off sick because their research careers and progress will suffer.	CAs feel clinical academia is very competitive and often full of rejection. This leads to many returning to full time clinical posts or not applying in the first place.	Female CAs reported meetings about potential applications being unsupportive and often discussion being based upon their reproductive decision making rather than research. They felt disempowered to challenge this. CAs were questioned on resilience if they expressed concerns over workload.	Participants described negative cultures around research including bullying, discrimination, perceived hierarchies in research topics etc.
Responsible party & stakeholders	Funder	Funder Academic Institutions	Funder	Funder Academic institutions
Suggested output	Create campaigns, videos and endorse charity activities related to mental health, anxiety and burnout to destigmatize it, promote help seeking behaviours. Specific reference to research careers should be made. Form a partnership	Recruit clinical academics to share their narratives using various media specifically discussing their failures and previous rejections to create a culture where rejection is viewed as normal and part of the development process. Offer more support throughout each stage.	Sample proformas and discussion points to guide careers meetings. Issue steer on not discussing protected characteristics or reproductive decision making. Encourage audit trails of meetings.	'Deep-dives' are meetings with a focus on a topic such as culture, gender, curricula etc. Evidence, evaluations, policy documentation is scrutinized and objectives set/ assessed. The purpose is to interrogate evidence and improve performance. A deep-dive on culture might look at how is positive culture promoted (collaboration, inclusivity etc), what do policies say, what objectives need setting, how are current performance metrics looking. Can be done at any institution - funders can mandate HEIs to conduct culture deep-dives and provide templates.

	with a mental health charity to normalize mental illness. Dedicated mental health and support section on websites with links to resources or case studies. Consider 'therapeutic mentoring'.		Form for best practice, encouraging co-creation of meeting notes that are signed.	
Intended audience	Clinical Academics	Clinical Academics	Clinical Academics	Clinical Academics
Professional group/ specialty (dentists/medics)	All			
Suggested evaluation/ performance metrics	Feedback and satisfaction surveys Metrics of access on links to mental health information	Track access metrics Feedback surveys	Surveys	Completed process Review outcomes following the 'deep-dive' Develop SMART objectives to assess performance against subsequently
Priority of implementation	High	Medium	Medium	Medium
Complexity of implementation	Low	Low	Low	Low

Conclusions

Our data provide comprehensive evidence that CAs struggle to navigate the CA pathway and balance clinical duties with conducting research. Both the literature and the participant narratives advocated for the importance and benefit of having protected time for research. Participants described the challenges of working in two competing environments, thus protected time provides a means of mitigating the negative impact of pressing clinical demands on research-related activity. The narratives of CAs revealed common issues such as isolation and exhaustion. Imposter syndrome was experienced by many CAs, consistently across the career trajectory. A detrimental culture of discriminatory behaviours and attitudes was described resulting in talented individuals being lost from the CA career pathway.

The COVID-19 pandemic presented additional complexity for women who needed to juggle their work and family commitments – some stating that the inequality within the gendered division of labour in their homes was reminiscent of the 1950s. COVID-19 was declared a 'disaster for feminism', with many women feeling the necessity to relinquish their research. However, the pandemic provided an unexpected opportunity for participants to develop their research network, forming new academic communities of practice.

Within the qualitative data, participants proposed interventions including formal mentorship, making funding accessible, and funders more approachable. Many myths regarding the CA career trajectory perpetuate; addressing such fallacies may serve to increase recruitment of clinicians who have previously been deterred from an academic path. Through fostering a supportive culture, built upon academic socialisation, clinical academia will be able to better nurture aspiring CAs. Early exposure to research through such socialisation is imperative to future workforce development.

Interventions to address the challenges CAs face are clearly needed. In order to make a real, measurable difference all interventions need to be thoroughly evaluated with findings published promptly and accessible to a wide audience with close attention to the clarity of reporting of methods, populations and interventions. The most striking finding from the systematic reviews was the paucity of high-quality, well-reported, research in this area, particularly from the UK. Establishing a culture and infrastructure designed to collect cohort-level longitudinal data as well as conduct comparative evaluations of interventions will be key in achieving a more equitable environment for clinical academics. Interventions evaluated within this infrastructure are most likely to be successful when embedded within comprehensive multi-faceted programmes of training, in which relational and support aspects are key. Interventions focused on individuals are felt to be less helpful than structural/environmental changes. Results should be presented in a disaggregated form, as a minimum reporting gender and ethnicity differences, so as to better understand the impacts of interventions on these groups, with analyses that clearly consider the intersectionality of factors experienced by CAs.

There are multi-factorial causes of the leaky pipeline within clinical academia; although there is no single solution or quick fix, stakeholders should seek to drive forward a culture of support for CAs and develop an infrastructure to evaluate interventions for those marginalised within the CA workforce. It is imperative to ensure equity in access and parity in experience for CAs, present and future.

The full report is available via the funders or the authors.

References

All references from systematic review and cited literatre are available in the full report.

ADVANCEHE 2016. Athena SWAN good practice initiatives.

AJJAWI, R., CRAMPTON, P. E. & REES, C. E. 2018. What really matters for successful research environments? A realist synthesis. *Medical education,* 52**,** 936-950.

AL-KHALIFA, E. 1992. Women Teachers and School Management. *Managing Change in Education: Individual and Organizational Perspectives***,** 95.

ALON, T. M., DOEPKE, M., OLMSTEAD-RUMSEY, J. & TERTILT, M. 2020. The impact of COVID-19 on gender equality. National Bureau of Economic Research.

ANSELMI, D. & LAW, A. 1998. Defining sex and gender. *Questions of gender: Perspectives and paradoxes***,** 1-17.

ARCHIBALD, D., HOGG, W., LEMELIN, J., DAHROUGE, S., ST JEAN, M. & BOUCHER, F. 2017. Building capacity for medical education research in family medicine: the Program for Innovation in Medical Education (PIME). *Health Research Policy & Systems,* 15**,** 91.

ARDAY, J. 2020. Fighting the tide: Understanding the difficulties facing Black, Asian and Minority Ethnic (BAME) Doctoral Students' pursuing a career in Academia. Taylor & Francis.

BHOPAL, K. 2020. Confronting White privilege: the importance of intersectionality in the sociology of education. *British Journal of Sociology of Education,* 41**,** 807-816.

BHOPAL, R. 2001. Racism in medicine: the spectre must be exorcised. British Medical Journal Publishing Group.

BMA & GLADD 2016. The experience of lesbian, gay and bisexual doctors in the NHS: Discrimination in the workplace or place of study.

BOTHELLO, J. & ROULET, T. J. 2019. The Imposter Syndrome, or the Mis-Representation of Self in Academic Life. *Journal of Management Studies,* 56**,** 854-861.

BRANDT, A. M., RETTIG, S. A., KALE, N. K., ZUCKERMAN, J. D. & EGOL, K. A. 2018. Can a Clinician-Scientist Training Program Develop Academic Orthopaedic Surgeons? One Program's Thirty-Year Experience. *Journal of Surgical Education,* 75**,** 1039-1044.

BRAUN, U. K., GILL, A. C., TEAL, C. R. & MORRISON, L. J. 2013. The utility of reflective writing after a palliative care experience: Can we assess medical students' professionalism? *Journal of Palliative Medicine,* 16**,** 1342-1349.

BRAUN, V. & CLARKE, V. 2006. Using thematic analysis in psychology. *Qualitative research in psychology,* 3**,** 77-101.

BRAUN, V. & CLARKE, V. 2013. *Successful qualitative research: A practical guide for beginners*, sage.

BREEN, R. & COOKE, L. P. 2005. The Persistence of the Gendered Division of Domestic Labour. *European Sociological Review,* 21**,** 43-57.

BROOKS, F. 1998. Women in general practice: Responding to the sexual division of labour? *Social science & medicine,* 47**,** 181-193.

BROWN, J. V., CRAMPTON, P. E., FINN, G. M. & MORGAN, J. E. 2020a. From the sticky floor to the glass ceiling and everything in between: protocol for a systematic review of barriers and facilitators to clinical academic careers and interventions to address these, with a focus on gender inequality. *Systematic reviews,* 9**,** 26.

BROWN, M. E., HUNT, G. E., HUGHES, F. & FINN, G. M. 2020b. 'Too male, too pale, too stale': a qualitative exploration of student experiences of gender bias within medical education. *BMJ open,* 10**,** e039092.

BURFORD, B., MORROW, G., ROTHWELL, C., CARTER, M. & ILLING, J. 2014. Professionalism education should reflect reality: findings from three health professions. *Medical Education,* 48**,** 361-374.

CAFFREY, L., WYATT, D., FUDGE, N., MATTINGLEY, H., WILLIAMSON, C. & MCKEVITT, C. 2016. Gender equity programmes in academic medicine: a realist evaluation approach to Athena SWAN processes. *BMJ open,* 6**,** e012090.

CAMPION, M. W., BHASIN, R. M., BEAUDETTE, D. J., SHANN, M. H. & BENJAMIN, E. J. 2016. Mid-career faculty development in academic medicine: How does it impact faculty and institutional vitality? *The Journal of Faculty Development,* 30**,** 49-64.

CARNES, B. A. 1992. Caring for the professional caregiver: The application of Caplan's model of consultation in the era of HIV. *Issues in Mental Health Nursing,* 13**,** 357-367.

CARNES, M., MORRISSEY, C. & GELLER, S. E. 2008. Women's health and women's leadership in academic medicine: hitting the same glass ceiling? *Journal of women's health,* 17**,** 1453-1462.

CHANG, S., MORAHAN, P. S., MAGRANE, D., HELITZER, D., LEE, H. Y., NEWBILL, S., PENG, H. L., GUINDANI, M. & CARDINALI, G. 2016. Retaining Faculty in Academic Medicine: The Impact of Career Development Programs for Women. *Journal of Women's Health,* 25**,** 687-96.

CHUNG, H. 2020. Return of the 1950s housewife? How to stop coronavirus lockdown reinforcing sexist gender roles. *The Conversation*.

CLARIVATE ANALYTICS 2020. EndNote X9.2

COLEMAN, M. 2003. Gender and school leadership: The experience of women and men secondary principals. *UNITEC, Auckland, New Zealand*.

COLLIER, D. & MAHONEY, J. 1996. Insights and pitfalls: Selection bias in qualitative research. *World Politics,* 49**,** 56-91.

COMEAU, D. L., ESCOFFERY, C., FREEDMAN, A., ZIEGLER, T. R. & BLUMBERG, H. M. 2017. Improving clinical and translational research training: a qualitative evaluation of the Atlanta Clinical and Translational Science Institute KL2-mentored research scholars program. *Journal of Investigative Medicine,* 65**,** 23-31.
COUNCIL, D. S. 2018. Professorial roles for dentists fall 8.3% since 2015. *British Dental Journal,* 225.
CRD 2008. Systematic Reviews.
CROSBY, F. J., WILLIAMS, J. C. & BIERNAT, M. 2004. The maternal wall. *Journal of Social Issues,* 60**,** 675-682.
CROZIER, S. E. & CASSELL, C. M. 2016. Methodological considerations in the use of audio diaries in work psychology: Adding to the qualitative toolkit. *Journal of occupational and organizational psychology,* 89**,** 396-419.
DALEY, S., WINGARD, D. L. & REZNIK, V. 2006. Improving the retention of underrepresented minority faculty in academic medicine. *Journal of the National Medical Association,* 98**,** 1435-40.
DANNELS, S. A., YAMAGATA, H., MCDADE, S. A., CHUANG, Y. C., GLEASON, K. A., MCLAUGHLIN, J. M., RICHMAN, R. C. & MORAHAN, P. S. 2008. Evaluating a leadership program: a comparative, longitudinal study to assess the impact of the Executive Leadership in Academic Medicine (ELAM) Program for Women. *Academic Medicine,* 83**,** 488-95.
DARBYSHIRE, D., BAKER, P., AGIUS, S. & MCALEER, S. 2019. Trainee and supervisor experience of the Academic Foundation Programme. *Journal of the Royal College of Physicians of Edinburgh,* 49**,** 43-51.
DECASTRO, R., SAMBUCO, D., UBEL, P. A., STEWART, A. & JAGSI, R. 2013a. Mentor networks in academic medicine: moving beyond a dyadic conception of mentoring for junior faculty researchers. *Academic Medicine,* 88**,** 488-96.
DECASTRO, R., SAMBUCO, D., UBEL, P. A., STEWART, A. & JAGSI, R. 2013b. Batting 300 is good: perspectives of faculty researchers and their mentors on rejection, resilience, and persistence in academic medical careers. *Academic Medicine,* 88**,** 497-504.
DEECH, B. 2009. Women doctors: making a difference. *Report of the Chair of the National Working Group on Women in Medicine. Department of Health*.
EHLERS, S. L., CORNELIUS, K. E., GREENBERG-WORISEK, A. J., WARNER, D. O., WEAVERS, K. M., THOMSON, K. R., HANSEN, M. J., LARSON, J. J., ENDERS, F. T. & IYER, P. G. 2018. A matched cohort examination of publication rates among clinical subspecialty fellows enrolled in a translational science training program. *Journal Of Clinical And Translational Science,* 2**,** 327-333.
ELLIS, M. 2018. Gendered Divisions of Labour. *In:* DISCH, L. & HAWKESWORTH, M. (eds.) *The Oxford handbook of feminist theory.* Oxford University Press.
EMANS, S. J., GOLDBERG, C. T., MILSTEIN, M. E. & DOBRINER, J. 2008. Creating a faculty development office in an academic pediatric hospital: challenges and successes. *Pediatrics,* 121**,** 390-401.
ENGLAND, P. 1979. Women and occupational prestige: A case of vacuous sex equality. *Signs: Journal of Women in Culture and Society,* 5**,** 252-265.
EVANS, J. A. 2004. Bodies matter: Men, masculinity, and the gendered division of labour in nursing. *Journal of Occupational Science,* 11**,** 14-22.
FERGUSON, D. 2020. 'I Feel Like a 1950s Housewife': How Lockdown has Exposed the Gender Divide'. *The Guardian,* 3.
FITZPATRICK, S. 2012. A survey of staffing levels of medical clinical academics in UK medical schools as at 31 July 2011. *London: Medical Schools Council*.
GERACI, S. A. & THIGPEN, S. C. 2017. A review of mentoring in academic medicine. *The American Journal of the Medical Sciences,* 353**,** 151-157.
GOLDENBERG, N. A., KRUSE-JARRES, R., FRICK, N., PIPE, S. W., LEISSINGER, C. A. & KESSLER, C. M. 2012. Outcomes of mentored, grant-funded fellowship training in haemostasis /thrombosis: findings from a nested case-control survey study. *Haemophilia,* 18**,** 326-31.
GONYEA, J. L., WRIGHT, D. W. & EARL-KULKOSKY, T. 2014. Navigating dual relationships in rural communities. *J Marital Fam Ther,* 40**,** 125-36.
GORDON, L., JINDAL-SNAPE, D., MORRISON, J., MULDOON, J., NEEDHAM, G., SIEBERT, S. & REES, C. 2017. Multiple and multidimensional transitions from trainee to trained doctor: a qualitative longitudinal study in the UK. *BMJ open,* 7.
GRISSO, J. A., SAMMEL, M. D., RUBENSTEIN, A. H., SPECK, R. M., CONANT, E. F., SCOTT, P., TUTON, L. W., WESTRING, A. F., FRIEDMAN, S. & ABBUHL, S. B. 2017. A randomized controlled trial to improve the success of women assistant professors. *Journal of Women's Health,* 26**,** 571-579.
GUEVARA, J. P., WRIGHT, M., FISHMAN, N. W., KROL, D. M. & JOHNSON, J. 2018. The Harold Amos Medical Faculty Development Program: Evaluation of a National Program to Promote Faculty Diversity and Health Equity. *Health Equity,* 2**,** 7-14.
HALL, V. 1999. Gender and education management: Duel or dialogue. *Educational management: Redefining theory, policy and practice***,** 155-165.
HALLEY, M. C., RUSTAGI, A. S., TORRES, J. S., LINOS, E., PLAUT, V., MANGURIAN, C., CHOO, E. & LINOS, E. 2018. Physician mothers' experience of workplace discrimination: a qualitative analysis. *bmj,* 363.
HARRISON, L. M., WOODS, R. J., MCCARTHY, M. C. & PARIKH, P. P. 2020. Development and implementation of a sustainable research curriculum for general surgery residents: A foundation for developing a research culture. *American Journal of Surgery,* 220**,** 105-108.
HAYWARD, C. P., DANOFF, D., KENNEDY, M., LEE, A. C., BRZEZINA, S. & BOND, U. 2011. Clinician investigator training in Canada: a review. *Clinical & Investigative Medicine,* 34**,** E192-E201.
HELITZER, D. L., NEWBILL, S. L., CARDINALI, G., MORAHAN, P. S., CHANG, S. & MAGRANE, D. 2016. Narratives of Participants in National Career Development Programs for Women in Academic Medicine: Identifying the Opportunities for Strategic Investment. *Journal of Women's Health,* 25**,** 360-70.

HENRY-NOEL, N., BISHOP, M., GWEDE, C. K., PETKOVA, E. & SZUMACHER, E. 2019. Mentorship in Medicine and Other Health Professions. *Journal of Cancer Education,* 34**,** 629-637.
HIGGINS, J. P., ALTMAN, D. G., GØTZSCHE, P. C., JÜNI, P., MOHER, D., OXMAN, A. D., SAVOVIĆ, J., SCHULZ, K. F., WEEKS, L. & STERNE, J. A. 2011. The Cochrane Collaboration's tool for assessing risk of bias in randomised trials. *Bmj,* 343**,** d5928.
HONG, Q. N., PLUYE, P., FÀBREGUES, S., BARTLETT, G., BOARDMAN, F., CARGO, M., DAGENAIS, P., GAGNON, M.-P., GRIFFITHS, F. & NICOLAU, B. 2018. Mixed methods appraisal tool (MMAT), version 2018. *Registration of copyright,* 1148552.
INNOVATION, B. & TEAM, G. 2003. BioScience 2015: improving national health, increasing national wealth. *A Report to Government by the Bioscience Innovation and Growth Team. London: Department of Trade and Industry*.
ISHAQ, M. & HUSSAIN, A. M. 2019. BAME staff experiences of academic and research libraries. *London: SCONUL. Retrieved October,* 24**,** 2019.
IVERSEN, A. C., EADY, N. A. & WESSELY, S. C. 2014. The role of mentoring in academic career progression: a cross-sectional survey of the Academy of Medical Sciences mentoring scheme. *Journal of the Royal Society of Medicine,* 107**,** 308-317.
JOANNA BRIGGS INSTITUTE 2014. Joanna Briggs Institute reviewers' manual: 2014 edition. *Australia: The Joanna Briggs Institute*.
JOHNSON, C., LONG, J. & FAUGHT, S. 2014. The Need to Practice What We Teach: The Sticky Floor Effect in Colleges of Business in Southern US Universities. *Journal of Academic Administration in Higher Education,* 10**,** 27-33.
JONES, R. D., MILLER, J., VITOUS, C. A., KRENZ, C., BRADY, K. T., BROWN, A. J., DAUMIT, G. L., DRAKE, A. F., FRASER, V. J., HARTMANN, K. E., HOCHMAN, J. S., GIRDLER, S., LIBBY, A. M., MANGURIAN, C., REGENSTEINER, J. G., YONKERS, K. & JAGSI, R. 2019. The Most Valuable Resource Is Time: Insights from a Novel National Program to Improve Retention of Physician-Scientists with Caregiving Responsibilities. *Academic Medicine,* 94**,** 1746-1756.
JOSHUA SMITH, J., PATEL, R. K., CHEN, X., TARPLEY, M. J. & TERHUNE, K. P. 2014. Does intentional support of degree programs in general surgery residency affect research productivity or pursuit of academic surgery? *Journal of Surgical Education,* 71**,** 486-91.
KHOT, S., PARK, B. S. & LONGSTRETH, W. T., JR. 2011. The Vietnam War and medical research: untold legacy of the U.S. Doctor Draft and the NIH "Yellow Berets". *Academic Medicine,* 86**,** 502-8.
KIGER, M. E. & VARPIO, L. 2020. Thematic analysis of qualitative data: AMEE Guide No. 131. *Medical Teacher***,** 1-9.
KING, G. 1996. Institutional racism and the medical/health complex: a conceptual analysis. *Ethnicity & disease,* 6**,** 30-46.
KLIMAS, J., FERNANDES, E., DEBECK, K., HAYASHI, K., MILLOY, M. J., KERR, T., CULLEN, W. & WOOD, E. 2017. Preliminary Results and Publication Impact of a Dedicated Addiction Clinician Scientist Research Fellowship. *Journal of Addiction Medicine,* 11**,** 80-81.
KLIMAS, J., MCNEIL, R., AHAMAD, K., MEAD, A., RIEB, L., CULLEN, W., WOOD, E. & SMALL, W. 2017a. Two birds with one stone: experiences of combining clinical and research training in addiction medicine. *BMC Medical Education,* 17**,** 22.
KLIMAS, J., SMALL, W., AHAMAD, K., CULLEN, W., MEAD, A., RIEB, L., WOOD, E. & MCNEIL, R. 2017b. Barriers and facilitators to implementing addiction medicine fellowships: a qualitative study with fellows, medical students, residents and preceptors. *Addiction Science & Clinical Practice,* 12**,** 21.
KOBRYNOWICZ, D. & BIERNAT, M. 1997. Decoding subjective evaluations: How stereotypes provide shifting standards. *Journal of Experimental Social Psychology,* 33**,** 579-601.
KOHLWES, J., O'BRIEN, B., STANLEY, M., GRANT, R., SHUNK, R., CONNOR, D., CORNETT, P. & HOLLANDER, H. 2016. Does Research Training During Residency Promote Scholarship and Influence Career Choice? A Cross-Sectional Analysis of a 10-Year Cohort of the UCSF-PRIME Internal Medicine Residency Program. *Teaching & Learning in Medicine,* 28**,** 314-9.
KOHLWES, R. J., SHUNK, R. L., AVINS, A., GARBER, J., BENT, S. & SHLIPAK, M. G. 2006. The PRIME curriculum. Clinical research training during residency. *Journal of General Internal Medicine,* 21**,** 506-9.
KRAEMER, R. R., WAKELEE, J. F., HITES, L., FRANK, S. J., SAAG, K., ROGERS, D. A., NELLORE, A., ERDMANN, N., NICHOLS, A. C. & MERLIN, J. S. 2018. Moving Career Development Upstream: Evaluation of a Course for Internal Medicine Trainees Contemplating Career Pathways in Academic Medicine. *Southern Medical Journal,* 111**,** 471-475.
KUMAR, K., ROBERTS, C. & THISTLETHWAITE, J. 2011. Entering and navigating academic medicine: academic clinician-educators' experiences. *Medical education,* 45**,** 497-503.
LACOBUCCI, G. 2020. Covid-19: NHS bosses told to assess risk to ethnic minority staff who may be at greater risk. British Medical Journal Publishing Group.
LADONNA, K. A., GINSBURG, S. & WATLING, C. 2018. "Rising to the level of your incompetence": what physicians' self-assessment of their performance reveals about the imposter syndrome in medicine. *Academic Medicine,* 93**,** 763-768.
LAUX, S. E. 2018. *Experiencing the imposter syndrome in academia: Women faculty members' perception of the tenure and promotion process.* Saint Louis University.
LAVE, J. & WEGNER, E. 1991. *Situated Learning: Legitimate Peripheral Participation,* New York, Cambridge University Press.
LAVER, K. E., PRICHARD, I. J., CATIONS, M., OSENK, I., GOVIN, K. & COVENEY, J. D. 2018. A systematic review of interventions to support the careers of women in academic medicine and other disciplines. *BMJ open,* 8.

LIBBY, A. M., HOSOKAWA, P. W., FAIRCLOUGH, D. L., PROCHAZKA, A. V., JONES, P. J. & GINDE, A. A. 2016. Grant Success for Early-Career Faculty in Patient-Oriented Research: Difference-in-Differences Evaluation of an Interdisciplinary Mentored Research Training Program. *Academic Medicine,* 91**,** 1666-1675.
LIN, M. P., LALL, M. D., SAMUELS-KALOW, M., DAS, D., LINDEN, J. A., PERMAN, S., CHANG, A. M. & AGRAWAL, P. 2019. Impact of a Women-focused Professional Organization on Academic Retention and Advancement: Perceptions From a Qualitative Study. *Academic Emergency Medicine,* 26**,** 303-316.
LOPES, J., RANIERI, V., LAMBERT, T., PUGH, C., BARRATT, H., FULOP, N. J., REES, G. & BEST, D. 2017. The clinical academic workforce of the future: a cross-sectional study of factors influencing career decision-making among clinical PhD students at two research-intensive UK universities. *BMJ open,* 7**,** e016823.
LOWE, B., HARTMANN, M., WILD, B., NIKENDEI, C., KROENKE, K., NIEHOFF, D., HENNINGSEN, P., ZIPFEL, S. & HERZOG, W. 2008. Effectiveness of a 1-year resident training program in clinical research: a controlled before-and-after study. *Journal of General Internal Medicine,* 23**,** 122-8.
LUMBY, J. & COLEMAN, M. 2007. *Leadership and diversity: Challenging theory and practice in education*, Sage.
LYONS, O. T., SMITH, C., WINSTON, J. S., GERANMAYEH, F., BEHJATI, S., KINGSTON, O. & POLLARA, G. 2010. Impact of UK academic foundation programmes on aspirations to pursue a career in academia. *Medical education,* 44**,** 996-1005.
MACDONALD, R. 2001. Homophobia in medicine. *BMJ,* 323**,** 0110358.
MAHASE, E. 2020. Black babies are less likely to die when cared for by black doctors, US study finds. British Medical Journal Publishing Group.
MANDEL, B. A., WEBER, S. M., GUTOWSKI, K. A., SALYAPONGSE, A. N. & BENTZ, M. L. 2018. What Influences a Plastic Surgery Resident to Pursue an Academic Career? *Plastic and Reconstructive Surgery - Global Open,* 6**,** e1860.
MARSH, J. D. & CHOD, R. 2017. Recruiting Faculty Leaders at US Medical Schools: A Process Without Improvement? *Academic Medicine,* 92**,** 1564-1568.
MASON, M. A. & GOULDEN, M. 2002. Do babies matter? *Academe,* 88**,** 21.
MAYER, S. J. & RATHMANN, J. M. 2018. How does research productivity relate to gender? Analyzing gender differences for multiple publication dimensions. *Scientometrics,* 117**,** 1663-1693.
MCINTOSH, P. 1988. White privilege: Unpacking the invisible knapsack. ERIC.
MCINTOSH, P. 2007. White privilege and male privilege. *Race, ethnicity and gender: Selected readings***,** 377-385.
MERANI, S., SWITZER, N., KAYSSI, A., BLITZ, M., AHMED, N. & SHAPIRO, A. M. 2014. Research productivity of residents and surgeons with formal research training. *Journal of Surgical Education,* 71**,** 865-70.
MILLS, L. S., STEINER, A. Z., RODMAN, A. M., DONNELL, C. L. & STEINER, M. J. 2011. Trainee participation in an annual research day is associated with future publications. *Teaching & Learning in Medicine,* 23**,** 62-7.
MOHER, D., LIBERATI, A., TETZLAFF, J. & ALTMAN, D. 2009. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *Annals of internal medicine,* 151**,** 264-269.
MONROUXE, L. V. 2009. Negotiating professional identities: dominant and contesting narratives in medical students' longitudinal audio diaries. *Current Narratives,* 1**,** 41-59.
MOSS, J., TESHIMA, J. & LESZCZ, M. 2008. Peer group mentoring of junior faculty. *Academic Psychiatry,* 32**,** 230-235.
MUNIR, F., MASON, C., MCDERMOTT, H., MORRIS, J., BAGILHOLE, B. & NEVILL, M. 2013. Advancing women's careers in science, technology, engineering, mathematics and medicine: Evaluating the effectiveness and impact of the Athena SWAN charter. *London: Equality Challenge Unit*.
MUTAMBUDZI, M., NIEDZWIEDZ, C. L., MACDONALD, E. B., LEYLAND, A. H., MAIR, F. S., ANDERSON, J. J., CELIS-MORALES, C. A., CLELAND, J., FORBES, J. & GILL, J. M. 2020. Occupation and risk of COVID-19: prospective cohort study of 120,621 UK Biobank participants. *medRxiv*.
NASAB, S., RUSHING, J. S., SEGARS, J. H., EVERS, E., HANDA, V. L., LAWSON, S., MILLER, C., YENOKYAN, G., BIENSTOCK, J. & SATIN, A. J. 2019. A Mentorship Program for Academic Obstetrician Gynecologists that Improved Publication and Overall Confidence for Success. *Seminars in Reproductive Medicine,* 37**,** 257-264.
NELSON, J. D., MARSHALL, J., KELLY, A. & VUTHIGANON, J. 2020. Dental student research mentorship in the era of COVID-19. *Journal of dental education*.
NHS IMPROVEMENT, N. P. B. M. A. D. S. F. 2018. NHS Provider Board Membership And Diversity Survey: Findings. <https://improvement.nhs.uk/documents/2620/NHSI_board_membership_2017_survey_findings_Oct2018a_ig.pdf>.
NIHR 2020. NIHR responds to the government's call for further reduction in bureaucracy with new measures.
OCKENE, J. K., MILNER, R. J., THORNDYKE, L. E., CONGDON, J. & CAIN, J. M. 2017. Peers for Promotion: Achieving Academic Advancement through Facilitated Peer Mentoring. *Journal of Faculty Development,* 31**,** 5-13.
OUZZANI, M., HAMMADY, H., FEDOROWICZ, Z. & ELMAGARMID, A. 2016. Rayyan—a web and mobile app for systematic reviews. *Systematic reviews,* 5**,** 210.
OVSEIKO, P. V., TAYLOR, M., GILLIGAN, R. E., BIRKS, J., ELHUSSEIN, L., ROGERS, M., TESANOVIC, S., HERNANDEZ, J., WELLS, G., GREENHALGH, T. & BUCHAN, A. M. 2020. Effect of Athena SWAN funding incentives on women's research leadership. *BMJ,* 371**,** m3975.
PATEL, M. S., TOMICH, D., KENT, T. S., CHAIKOF, E. L. & RODRIGUE, J. R. 2018. A Program for Promoting Clinical Scholarship in General Surgery. *Journal of Surgical Education,* 75**,** 854-860.
PENNY, M., JEFFRIES, R., GRANT, J. & DAVIES, S. C. 2014. Women and academic medicine: a review of the evidence on female representation. *Journal of the Royal Society of Medicine,* 107**,** 259-263.
PERIYAKOIL, V. S., CHAUDRON, L., HILL, E. V., PELLEGRINI, V., NERI, E. & KRAEMER, H. C. 2020. Common types of gender-based microaggressions in medicine. *Academic Medicine,* 95**,** 450-457.
RANIERI, V., BARRATT, H., FULOP, N. & REES, G. 2015. Clinical academics' postdoctoral career development. British Medical Journal Publishing Group.

READER, S., FORNARI, A., SIMON, S. & TOWNSEND, J. 2015. Promoting Faculty Scholarship - An evaluation of a program for busy clinician-educators. *Canadian Medical Education Journal,* 6**,** e43-60.
RESAR, L. M., JAFFEE, E. M., ARMANIOS, M., JACKSON, S., AZAD, N. S., HORTON, M. R., KAPLAN, M. J., LAIHO, M., MAUS, M. V. & SUMNER, C. J. 2020. Equity and diversity in academic medicine: a perspective from the JCI editors. *The Journal of clinical investigation,* 129**,** 3974-3977.
RIES, A., WINGARD, D., GAMST, A., LARSEN, C., FARRELL, E. & REZNIK, V. 2012. Measuring faculty retention and success in academic medicine. *Academic Medicine,* 87**,** 1046-51.
RIES, A., WINGARD, D., MORGAN, C., FARRELL, E., LETTER, S. & REZNIK, V. 2009. Retention of junior faculty in academic medicine at the University of California, San Diego. *Academic Medicine,* 84**,** 37-41.
RIMMER, A. 2020. Covid-19: Two thirds of healthcare workers who have died were from ethnic minorities. British Medical Journal Publishing Group.
ROBERTS, K., DOWELL, A. & NIE, J.-B. 2019. Attempting rigour and replicability in thematic analysis of qualitative research data; a case study of codebook development. *BMC medical research methodology,* 19**,** 66.
ROLLOCK, N. & GILLBORN, D. 2011. Critical Race Theory (CRT), British Educational Research Association online resource. *https://www.bera.ac.uk/researchersresources/publications/critical-race-theory-crt,* 9**,** 2015.
ROMANO, M. J. 2018. White privilege in a white coat: how racism shaped my medical education. *The Annals of Family Medicine,* 16**,** 261-263.
ROSE, L. 1994. Homophobia among doctors. *Bmj,* 308**,** 586-587.
ROTHWELL, P. M. 2006. Medical academia is failing patients and clinicians. British Medical Journal Publishing Group.
SAMBUNJAK, D., STRAUS, S. E. & MARUŠIĆ, A. 2006. Mentoring in academic medicine: a systematic review. *Jama,* 296**,** 1103-1115.
SAMBUNJAK, D., STRAUS, S. E. & MARUSIC, A. 2010. A systematic review of qualitative research on the meaning and characteristics of mentoring in academic medicine. *Journal of general internal medicine,* 25**,** 72-78.
SCHRUBBE, K. F. 2004. Mentorship: a critical component for professional growth and academic success. *Journal of dental education,* 68**,** 324-328.
SHERIDAN, J. T., FINE, E., PRIBBENOW, C. M., HANDELSMAN, J. & CARNES, M. 2010. Searching for excellence & diversity: increasing the hiring of women faculty at one academic medical center. *Academic Medicine,* 85**,** 999-1007.
STEWART-BROWN, S. 2020. Gender diversity in academic medicine. *BMJ,* 371**,** m4076.
STUBBE, D., MARTIN, A., BLOCH, M., BELITSKY, R., CARTER, D., EBERT, M., FRIEDMAN, A., GIESE, A., KIRWIN, P., ROSS, R. G. & LECKMAN, J. F. 2008. Model curriculum for academic child and adolescent psychiatry training. *Academic Psychiatry,* 32**,** 366-76.
SUE, D. W., ALSAIDI, S., AWAD, M. N., GLAESER, E., CALLE, C. Z. & MENDEZ, N. 2019. Disarming racial microaggressions: Microintervention strategies for targets, White allies, and bystanders. *American Psychologist,* 74**,** 128.
SWEENY, A., VAN DEN BERG, L., HOCKING, J., RENAUD, J., YOUNG, S., HENSHAW, R., FOSTER, K. & HOWELL, T. 2019. A Queensland research support network in emergency healthcare. *Journal of Health Organization & Management,* 33**,** 93-109.
TESCH, B. & NATTINGER, A. 1997. Career advancement and gender in academic medicine. *Journal-Irish Colleges of Physicians and Surgeons,* 26**,** 172-176.
TESCH, B. J., WOOD, H. M., HELWIG, A. L. & NATTINGER, A. B. 1995. Promotion of women physicians in academic medicine: glass ceiling or sticky floor? *Jama,* 273**,** 1022-1025.
THOMPSON, N., CARTER, M., CRAMPTON, P., BURFORD, B., MORROW, G. & ILLING, J. 2020. Workplace bullying in healthcare: A qualitative analysis of bystander experiences. *The Qualitative Report*.
TRIVEDY, C., MILLS, I. & DHANOYA, O. 2020. The impact of the risk of COVID-19 on Black, Asian and Minority Ethnic (BAME) members of the UK dental profession. *British dental journal,* 228**,** 919-922.
TZANAKOU, C. & PEARCE, R. 2019. Moderate feminism within or against the neoliberal university? The example of Athena SWAN. *Gender, Work & Organization,* 26**,** 1191-1211.
VALANTINE, H. A., GREWAL, D., KU, M. C., MOSELEY, J., SHIH, M. C., STEVENSON, D. & PIZZO, P. A. 2014. The gender gap in academic medicine: comparing results from a multifaceted intervention for stanford faculty to peer and national cohorts. *Academic Medicine,* 89**,** 904-11.
VAN DEN BRINK, M., BENSCHOP, Y. & JANSEN, W. 2010. Transparency in academic recruitment: a problematic tool for gender equality? *Organization Studies,* 31**,** 1459-1483.
VIGLIONE, G. 2020. Are women publishing less during the pandemic? Here's what the data say. *Nature,* 581**,** 365-366.
WELLS, G., SHEA B & O'CONNELL D, P. J., WELCH V, LOSOS M, ET AL. 2014. The Newcastle-Ottawa Scale (NOS) for assessing the quality of nonrandomised studies in meta-analyses.
WHITE, K. 2003. Women and leadership in higher education in Australia. *Tertiary education & management,* 9**,** 45-60.
WILLIAMS, J. C. & DEMPSEY, R. 2018. *What works for women at work: Four patterns working women need to know*, NYU Press.
WILLIAMS, J. C. & SEGAL, N. 2003. Beyond the maternal wall: Relief for family caregivers who are discriminated against on the job. *Harv. Women's LJ,* 26**,** 77.
WILLIAMS, J. C. 2004. Hitting the maternal wall. *Academe,* 90**,** 16.
WILLIAMS, J. C. 2005. The glass ceiling and the maternal wall in academia. *New Directions for Higher Education,* 2005**,** 91-105.
WILLIAMS, J. C. 2015. The 5 biases pushing women out of STEM. *Harvard Business Review,* 24.
WINN, A. S., EMANS, S. J., NEWMAN, L. R. & SANDORA, T. J. 2018. Promoting Resident Professional Development Using Scholarly Academies. *Academic Pediatrics,* 18**,** 477-479.
WISHART, R., DUNATCHIK, A. & SPEIGHT, S. 2019. Changing patterns in parental time use in the UK.

WONG, G., WESTHORP, G., GREENHALGH, J., MANZANO, A., JAGOSH, J. & GREENHALGH, T. 2017. Quality and reporting standards, resources, training materials and information for realist evaluation: the RAMESES II project. *Health Services and Delivery Research,* 5.
ZHUGE, Y., KAUFMAN, J., SIMEONE, D. M., CHEN, H. & VELAZQUEZ, O. C. 2011. Is there still a glass ceiling for women in academic surgery? *Annals of surgery,* 253**,** 637-643.