Access, Experience and Outcomes Among Diverse Groups Nationally from Classroom to Clinic: The Gini Factor in Medical Education

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Department of Educational Research
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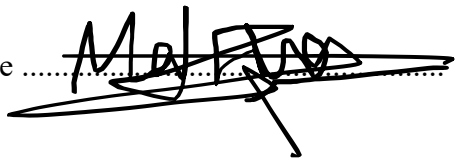
This thesis results entirely from my own work and has not been offered previously for any other degree or diploma.

Signature ..... 

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Dedication

I dedicate this thesis to all my colleagues working in the NHS who tirelessly work around the clock to ensure that our NHS remains world-renowned.

I am deeply grateful to the General Medical Council for their support with navigating the process for obtaining the UKMED data required for this thesis as well as their profound insights and support throughout this research journey. Additionally, I would like to thank the UKMED team for extracting the data for this thesis, which significantly enhances our understanding of access, experience, and outcomes among diverse groups throughout the journey from classroom to clinic in General Practice, the largest specialty in Medical Education.

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Abstract

This thesis explores access, experience, and outcomes from GP Higher Specialist Training (GPHST), the largest UK speciality training programme, among diverse groups through equalities lenses solely and intersectionally: age, sex, socioeconomic status, ethnicity, disability, religion, sexual orientation. Three quantitative cohort studies are presented using UK Medical Education Database (UKMED) data relating to trainees who applied for GPHST on the national ORIEL application system over a three-quarter decade period (2013-2020) and who had lived in England when they applied to medical school (earliest date 2007) with trainee-level longitudinal data relating to their socioeconomic, demographic, geographical and academic metrics from pre-undergraduate through to postgraduate education (from classroom to clinic).

Study one, which explored access to GPHST, found increased diversity in applications during the study period. Sole application to GPHST was more likely among white trainees, standard entry medicine (SEM) trainees, female trainees and trainees with a disability comparative to their counterparts. Trainees who lived pre-medical school in the most deprived quintiles for IMD, LE, Indoor LE, Outdoor LE, Income, Employment and Crime deprivation were more likely to apply to GPHST in combination with other specialities comparative to trainees who lived pre-medical school in the least deprived quintiles and all other quintiles. Direct application to GPHST was less likely among white trainees and those from most deprived quintiles for IMD, LE, indoor LE, Outdoor LE, Income, Employment, Health and Disability, Crime and Education comparative to the least deprived quintiles but not comparative to all other quintiles. Trainees were more likely to be given an offer for a GPHST National Training Number if they were female and applied for SEM although there was no statistically significant difference in offers of a GPHST national training number by level 1 ethnicity. Decision tree analyses provide a nuanced understanding of intersectional factors influencing access.

Study two, which explored experience during GPHST, found that observed variations in AKT and CSA performance through each of the equalities lenses were not inequitable (AKT_{Gini} and CSA_{Gini} <0.15). Multivariate analyses demonstrated that when modelling is adjusted for level 1 and level 2 ethnicity, ethnicity is no longer a predictor of performance but rather socioeconomic factors emerge as predictors of performance in the AKT and CSA. The magnitude of the attainment gap increases during UG and PG training among trainees who lived pre-medical school in the most deprived quintiles for IMD, Income Deprivation, Employment Deprivation, trainees who were on Income Support and free school meals. The magnitude of the attainment gap also increases during UG training among ethnic minorities, trainees who lived pre-medical school in the most deprived quintile for adult skills deprivation (v all other quintiles) and those with a religious belief although there were no changes in the attainment gap for these characteristics during PG training. The magnitude of CYP deprivation gap narrows during UG training but widens during PG training.

Study three, which investigated outcomes from GPHST, found that non-standard ARCP Outcomes were more likely among trainees who were male, black/mixed and those who lived pre-medical school in the most deprived quintile for Income deprivation v the least deprived quintile or all other quintiles. Trainees were less likely to complete CCT timely if they were: female, white, disabled or Christian. Trainees who were more likely to complete CCT timely included Asian and Indian trainees as well as those who lived pre-medical school in the most deprived quintiles for Income, Employment, Education, CYP and Adult Skills deprivation in comparison to the least deprived quintiles or all other quintiles.

This thesis offers significant insights into the extent of equity in the GP training pathway from end to end in cohorts over a three-quarter decade period. This thesis contributes significant knowledge to the literature and to practice across access, experience and outcomes from GPHST with implications for informing policy and driving efforts towards a more equitable GP workforce that represents the diverse population it serves. Of particular significance, the introduction of Gini coefficients as a measure of the degree to which there is equity in educational attainment among diverse groups provides a novel contribution to the field, offering a reproducible methodology across medical education.

Chapter 1: Introduction

1. Introduction

Every human should have an equal right to education; the right to education is among the basic human rights to which all are entitled (2). Yet, several studies across the globe have shown staggering educational inequalities between various societal groups by protected characteristic and otherwise during school, undergraduate and postgraduate education across numerous disciplines in several respects relating to access, experience and outcomes from education (3). Medical education is no different and the literature, which will be outlined, sets out a solid case for exploiting emerging big databases to understand, monitor, and where necessary, implement evidence-based interventions to ensure equitable access, experience and outcomes in medical training.

Medical education scholars have thus far noted inequality gaps in a number of contexts including through the works of: **a)** Tiffin et al. 2014 investigating sociodemographic characteristics and admission to medical school (4), **b)** Bury et al. 2023 exploring age and ethnicity on admission to public health training (5), **c)** Tridente et al. 2022 studying ethnicity and country of medical training on admission to intensive care training (6), **d)** Woolf et al. 2020 surveying ethnicity on performance in the UCAT (7), **e)** Ellis et al. 2022 reconnoitring ethnicity and overall IMD on performance in the MRCS (high stakes postgraduate surgical training examination) (8), **f)** Kelly et al. 2023 investigating performance in the MRCPCH (high stakes postgraduate paediatric training examination) and progression during paediatric training (9) and **g)** Rothwell et al. 2017 examining age, sex, ethnicity, country of graduation and training environment on progression outcomes during training for medical trainees (10).

These findings have resulted in significant policy changes over time with one notable example being the implementation of HEI widening participation schemes across the UK (11) (12) albeit sadly reported by Fielding et al. 2018 (13) that these schemes have resulted in little discernible change in the demography of those accepted into medical school. Nevertheless, this is indicative that findings of inequity in medical education spark widespread concern throughout the medical profession and society driving a strive for the better use of data to inform policy to shift the dial.

This thesis shines a spotlight on General Practice training; the most widely subscribed and shortest medical training programme in the UK. General Practitioners are the cornerstone of health working within a wider team that promotes, prevents and offers treatment as well as caring for people with long-term conditions and referring patients to other medical services for urgent and specialist treatment (14). The Royal College of Physicians (RCGP) is the professional body and guardian of

standards, including curricula and assessment, for all GPs in the UK (15). The UK standard GP training pathway for home students involves 3 key phases: pre-undergraduate, undergraduate and postgraduate. Firstly, the pre-undergraduate phase involves a UCAS application to a UK medical school, with a UCAS tariff, typically based on GCSE and A-level grades, and a UK Clinical Aptitude Test (UCAT) score. Secondly, the undergraduate phase involves multiple clinical and written examinations over five to six years of medical school that go towards deriving an Educational Performance Measure (EPM) decile score which in equal weighting with the Situation Judgement Test (SJT) are combined to determine admission for postgraduate training (16). Thirdly, the postgraduate phase typically involves two years of foundation training followed by a further three years of specialist training in General Practice during which trainees are required to pass an annual review of professional competencies (ARCP) which considers several assessments throughout each year aligned to their curriculum as well as the MRCGP examination which is comprised of the Applied Knowledge Test (AKT) and the Clinical Skills Assessment (CSA); completion of all of the aforementioned will lead to eligibility to apply for a Certificate of Completion of Training (CCT) in General Practice.

General Practice, holding over 40% of specialty training posts in the UK, needs recruits representative of the UK's population. Equitable access to GPHST is compromised by earlier inequities in medical school and foundation training access, limiting the pool of eligible applicants. Much of the existing literature relating to access to GPHST does not take a diverse view through equalities lenses and focuses on: 1) applicant motivation for applying to GPHST such as through the works of Irish et al., 2011 (17); Watson et al., 2011 (18); Smith et al., 2015 (19), 2) demographic factors which reduce the odds of application to GPHST such as non-graduate entry, intercalation and above-median academic performance during medical school through the work of Gale 2019 (20), 3) approaches for recruitment to GPHST including the works of Patterson et al. 2000, Patterson et al. 2001, Patterson et al. 2005, Plint & Petterson et al. 2009 and 4) the impacts of the public image of a GP on applications to GPHST which includes the works of Alberti et al. 2017 (21) and Barry et al. 2019 (22). Scholars including Derbyshire et al. 2014 (23) have also explored the extent to which travel time to GP placements could become a barrier to applications for GPHST and the extent to which time spent in General practice placements or training affects application into GPHST, with Irish et al 2011 (17), Alberti et al. 2017 (21) and McManus et al 2020 (24) concluding that it does but Vaidya et al. 2019 (25) concluding it does not. However, central research questions emerge from the literature relating to access to GPHST solely and intersectionally by age, sex, deprivation, ethnicity, disability, sexual orientation and religion with respect to: a) trends in applications between 2013-

2020, b) sole applications to GPHST comparative to those made in combination with other specialties, c) direct and non-direct applications to GPHST, d) Successful offer of a GPHST national training number.

Scholars including Park et al., 2015 (26) and MacVicar et al., 2015 (27) show that although RCGP training is extensive, its' short duration and community-focused nature presents unique challenges. Research led by Woolf et al., 2016 (28) and Warwick et al., 2014 (29) highlights that ethnic minority trainees and international medical graduates (IMGs) face additional barriers, including biases and lack of support, impacting their training experiences and performance in associated high stakes examinations including MRCGP AKT and CSA. Woolf et al., 2016 emphasises the need for non-stigmatising interventions and improved trainee-trainer relationships (28). Scholars including Siriwardena et al., 2013 (30) and Patterson et al., 2018 (1) have published studies examining performance in the MRCGP AKT and CSA which have largely relied upon data from the GP National Recruitment Office (GPNRO) to explore the extent to which the Multi-Speciality Recruitment Assessment (MSRA) and accompanying Situational Judgement Test which is undertaken as part of the application process for GPHST are predictive of performance in key assessments undertaken during GPHST like the MRCGP AKT and CSA. However, in comparison with the UKMED database, the GPNRO database is limited in metrics relating to demographic data and longitudinal data such as Office for National Statistics household deprivation metrics at the point of application to medical school, including the overall IMD, IMD domains, subdomains, and previous academic performance, for example, UCAS tariff and EPM which limits the conclusions that can be drawn from studies reliant on GPNRO data to predict MRCGP AKT and CSA performance. Consequently, there are gaps in the literature relating to understanding: performance in the MRCGP AKT and CSA through the equalities lenses, longitudinal performance across key high stakes assessments from pre-undergraduate to postgraduate medical education and predictors of performance in the MRCGP AKT and CSA accounting for longitudinal academic and socio-demographic variables outside of the application process. Furthermore, recognising that more than one in three doctors registered in the UK have trained abroad (31), the aforementioned studies in the literature, have included international medical graduates within predictive analyses for performance in the MRCGP AKT and CSA but without access to longitudinal data from their pre-undergraduate and undergraduate training from their countries of qualification and thus may be drawing unsafe conclusions due to these limitations. As such, the present thesis uses longitudinal UKMED data from UCAS tariff to Certificate of Completion of Training (CCT) thus filling a critical gap in the literature relating to the extent to which there is equity degree to which there is equitable experience among UK graduates.

This is a hugely important question, not least, because in 2014 the British Association of Physicians of Indian Origin (BAPIO) brought an unsuccessful judicial review that the RCGP had failed to fulfil the public sector equality duty imposed on them by section 149 of the Equality Act 2010 such that the RCGP had discriminated directly or indirectly against South Asian and BME doctors in the assessment of the MRCGP CSA whereby it was noted that pass rates were as follows: White: 93.5%, South Asian: 76.4% and Black: 72.7% (32). The BAPIO challenge relied upon arguing that the observed variation in pass rates constituted differential attainment which has been defined in the literature as an unexplained variation in attainment between different groups who share a protected characteristic and those who do not (33). However, pass rates are only able to articulate observed variations in performance, through the provision of the proportions of students meeting a minimum standard, but not the distribution of scores above or below a passing threshold and not the extent to which any observed variations in academic achievement are equitable. In fact, with reference to pass rates, the High Court ruled that "all that they do, is to demonstrate that there is a difference of outcome" but "the statistical differences which exist do not of themselves establish direct discrimination". As such, to reiterate, pass rates are only able to articulate observed variations in performance but not the extent to which academic achievement is equitable. The same is true of odds ratios, used by several scholars within the medical education landscape, which are prone to skew by small sample sizes and do not measure equity. The real question is the extent to which any observed variations are equitable. Within medical education, scholars have not thus far adopted a robust approach to measure the degree of equity in academic performance, unlike in other sectors which will be explained further. The use of standard deviations and GINI coefficients are discussed with the latter having emerged as the most apt for describing the extent of equity in attainment. GINI co-efficient are nationally and internationally used, reproducible measures of statistical dispersion to characterise equality and calculate the extent of equity. The Gini coefficient is commonly applied in economic studies to evaluate income inequality but increasingly used in education, health, and other sectors to assess equity in access and outcomes. Although Gini coefficients have not yet been used to calculate the extent of educational equity in medical education or the MRCGP AKT and CSA, Gini coefficients have been used to characterise inequity within school education with respect to the average number of years of schooling by Baro and Lee 1991 (34), Thomas et al. 2002 (35), Mesa 2007 (36) and Tomul et al. 2011 (37) as well as being used to investigate the degree of inequity in academic attainment at secondary school by Zehorit Dadon Golan (38). Thus far, scholars within medical education have focused on differential attainment by ethnicity which leaves key gaps in the literature relating to differential attainment among other diverse groups by: age, sex, deprivation

(overall IMD, IMD domains and IMD subdomains), disability, sexual orientation, or religion solely and intersectionally; these are gaps which the present thesis will address through contributions to knowledge and practice made by the novel developments of AKT_{Gini} and CSA_{Gini} for each of those diverse groups and other insights which serve as an evidence basis for policy making and evidence based intervention.

Despite persistent recruitment and retention challenges in the GP workforce over the past two decades which have been highlighted by reports and scholars including: Young et al. 1999 (39), Goldacre et al. 2002 (40), Lambert et al. 2016 (41), Owen et al. 2019 (42), Hall et al. 2019 (43), Hanratty et al. 2022 (44), Martin et al. 2022 (45), Rashid et al. 2016 (46), Tavabie et al. 2013 (47), Sharma et al. 2020 (48), few studies have comprehensively explored predictors of non-standard ARCP outcomes and timely CCT completion drawing upon longitudinal data from across the whole GP training pathway from as early as pre-undergraduate education with metrics for each of the equalities lenses.

This is the first study of its kind to work with the UK Medical Education Database to develop a unique dataset of applicants to GP training from 2012-2020 who lived in England when they applied to medical school with longitudinal data for each participant from UCAS application to Certificate of Completion of Training in GPHST including granular deprivation domain and subdomain data from the Office for National Statistics to explore access, experience and outcomes among diverse groups across the whole training pathway for General Practice. The data provided within UKMED is granular participant level data including: sex, age, ethnicity, pre-undergraduate socioeconomic status (IMD domains and subdomains, free school meals, parental degree, income support, type of schooling), sexual orientation, religion and disability as well as geographical factors (HEI attended and course type).

Three studies are presented examining access, experience and outcomes from GPHST respectively through the equalities lenses: age, sex, deprivation, ethnicity, disability, sexual orientation and religion solely and intersectionally. Study one explores access to GPHST among the aforementioned diverse groups with respect to: a) trends in applications between 2013-2020, b) sole applications to GPHST comparative to those made in combination with other specialties, c) direct and non-direct applications to GPHST, d) Successful offer of a GPHST national training number and e) Intersectionality informed identification of groups with respect to (b) and (c). Study two explores the extent to which there is equity of experience in GPHST through exploration of: changes in

longitudinal academic performance across key high stakes assessment from pre-undergraduate to undergraduate medical education (UCAS tariff to EPM) and undergraduate to postgraduate medical education (EPM to AKT), whether there are observed variations in AKT and CSA performance through each of the equalities lenses and, if so, the extent to which these observed variations are equitable through calculation of the AKT_{Gini} and CSA_{Gini}. Study two also reports predictors of success and failure in the first attempt of the AKT and CSA accounting for intersectional factors such as longitudinal demographic, socioeconomic, geographical and academic factors. Study three explores outcomes from GPHST with respect to ARCP outcomes and Certificate of Completion of Training (CCT) completion enabling registration onto the GP specialist register among diverse groups as well as investigating predictors of non-standard ARCP outcomes and timely CCT completion accounting for intersectional factors such as longitudinal demographic, socioeconomic, geographical and academic factors.

Overall, equitable access to GP training paves the way for a GP workforce which is representative of the population it serves. Equitable experience during the GP training pathway contributes to equitable progression and outcomes thereby also ensuring that the GP workforce is representative of the population which it serves. Equitable outcomes from GP training ensure that the GP workforce is representative of the population which it serves. Several landmark findings are presented in this thesis contributing significant knowledge to the literature's understanding of equity in access, experience and outcomes across the whole GPHST training pathway nationally from UCAS tariff to CCT as well as notable contributions to practice including the use of the AKT_{Gini} and CSA_{Gini} which can be applied to measure equity in attainment internationally in due course.

Chapter 2: Literature Review

Chapter 2 Overview: Literature Review

This chapter will outline and offer critical appraisal of the literature regarding: the three phases of the GP training pathway from UCAS to CCT drawing comparisons with the international landscape, the legal definition of inequalities and its' application to the different training bodies involved throughout the decade long GPHST training pathway and the literature surrounding access, experience and outcomes in GPHST.

The literature review is structured to describe studies individually rather than focusing on identifying patterns across the literature, reflecting a deliberate approach to thoroughly present the breadth and depth of existing research. This approach ensures that the unique contributions, methodologies, and findings of each study are clearly articulated, providing a comprehensive foundation for understanding the current state of knowledge. Such an approach is particularly useful when the field is diverse or fragmented, as it highlights the distinct perspectives and approaches within the literature without prematurely synthesising them into overarching patterns. By presenting studies in turn, the review creates a transparent and detailed account that respects the complexity of the research landscape and supports the study's aim of grounding its analysis in a robust and inclusive review of existing work.

2. Literature Review

2.1 What does GP training look like across the globe: UK, EU and US perspectives

To enable international comparisons in GP training, especially with other countries where there is a similar burden of disease among the population but differences in the training pathway such as within the European Union (EU) and United States (US), it is apt to look to the International Standard Classification of Education (ISCED), a statistical framework for organising information on education maintained by the United Nations Educational, Scientific and Cultural Organization (UNESCO) (49). ISCED highlights eight levels of education (table 1): early childhood education (level 0), primary education (level 1), lower secondary education (level 2), upper secondary education (level 3), post-secondary education (level 4), short cycle tertiary education (level 5), Bachelor's degree or equivalent (level 6), Master's or equivalent (level 7) and Doctorate or equivalent (level 8) (49). Long degrees in highly specialised professional studies such as medicine are usually classified as ISCED level 7 (49).

Prospective medical students in the UK and EU undergo early childhood education (ISCED level 0), primary education (ISCED level 1) and secondary education (ISCED level 2 and 3) before applying to medical school, subsequent foundation training and Higher Speciality Training in General Practice. The minimum ISCED level of education required for application to medical school in the UK and for many countries within the EU is upper secondary education (ISCED level 3) whereas in other countries with a similar burden of population disease such as the United States (US), students are required to then go on to complete a Bachelor's degree or equivalent (ISCED Level 6) to be eligible to apply for medical school before then embarking upon 3 years of postgraduate speciality training in Family Medicine (the equivalent of GP in the UK). During this, doctors rotate between paediatrics, obstetrics, general surgery, emergency medicine and internal medicine as well as inpatient services such including critical care and outpatient speciality clinics such as HIV clinic or sickle cell clinic (50). After training is completed and all requirements are met, residents are eligible to take the Family Medicine certification exam by the ABFM (akin to the MRCGP in the UK). Although studies have not explored the extent to which there is equity in ABFM performance by equalities lenses or predictors of performance, studies have reported differences between rural and urban trained family medicine residents (51). It is worth noting that in the US, passing the USMLE is necessary to enable registration for a medical license. Currently there is no medical license exam in the UK although shortly the GMC is due to launch a compulsory licensing examination known as the UKMLA (52).

European Commission 2005 rules stipulate that education for general practice must be of at least 3 years duration, with at least 6 months spent in a general practice and a period of 'internship' similar to the UK foundation programme, lasting between 6-24 months (although in some countries this is part of undergraduate education) (31). However, in the UK all doctors wishing to practice as a fully qualified GP are required to have completed a CCT in GP whereas in 41% of 27 European countries surveyed by the European Academy of Teachers in General Practice/Family Medicine (EURACT), doctors can work as a GP without a qualification in GP or family medicine. Nevertheless, most European countries now comply with the EU 2005 rules and in fact, 13 of the 27 countries surveyed by EURACT have a longer training scheme of 4–5 years duration (31). Finland has the longest GP training in Europe with 6 years training required (31). In Germany, trainees must complete 60 months of training consisting of 24 months in general practice, 12 months in acute hospital-based medicine, at least 6 months in another area of acute, unscheduled patient care, up to 18 months of experience in a related, immediate care field and a further 80 hours of training in psychosomatic conditions (53). Trainees are responsible for finding appropriate jobs to fulfil the training requirements. There is no training programme or organised pathway incorporating the appropriate jobs for them (54). As a matter of interest, Germany has previously turned away UK trained GPs in violation of the EU Council directive 93/16/EEC on account of not recognising UK GP training and CCT awarded by the UK Joint Committee on Postgraduate Training for GP. Doctors in this situation have been told by German authorities that they must sit a German specialist GP exam which by EU law is not necessary and doctors in this situation have cited concerns that Germany has too many doctors and its GP training system is in disarray (55). On the contrary, the UK has been applying an evidence based systematic methodology for mapping GP training between countries looking at training pathway, curriculum, assessment, healthcare context, CPD and revalidation to support the UK's ambitions to recruit more GPs, and alleviate current GP workforce pressures (56). For example, Australia was rated 'green' for training pathway, curriculum, and assessment, and 'amber' for healthcare context and CPD and revalidation. The overall rating was 'green' indicate similarity with UK training (56). GPHST in the UK is among the shortest, at 3 years duration with 18 months in general practice and 18 months in secondary care (31).

Studies have reported that GP training in the EU is a popular choice with trainees in the EU finding the hospital placements to be an instrumental part of their training experience (57). Scholars have also published that motivations of GP trainees in the EU for accessing GPHST include: 'compatibility with family life' (59.5%), 'challenging medically broad discipline' (58.9%), 'individual approach to people' (40.1%), 'holistic approach' (37.8%) and 'autonomy and independence' (30.4%) (58). As will

be discussed later, these motivations are broadly similar to those expressed by UK Trainees applying for GPHST. However, there is an absence of data available regarding the proportion of doctors who graduate abroad and obtain a license to practice medicine in the UK, although GMC data from 2021 suggests that there are about 26,033 doctors with a PMQ from the EEA and 81,457 with a PMQ in other countries (IMGs) (59). There is also little published data about the number of candidates who sit the MRCGP internationally without intending to hold a license to practice or work in the United Kingdom (60).

Irrespective of the global differences in GP training, there remain gaps in the literature around equity in access, experience and outcomes from General Practice, or equivalent, training in the UK, EU and the US through each of the equalities lenses including age, sex, ethnicity, disability, deprivation, religion, sexual orientation.

2.2 The whole training pathway for General Practitioners in the UK

In the UK, the GP training pathway consists of three key phases: pre-undergraduate, undergraduate and postgraduate. Each of the three phases must be successfully completed in succession to enable CCT.

Pre-undergraduate

The pre-undergraduate phase involves a UCAS application to a UK medical school with a personal statement outlining work experience, personal and professional skills and commitment to medicine as well as a UCAS tariff, typically based on GCSE and A-level grades or degree classification (for graduates), a UK Clinical Aptitude Test (UCAT) (61) score and for some Higher Education institutions (HEIs) a BioMedical Admissions Test (BMAT) (62). The UCAT is comprised of five sections: Verbal reasoning, Decision reasoning, Quantitative Reasoning, Abstract Reasoning and Situational Judgement. The first four sections are assigned a quantitative score whilst the last section is assigned a band.

Several published works have found UCAS tariff to be a predictor of acceptance into medical school (63) and a predictor of academic attainment at medical school (64) (65). Powis et al. 2007 and Thiele et al. 2016 noted that students from disadvantaged households achieve lower UCAS tariff scores (64) (66) who in turn achieve lower grades at medical school (64) which, in turn, contributes to a lower EPM score thus, until 2024, affecting foundation school placement. McManus et al. 2008 noted that ethnic minority students achieve lower grades overall at GCSE and A-level in comparison to White applicants (67). Nevertheless, Thiele et al. 2016 noted that, students who classified themselves as white were more likely to achieve a higher average at fourth year than students of other ethnicities, though they did not enter university with the highest grades (64). Studies have neither thus far explored longitudinal performance between UCAS tariff which is a measure of pre-undergraduate academic performance and the EPM which is a measure of graduate academic performance nor between EPM and the MRCGP. Furthermore, although UCAS tariff has not been found to be a predictor of future clinical performance in the MRCP, which is the equivalent examination to MRCGP but for medical specialities (68), studies have not thus far explored whether the UCAS tariff in combination with other variables has a bearing on access to GPHST, experience during GPHST, performance in the MRCGP CSA or MRCGP AKT or progression/outcomes from GPHST.

Scholars have questioned the appropriateness of the UCAT for selecting medical students (69) finding an independent association between better performance and the use of paid, commercial, preparation resources which candidates from more deprived backgrounds were significantly less likely to use (70). Furthermore, some scholars including Lynch et al. 2009 report that UCAT scores did not predict Year 1 performance at some medical schools (71). However, a systematic review authored by Bala et al. 2021 and a national cohort study led by MacKenzie et al. 2016 found the UCAT to be a predictor of academic performance during medical school (72). Moreover, Bala et al. 2021 found the UCAT to be a predictor of performance in the SJT although only one study was identified looking at postgraduate outcome measures and this demonstrated that the UCAT was not a predictor of health or conduct FtP declarations at GMC registration (73). Studies have not thus far explored whether the UCAT in combination with other variables has a bearing on access into GPHST, experience during GPHST and performance in the MRCGP CSA or MRCGP AKT or progression/outcomes from GPHST.

Seven medical schools currently (2023) use the BMAT, which includes three sections: 1) Thinking skills testing generic skills in problem solving and critical thinking, 2) Scientific Knowledge and Applications testing the ability to apply scientific knowledge typically covered in high school science and maths, 3) Writing task testing the ability to select, develop and organise ideas to communicate them in writing concisely and effectively (74) (75). Studies have found BMAT scores to be a predictor of performance in undergraduate written assessments at medical school (76) (77) (78) equitably by sex, school type and neighbourhood deprivation (76) as well as a predictor of performance in both written assessments of the MRCP (79). Davies et al. 2022 found performance in section 1 of the BMAT to be predictive of performance in year 5 and 6 at Imperial College London although not at Lee Kong Chain School of Medicine and performance in section 2 of the BMAT to be predictive of performance on all written assessments at both aforementioned organisations (77).
However, studies have not explored whether BMAT performance is equitable by ethnic group or whether the BMAT is a predictor of performance in postgraduate training including the MRCGP AKT written examination or practical CSA examination. Scholars have opined that although the BMAT is a sound assessment of scientific knowledge independent of A-levels, it is less useful than comparable tools such as the UCAT which is sat by a significantly higher proportion of students more representative of the workforce rather than the BMAT (which has traditionally been more relied upon predominantly by Oxbridge and London universities) (77).

Successfully shortlisted applicants are invited for an interview, designed by each university, which is typically a Multiple Mini Interview (MMI) (75). Scholars are divided about whether the MMI is a reliable admissions tool with some scholars reporting that MMIs have greater predictive validity of performance in undergraduate medical education than the UCAT (80) and are effective for probing dimensions ranging from applicants' responses to novel situations to their reactions to ethical dilemmas thus providing broader insights into personal attributes and perspectives on patient care (81) (82) but Jerant et al. 2012 reporting the exact opposite on the basis of a study finding that MMIs are positively biased towards applicants with an extroverted personality (83) and Rees et al. 2016 reporting potential disadvantage for ethnic minority groups who tend to perform less well on the MMI (84). It is important to note that selection criteria can change annually for each medical school. In 2021, there were around 28,690 applicants competing for 9,500 medical school places giving a matriculation rate of 33.1% (85).

Undergraduate

The undergraduate phase involves multiple medical school based clinical and written examinations over five to six years that go towards deriving an Educational Performance Measure (EPM) decile score which in equal weighting with the Situation Judgement Test (SJT) are combined to determine admission for postgraduate training (62) (86).

The EPM measures educational performance during medical school through three components: a) a quantitative measure of the students' performance throughout medical school, in relation to their peers, using multiple assessments of their knowledge and practical skills over time; students are awarded 34 points for the 10th (lowest) decile to 43 points for students in the 1st (highest) decile, b) 0-5 points for additional degrees depending upon the grade achieved and c) 0-2 points available for additional publications (1 point per PUBMEDID cited 1st author publication). Scholars have generally found the EPM decile score to be a fair selection criterion (87) and a good predictor of ARCP outcomes from foundation training although have also found that the other two measures of education achievements do not add value to predicting ARCP outcomes during foundation training or foundation programme completion (88). Studies have not yet explored the extent to which the EPM decile in combination with other variables has a bearing on access into GPHST, experience during GPHST and performance in the MRCGP CSA or MRCGP AKT or progression/outcomes from GPHST. Studies have also not explored whether there is a longitudinal difference in attainment between EPM and MRCGP through each of the equalities lenses.

The SJT tests the employment attributes needed to work as a foundation doctor (16). Scholars are divided about the reliability of the SJT. Of interest, a study exploring the extent to which personality traits assessed on medical school admission predict performance found that emotional non-defensiveness predicted EPM decile whilst emotional non-defensiveness, aloofness and empathy were predictive of SJT score (89). On one hand some scholars support the use of the SJT with: Petty-Saphon et al. 2017 (90), Sahota et al. 2020 (91) and Sahota et al. 2023 (92) reporting that the SJT is a reliable measure of professional attributes for clinical practice, Ismail et al. 2019 (93) describing the SJT as a test of high reliability, validity and cost-effectiveness, Smith et al. 2018 (88) finding the SJT to be a good predictor of ARCP outcomes during foundation training and Cousans et al. 2017 (94) reporting that the SJT is a good predictor of supervisor-rated performance and incidence of remedial action during postgraduate training. However, on the other hand, some scholars including Simon et al. 2015 (95) and Patel et al. 2015 (96) have highlighted poor correlation between the SJT and academic performance during medical school and have called for the SJT to be replaced with an alternative assessment which more closely correlates with medical school performance (96).

Moreover, scholars have raised concerns with respect to a perceived conflict of interest arising from the fact that Work Psychology Group which predominantly carried out the literature supporting the implementation of the SJT receives funding for its delivery. Scholars have pointed to several documented flaws in the research relating to the use of Cronbach's alpha to calculate reliability and consistency and next to no consideration of differential performance among minority groups (97) with suggestions that the SJT is perpetuating inequalities by way of a workforce distribution that does not distribute skills according to healthcare service need. Studies have found a statistically significant difference between the knowledge and skills of doctors (as measured by the EPM and SJT) entering the Foundation Programme in different Foundation Schools which might cause unfair differences in the delivery of patient care in different regions (98). Studies have not thus far explored the extent to which the EPM and SJT are predictors of performance in the MRCGP AKT or MRCGP CSA examinations or ARCP outcomes whilst accounting for regional differences in GPHST.

The EPM and SJT are combined to determine selection into a two year foundation programme (FP) or specialised foundation programme (SFP) which provides an opportunity to develop research, teaching and leadership/management skills in addition to the competences outlined in the Foundation Programme Curriculum hosted by the UK Foundation Programme Organisation (UKFPO)

which bridges the gap between medical school and specialty / GPHST. SFP posts are all recruited to through competitive selection methodology and will require applicants to attend an interview.

Aside from the undergraduate 5 year **Standard Entry Medicine (SEM) course**, there are a variety of other medical school course types which Higher Education Institutes offer:

Graduate Entry Medicine (GEM), is an undergraduate, accelerated 4 year programme open to those with a prior bachelor's degree offered by 15 out of 44 medical schools. James et al. 2008 found that Graduate entrants to medicine widen academic and socio-demographic diversity in the medical school student population (99). Fourteen universities require and an upper second class undergraduate degree and one university requires a lower second class undergraduate degree (75). Eleven of the fifteen universities accept a previous degree in any discipline whilst four mandate completion in a life sciences subject (75). Admission criteria for GEM include the Graduate Medical School Admissions Test (GAMSAT) which interestingly, Groves et al. 2007, Wilkinson et al. 2008 (100) and Coates et al. 2008 (101) reported has limited sole value in predicting academic performance during medical school with better predictors including interview score and GPA (102) (100) (101) although studies have not thus far explored the predictive validity of the GAMSAT for postgraduate written and clinical examinations. Postgraduate students are also eligible to apply for SEM as a postgraduate in which case the GAMSAT may be offered by some HEIs in lieu of academic grades or other aptitude tests in some circumstances (75). A ten year retrospective overview, authored by Mercer et al. 2015, with detailed analysis of candidates' performance found that GAMSAT test reliability is consistently high although there are significant variations in candidate performance related to age, sex, level and discipline of previous academic study and language background with higher scores overall more likely for candidates who are male, less than 24 years old, have an English-speaking background, an Honours degree or a doctorate and who have completed a degree which is not health-related (103).

Garrud et al. 2018 found that, for graduates, attending the GEM course or the SEM course has little effect on graduate entrant completion, or EPM or SJT scores, despite differences in student profile (104). Garrud et al. 2012 found that problems encountered in a graduate-entry medicine course were comparable to those reported in a corresponding undergraduate programme with respect to educational performance, health and behaviour (105) although studies have not thus far explored whether undertaking GEM solely or in combination with other variables has a bearing on access into GPHST, experience during

GPHST and performance in the MRCGP CSA or MRCGP AKT or progression/outcomes from GPHST.

Medicine with a gateway year, is a six year course which has been created specifically to widen participation and to select and recruit individuals who are of high ability and motivation but who have experienced barriers to learning in their environment. Widening participation refers to the policy that people such as students from disadvantaged backgrounds, mature students, those from ethnic and cultural groups and disabled students should be encouraged into higher education (106). Widening participation in medicine enhances social mobility and ensures that the workforce is representative of the population which it serves. The first year of the gateway provides a foundation for progression to a SEM course at the same institution (75) and research from various scholars including Smith et al. 2021 (107), Curtis et al. 2020 (12) and Kumwenda et al. 2019 (108) has reported that gateway courses provide focused support on academic confidence, developing professional identity, financial support, establishing a sense of belonging as a student and developing supportive relationships with staff and peers. Scholars including Elmansouri et al. 2013 and Duenas et al. 2021 have also found that gateway programmes increase diversity of backgrounds represented within the profession (109) (110). Furthermore, Elmansouri et al. 2013, went one step further to explore outcomes from gateway courses in 3 UK Medical Schools between 2007-2013 using data from the national UK Medical Education Database finding that gateway courses increased the number of applications to GP training but graduates from gateway courses were 0.38 times less likely to pass their first attempt at any membership examination (e.g-MRCGP) compared with graduates from SEM courses although there was no difference found in ARCP outcomes for foundation training between gateway graduates and SEM graduates (109). Studies have not thus far explored whether undertaking medicine with a gateway year solely or in combination with other variables has a bearing on access into GPHST, experience during GPHST and performance in the MRCGP CSA or MRCGP AKT or progression/outcomes from GPHST.

Medicine with a preliminary year, is a six year course designed for applicants who don't have the right qualifications for SEM having achieved high grades at national examinations (e.g. A Levels) but did not study the required science subjects for SEM (75). These are relatively new programmes with a small number of places and there is very little data and research about outcomes from these programmes.

There are three main teaching styles in medical education; traditional, problem based learning (PBL) and integrated. Traditional courses tend to focus on delivering scientific theory first before moving to clinical settings after a few years (75) (111). PBL is a student-centered approach in which students learn about a subject by working in groups to solve an open-ended problem which drives motivation and the learning (75) (111). Integrated Medicine courses teach scientific knowledge alongside clinical training enabling early clinical exposure (75) (111). There is limited literature about whether there is an association between course type and aspirations for application to GPHST as well as the extent to which course teaching style solely or in combination with other variables has a bearing on access into GPHST, experience during GPHST and performance in the MRCGP CSA or MRCGP AKT or progression/outcomes from GPHST.

Each HEI hosting a medical course (undergraduate or graduate entry) has the autonomy to set a curriculum and programme of assessment aligning to the regulator's standards and Outcomes for Graduates (112). Upon graduation, each medical school recommends the applicant to the General Medical Council (GMC) for provisional registration with a license to practice allowing participation in an approved Foundation Year 1 (F1) programme in the UK. It is only upon successful completion of F1, that doctors are issued with full GMC registration from Foundation Year 2 (F2). In the UK, the regulator is the GMC. The role of the GMC is to protect, promote and maintain the health and safety of the public by ensuring proper standards in the practice of medicine and improve medical education and practice across the UK (113). The Medical Act 1983 (amended in 1995 to include professional performance) sets out the legislation in the UK underpinning the work of the GMC in governing the regulation and credentials of the medical profession (114). The GMC oversees medical education and training in the UK and expect newly qualified doctors to have achieved the capabilities described in the Outcomes for graduates on graduation (113). The GMC recognises that graduate doctors will need ongoing practical experience to develop and consolidate their skills and capabilities during foundation training where they will continue their training under supervision in a multidisciplinary team (115).

Postgraduate

The postgraduate phase typically involves two years of foundation training followed by a further three years General Practice Higher Specialist Training (GPHST) designed to prepare doctors to become a GP and provide them with the skills needed to manage patients presenting with a wide

range of health issues (86) (15). Trainees have the option to undertake academic foundation training and academic GPHST which usually includes undertaking research contributing to the award of a higher degree (MD/PhD). Every year postgraduates are subject to an annual ARCP (annual review of professional competency) (116). The Annual Review of Competency Progression (ARCP) process is the means by which doctors in training are reviewed each year to ensure that they are offering safe, quality patient care, and to assess their progression against standards set down in the curriculum for their training programme (116). The ARCP reviews acquisition of competencies, health, behaviours, work placed based assessments and supervisor reports as well performance in necessary professional postgraduate examinations including the MRCGP AKT and CSA assessments which are critical for progression (116). Upon successful completion of GP Higher Specialist training, trainees are awarded a CCT in General Practice entering them onto the specialist register for General Practitioners (62) (86). The relevant literature relating to access, experience and outcomes from postgraduate training is discussed within subsequent sections of the literature review.

2.3 Defining Equalities

In 2014, the British Association of Physicians of Indian Origin (BAPIO) brought a judicial review that the RCGP had failed to fufill the public sector equality duty imposed on them by section 149 of the Equality Act 2010 such that the RCGP had discriminated directly or indirectly against South Asian and ethnic minority doctors in the assessment of the MRCGP CSA whereby it was highlighted that pass rates were as follows: White: 93.5%, South Asian: 76.4% and black 72.7%. The case was based upon BAPIO's interpretation of the Equality Act 2010 and the Public Sector Equality Duty and belief of breaches in these regards. Section 149 of the Equality Act 2010, states that a public authority must, in the exercise of its functions, have due regard to the need to: (a) eliminate discrimination, harassment, victimisation and any other conduct that is prohibited by or under this Act; (b) advance equality of opportunity between persons who share a relevant protected characteristic and persons who do not share it; (c) foster good relations between persons who share a relevant protected characteristic and persons who do not share it. In other words, the Equality Act 2010 stipulates that it is against the law to discriminate against someone because of: age, disability, gender reassignment, marriage and civil partnership, pregnancy and maternity, race, religion or belief and sex or sexual orientation (117). Furthermore, the public sector duty requires public bodies, when making strategic decisions such as deciding priorities and setting objectives, to consider how their decisions might help to reduce the inequalities associated with socio-economic disadvantage. The law stipulates that inequalities could include inequalities in education, health, housing, crime rates, or other matters associated with socio-economic disadvantage. Public Bodies are strictly defined in the Act and include the General Medical Council but not Higher Education Institutes or Royal Colleges. However, following a 2014 judicial review brought by BAPIO against the RCGP with the GMC as an interested party, the Royal College was confirmed to be a public authority and subject to s.149 of the Equality Act 2010 by a ruling of the High Court: *R. (on the application of Bapio Action Ltd) v Royal College of General Practitioners* [2014] EWHC 1416 (Admin).

Socioeconomic status and Deprivation

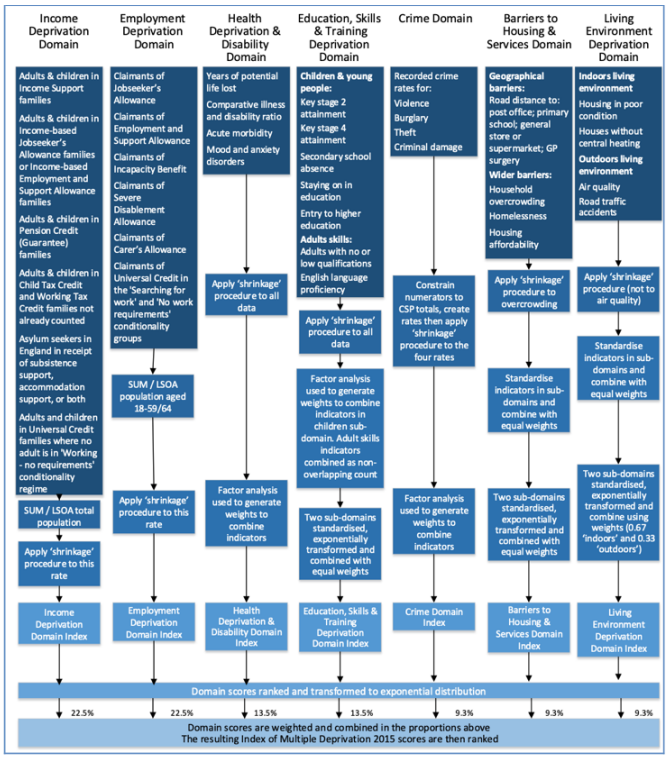
Interestingly, bodies which fall outside of the definition of public bodies are not obligated, within the law, to have due regard to socio-economic inequality when making strategic decisions about how to exercise functions. Despite HEIs not being regarded as public bodies, HEIs have shown altruistic commitment to narrowing inequalities, for example, by the implementation of widening participation schemes although more is undoubtedly needed. Given the aforementioned ruling, the RCGP is now regarded, along with the GMC, as a public body subject to public sector duty provisions,

meaning that the RCGP does have a legal duty to have “due regard” to socio-economic inequality when making strategic decisions about how to exercise functions including in relation to access, experience and outcomes from GPHST.

There are various measures of socioeconomic status which are referenced by the literature in medical education studies including: being a recipient free school meals, parental degree, school type, family on income support, POLAR (participation of local areas) (118) which measures the proportion of young people in a given area who participate in higher education and the Index of Multiple Deprivation (IMD) (119) derived from UK Census data. Where medical education studies have explored the role of deprivation, the main metric has been the overall IMD as opposed to its’ domains or more granular subdomains. For example, Ellis et al. 2022, reported a statistically significant difference in performance at the Membership of the Royal College of Surgeons (MRCS) examination as measured by the overall IMD (8). However, the overall IMD is not the most granular socioeconomic metric for exploring the effects of deprivation on examination performance, or indeed all other questions relating to access, experience and outcomes from GPHST, as for example indicators for the proportion of road traffic accidents and air quality which contribute to the outdoor LE subdomain and, indeed, the overall IMD do not provide relevant socioeconomic information and their weighting with other subdomains may mask effects of other pertinent socioeconomic factors.

The overall IMD incorporates seven domains of deprivation weighted as indicated: Crime (9.3%), Education (13.5%), Health and disability (13.5%), Income (22.5%), Employment (22.5%), Barriers to Housing and Services (BHS) (9.3%) and Living Environment (9.3%) (119). BHS, LE and Education sub-domains each have two sub-domains. BHS subdomains include (a) Geographical barriers, an indicator of proximity to local services, and (b) Wider BHS which includes an indicator for household overcrowding. LE sub-domains include (a) Indoor LE which has an indicator for housing quality and (b) Outdoor LE which has an indicator for air

Figure 1 summarises the domains, indicators and methods used to construct the Lower-layer Super Output Area level Indices of Deprivation 2019



pollution. Education sub-domains include: (a) Children and Younger People's education attainment (CYP) and (b) Adult Skills (119). Whilst, the IMD is the overall measure of relative deprivation for small areas in England (figure 1) incorporating intersectionality of seven deprivation domains (figure 1), understanding the effects of more granular forms of deprivation on access, experience and outcomes from GPHST is of value. Having recognised this gap in the literature, I approached UKMED and worked with the database to incorporate Office for National Statistics data relating to IMD domains and subdomains thus enabling investigation of the roles of specific deprivation forms on equity of access, experience and outcomes from GPHST.

On a point of critical appraisal, other measures of socio-economic status which are not relied upon in the medical education sector include TUNDRA (tracking underrepresentation by area) which is an enhanced area-based measure that uses individualised data and tacks individuals from Key Stage 4 to higher education (118) and the Townsend deprivation score which primarily focuses on car and home ownership (120). These two metrics are not used as measures of socioeconomic status in medical education research as the former is restricted to English state-funded mainstream schools and the latter is comprised of indicators which are not relevant.

Sex

Data recorded within medical education databases, including the GMC register and the UKMED database, is self-declared by the individual trainee. Within the UKMED database, sex is recorded as male or female. Scholars, through the works of: Tiffin et al. 2014 (121), James et al. 2006 (122). Lambe et al. 2012 (123), Lambe et al. 2016 (124) and Lievens et al. 2016 (125), have shown that males perform better than females on the cognitive components of the UCAT although the reverse has been noted for knowledge based assessments. Scholars have reported that applications for GPHST are more likely to be made by females although less is known about disparities in experience or outcomes during GPHST.

Age

Age, in UK medical education studies, is derived from an individual's date of birth. Studies have shown that there is generally no association between age at entry to medical school and eventual speciality career choice (126) although several scholars including Lambert et al. 2001 (126), Lane et al. 2021 (127) and Goldacre et al. 2007 (128) reported that graduates at entry to medical school are more likely than non-graduates to choose a career in General Practice. Of note, it is often assumed in published works in medical education that graduates are older than non-graduates and this

disaggregation is often used as a surrogate measure of age within published works and enables a proxy measure of age to be treated as a binary, discrete or categorical variable within an analysis. There is little published work around age comparisons with respect to experience, academic attainment, or outcomes from GPHST.

Ethnicity

The Government Statistical Service (GSS) has set out stringent standards for collecting, reporting, and using ethnicity data to ensure high value, quality, and trustworthiness (129). The GSS recommend that ethnicity data which is collected and used should be 'self-reported' unless the individual is unable to self-report in which case the data can be collected by a 'third party' or 'proxy'. The GSS position is that ethnicity data collected by someone else will generally be of lower quality than when someone reports their own ethnicity as it might not necessarily reflect the ethnicity the person themselves would respond with (129). Level 1 ethnicity is the higher-level ethnic grouping (e.g- Black or Black British) whereas Level 2 ethnicity is the more granular groupings (e.g-Caribbean, African or any other Black African). With regards to writing about ethnicity, the agreed convention is to use the term 'ethnic minorities' to refer to all ethnic groups except the white British group (130). Despite centralised UK Government guidance, scholars including Khunti et al. 2021 (131) report that the quality and completeness of ethnicity data is historically poor on account of a lack of understanding on the importance of the data, reluctance of staff to ask for data, fears over participant reactions and confusion about categorisation (131). The GSS advocates that data is disaggregated by protected characteristics including ethnicity (129). However, like many other fields, relatively few published works within medical education disaggregate data by ethnicity and so we generally thus far have a very modest understanding of equity in access, experience and outcomes from General Practice training by ethnicity.

Beyond General Practice, Lacobucci et al. 2020 found that doctors from ethnic minority backgrounds are generally less likely to be successful in accessing higher speciality training (132). Published works highlight the extent of the disparity across numerous specialities including: Public health (Bury et al. 2023 (5), Lacobucci 2022 (133)), Intensive Care (Tridente et al. 2022 (6)), Paediatrics (Kelly et al. 2021 (9)) and Surgery (El Boughdady et al. 2023 (134)). Decade long disparities in access to higher speciality training have also been reported worldwide in numerous specialities internationally including, for example: Paediatrics in the US and Australia (Chantiluke et al. 2022 (135)), Public Health in the US (Duffus et al. 2014 (136)), Physician training in the US (Smedley et al. 2001 (137)) and Surgery in Australasia (Villaneuva et al. 2021 (138)) and in the US ((Ellis et al. 2021 (139)). In the

US, the Flexner Report on Medical Education in 1910 (140), which posited that 'the country needs fewer and better doctors', appears to have created greater barriers for ethnic minority medical trainees (141). Studies have not yet formally explored disparities in access to GPHST in the UK.

Of UK medical graduates, 72% of ethnic minority foundation doctors applying for a specialty training programme are successful on their first attempt, compared to 81% of white doctors (142). Scholars have highlighted that even for those ethnic minority trainees who succeed in securing a place within UK higher speciality training, they appear to be at greater odds of poorer experience during higher speciality training including lower pass rates in postgraduate examinations (differential attainment) necessary for progression. The GMC has found that once in specialty training, UK-qualified white candidates have an average 75% pass rate in postgraduate exams (143) compared with 62.7% for UK-qualified ethnic minority candidates and 42.7% for non-European international medical graduates (142). Satisfactory progression within training is a critical component of trainee experience yet scholars have highlighted concerns about differential attainment in postgraduate examinations disadvantaging ethnic minority trainees in terms of examination success, progression and outcomes from training. It is interesting to note that UK Higher Education scholars including Shah et al. 2019 (142), Richardson et al. 2018 (144), Bhopal 2019 (145) report observed differences in academic attainment between White students and ethnic minority students earlier in the education pathway pertaining to pre-undergraduate and undergraduate education.

Whilst there is a growing body of literature discussing differential attainment, the term is often used loosely in relation to observed disparities in academic attainment in examinations by ethnicity, rather than a calculation of equity; educationalists have called for statistical approaches to measure and monitor the extent of equity in academic performance. The present thesis explores access, experience and outcomes from GPHST by ethnicity (both level 1 and level 2 ethnicity categorisations), whether there are observed variations in MRCGP AKT and CSA performance and the extent to which there is equity in academic attainment by ethnicity thus enabling more nuanced and detailed insights. In General Surgical training, observed variations in postgraduate examination performance have been reported even when other demographic and socioeconomic factors have been accounted for (8). Studies have not yet adopted the same longitudinal perspective to GPHST accounting for equalities lenses.

This thesis also, adds value to another gap in the literature; that is the exploration of longitudinal changes in academic performance among diverse groups across the continuum of education from pre-undergraduate to postgraduate education. Moreover, scholars have highlighted that ethnic

minority trainees are at greater odds of poorer outcomes including delayed progression, greater risk of performance management and higher referrals to the GMC although further work is needed to explore these areas by individual speciality area (146). Van Moppes et al. 2023 highlights that ethnic minority GP trainees are at risk for underperformance assessments (147).

Disability

Disability data available in the UKMED database disaggregates disability by visual impairment, cognitive impairment, auditory impairment, learning disability, manual dexterity, mental illness, mobility, speech or otherwise. The vast majority of declared disability relates to the category of learning disability. Ellis et al 2021 explored the impact of disabilities on performance on the intercollegiate Membership of the Royal College of Surgeons examination (MRCS) conducing that candidates with registered disabilities performed less well in examinations taken throughout school and medical school and had "significantly lower first-attempt Part A pass rates (46.3% compared to 59.8%, $p < 0.001$) but similar MRCS Part B pass rates ($p=0.339$) in comparison to candidates without a disability" (148). However, after adjusting for prior academic performance and sociodemographic predictors of success, logistic regression found that candidates with disabilities were as likely to pass MRCS at first attempt as their peers who achieved similar grades at high school and medical school "(odds ratio 1.04, 95% CI 0.66 to 1.62)" (148). Studies have not thus far explored the impact of declared disability on access, experience and outcomes in GPHST.

Religion

There is very limited literature, particularly in the UK, exploring whether religious beliefs have a bearing on access, experience or outcomes in Medicine generally. The UKMED database includes individual, self-declared religion with denominations of the six mainstream religious groups: Christian, Hindu, Sikh, Buddhist, Muslim, Jewish or 'No religion'. 'prefer not to say' or 'other'. US scholars including Frank et al. 1999 (149), Curlin et al. 2005 (150) and Neelman & King 1993 (151) suggest that GPs are more religious than physicians of other specialities although the work of Curlin et al. 2007 demonstrates that there is no evidence that physicians who are more religious disproportionately care for the underserved (152). Korup et al. 2019 undertook a meta-analysis of individual clinician data from seven countries which found that half of clinicians were influenced by their religious beliefs and that this was most pronounced in India, Indonesia and a European faith-based hospital (153). Gunn et al. 1996 published a US case study where there had been deemed to have been religious discrimination in the selection of medical students in 1996 though the inclusion of an assessment incorporating scenarios of abortion and sterilisation which are hugely contentious

and where clinicians have a right to conscious objection in practice (154). Scholars including Collier et al. 2021 (155) and Lal et al. 2020 (156) have highlighted the importance that spirituality and religion hold for trainees in medical and surgical specialities and its role in wellness and minimising burnout. Furthermore, personal accomplishment has been shown to be significantly higher in those who reported that their work was influenced by their religious or spiritual beliefs (156). There is an absence of published works detailing the extent to which religious beliefs have a bearing on access into GPHST, experience during GPHST and performance in the MRCGP CSA or MRCGP AKT or progression/outcomes from GPHST.

Sexual Orientation

The UKMED database includes self-declared sexual orientation with the following categories: heterosexual/straight, bisexual, lesbian/gay, 'other' or 'prefer not to say'. Scholars including Sorini et al. 2023 (157) and Danckers et al. 2024 (158) have called for further quantitative research to aid understanding of access, experience and outcomes from GPHST by sexual orientation citing perceived barriers and a paucity of literature with published data to inform interventions (157) (158). Published medical education studies have not thus far included sexual orientation data in modelling and it continues to be very challenging to grasp a true picture of sexual orientation among doctors and GPs, even with the rise of big databases such as UKMED, on account of very small numbers of lesbian, gay, bi or transexual doctors feeling comfortable to report their identity due to perceived prejudice and discrimination, as reported by Torjesen et al. 2022 (159) Schlick et al. 2021 (160) and Runswik et al. 2022 (161). We thus far have a very limited understanding of access, experience or outcomes from GPHST by sexual orientation.

Intersectionality

Intersectionality, coined by Kimberlé Crenshaw in 1989, is a qualitative framework developed in the late 20th century that identifies how overlapping systems of power marginalise individuals (162) (163). Crenshaw introduced the concept within antidiscrimination law, highlighting that social identities could not be understood in isolation and instead, various aspects of identity, such as race and gender, interact to create unique experiences of privilege and oppression, exemplified by "gendered racism" experienced by Black women (162) (163). Patricia Hill Collins expanded this framework into a "matrix of domination," emphasising that identities like race, class, gender, and sexuality intersect, shaping different experiences of privilege and oppression (164). Collins argued that social identities combine in complex ways, influencing how individuals navigate societal

structures. This perspective underscores the importance of understanding the bearing of equalities lenses solely and intersectionally on access into GPHST, experience during GPHST and performance in the MRCGP CSA or MRCGP AKT or progression/outcomes from GPHST. This is necessary to enable a full grasp of systemic inequalities and individual experiences.

Lugones et al. 1983 introduced the idea of "interlocking systems of oppression," highlighting that sexism, racism, and other forms of oppression are interconnected and must be considered together. Lugones also discussed the "coloniality of gender" where ongoing influences of eurocentrism emphasise that gender is an inseparable layer of oppression from other systems of race or colonialism and "world-travelling," emphasising how identities shift in different contexts, revealing layers of oppression (165). Furthermore, Annamma 2020, applied intersectionality to show how racial and gender expectations affect outcomes thus suggesting that institutions and individuals needed to do more to eliminate the multiple layers of inequity within education (166). However, with different perspectives decades later, Kimmel and Ferber et al. 2017 examined how different axes of privilege intersect. Kimmel and Ferber's work urges institutions to recognize their privileged positions and advocate for social justice through equitable processes and training outcomes (167). Nevertheless, Ervelles' 2011 argues that disability cannot be isolated from other forms of identity and marginalisation, highlighting the importance of intersectionality in understanding these experiences (168). Erevelles critiques ableism and its destructive impact, especially when combined with racism, sexism, and other forms of discrimination, and calls for a radical transformation of societal structures and attitudes towards disability which starts with accounting for disability within intersectional analyses exploring educational access, experience and outcomes (168). Annamma 2020 reinforces this perspective within education focusing on how ethnic minority disabled students are marginalised and examining how race and disability intersect to create and complicate inequities in education (166). Annamma advocates for an inclusive, anti-racist, and anti-ableist approach in education, emphasising that understanding and addressing educational inequities require considering both race and disability together (166). However, Puar 2007 critiques the standard use of intersectionality in contemporary feminist and queer theories, suggesting that it can sometimes reinforce the very categories it aims to deconstruct (169). Instead, Paur advocates for an assemblage approach, which she believes can better capture the dynamism and fluidity of identities and power relations (169). Paur's concept of "assemblage", borrowed from Gilles Deleuze and Félix Guattari, argues for a fluid, interconnected perspective that transcends and complicates traditional identity politics (169). Assemblages are not stable entities but contingent, shifting collections of elements that come together under certain conditions to form temporary alliances or identities which are, for

example, relevant for contemporary queer theory, postcolonial theory, critical race theory, and feminism (169).

Leslie McCall's 1990 work focuses on the methodological aspects of intersectionality, particularly "intracategorical complexity" (170). McCall emphasises that social categories are overlapping and mutually constitutive, not distinct and independent (170). This overlap can lead to "intersectional invisibility," where individuals at the intersection of multiple identities may be overlooked or marginalised (170). This concept highlights the unique, layered forms of discrimination and how social systems often fail to recognize and address them effectively. McCall underscores the importance of using disaggregated data and analytical approaches that can account for the complex interplay of various identities to better advocate for equity and justice (170).

Acker 2012 investigates how intersecting identities affect workplace experiences, such as career opportunities, wage gaps, and experiences of discrimination or harassment (171). She introduced the concept of "inequality regimes" to describe the interlocking practices and processes that perpetuate inequalities based on race, gender, and class in organisations (171). These regimes are maintained by organisational hierarchies, wage structures, informal practices, and patterns of segregation. Initially focused on gender, Acker expanded her framework to include other social categories like race and class, aligning with Kimberlé Crenshaw's concept of intersectionality, which highlights how various forms of oppression intersect and overlap in complex ways.

Hankivsky emphasises that social categories like race, gender, class, and sexual orientation are interconnected and shape individuals' experiences in complex ways (172). In her 2012 paper, "Intersectionality 101," she discusses the use of intersectionality as a research paradigm and makes key contributions highlighting the need for research and policy to consider how various intersecting social categories influence health outcomes including within General Practice, the cornerstone of health in communities and society (173). Policy researchers like Angelique Harris have used intersectionality to critique policy development, showing how policies can perpetuate or exacerbate inequalities if they ignore intersectional identities (174). This theoretical stance has influenced medical education, providing a basis for policy aims which both strive for equitable access, experience and outcomes from training as well as for future doctors to understand and respect diverse patient identities and experiences. Unequal distribution of inequalities embedded within society drives educational inequalities and inequalities in socioeconomic factors (175).

Big databases with longitudinal data including disaggregated metrics through the equalities lenses, provide a unique opportunity to explore access, experience and outcomes from GPHST among diverse groups. By considering intersectional factors, there are significant implications for policymakers to create more equitable health policies and programs, such as inclusive entry criteria for GPHST, equitable experience and outcomes ultimately improving doctor-patient relationships, patient satisfaction, and health outcomes.

Hondagneu-Sotelo 2000 (176) and Hondagneu-Sotelo 2003 (177) applied intersectionality to understand the complexities of immigrant experiences such as those faced by IMG doctors and trainees. These theoretical works are likely to underpin difficulties which scholars including Woolf et al. 2016 have reported from qualitative analyses as hindrances to GP trainees' learning and performance including: relationships with senior doctors, cultural differences, lack of trust from seniors, workplace-based assessment and recruitment vulnerable to bias and being more likely to face separation from family and support outside of work (28). Hondagneu-Sotelo argue that the intersection of ethnicity, gender, class, and legal status shapes the lived experiences of immigrants, influencing issues like wage disparity, social mobility, and cultural assimilation.

Critics argue that the complexity of intersectionality can lead to an overwhelming multiplication of identity categories, potentially creating a hierarchy of victimhood or diluting efforts towards systemic change. Bauer argued that intersectionality asserts that multiple social positions cannot be adequately understood by considering social positions independently (178) (179) (180). However, proponents contend that this complexity reflects the multifaceted nature of human experiences and social structures, leading to more inclusive and effective solutions for social justice issues (181). Intersectionality highlights the invisibility of certain individuals and groups within dominant narratives and power structures. It underscores that social movements and policies can marginalize those at intersections if they fail to consider intersecting identities. Thus, intersectionality is vital for social justice work, emphasising the need to combat all forms of discrimination simultaneously. Intersectionality captures the intricacy of lived experiences, fostering a nuanced understanding of social phenomena and inequality thus helping to address social issues by acknowledging the complexity of individual experiences and identities, making it essential for analysing and addressing systemic oppression and privilege. In fields such as GPHST, intersectionality considers demographics, protected characteristics, and pre-medical school admission deprivation, offering opportunities for detailed analysis of interacting social dimensions. Exploring intersectionality in educational research, through univariate and multivariate analyses, highlights its analytical versatility and offers a richer, more nuanced understanding of human experiences and systemic inequality. (182).

2.4 Access to GP Higher Specialist Training in the UK among Diverse Groups

General Practice, holding over 40% of specialty training posts in the UK, needs recruits representative of the UK's population. Equitable access to GPHST is compromised by earlier inequities in medical school and foundation training access, limiting the pool of eligible applicants. Much of the existing literature relating to access to GPHST does not take a diverse view through equalities lenses and focuses on: applicant motivation for applying to GPHST (Irish et al., 2011 (17); Watson et al., 2011 (18); Smith et al., 2015 (19)), demographic factors which reduce the odds of application to GPHST such as non-graduate entry, intercalation and above-median academic performance during medical school (Gale 2019 (20)), approaches for recruitment to GPHST (Patterson et al. 2000, Patterson et al. 2001, Patterson et al. 2005, Plint & Petterson et al. 2009) and the impacts of the public image of a GP on applications to GPHST (Alberti et al. 2017 (21), Barry et al. 2019 (22)). Scholars including Derbyshire et al. 2014 (23) have also explored the extent to which travel time to GP placements could become a barrier to applications for GPHST and the extent to which time spent in General practice placements or training affects application into GPHST, with Irish et al 2011 (17), Alberti et al. 2017 (21) and McManus et al 2020 (24) concluding that it does but Vaidya et al. 2019 (25) concluding it does not.

Experience of General Practice training prior to application

A systematic review of undergraduate medical education in UK GP settings from 1990 onwards, authored by Park et al. 2015, found that GP is as good, if not better, than hospital delivery of clinical skills on account of: a deeper understanding of the complex and often hierarchical relationships shaping possibilities for student and patient active participation in learning, a richer appreciation of a variety of perspectives about GP as a socio-cultural learning space and the potentially complex tensions which students contend between teaching environments (26). However, with no unified national General Practice curriculum, there are significant differences among eligible applicants' access to GP training during foundation training where a GP placement is not compulsory and during medical school where different medical schools allocate vastly different amounts of time in General Practice (25). The literature has identified insufficient numbers of medical students intending to pursue GP careers (183) and, in 2016, UK Parliament recommended that GP be taught in UK medical schools as a 'subject' in its own right in a way which is as professionally and intellectually rewarding as any other specialism (184). There is conflicting literature around the extent to which time spent in General Practice training is associated with entry into higher specialist General Practice training with Irish et al. 2011 (17) and Alberti et al. 2017 (21) reporting a statistically significant correlation and

Vaidya et al. 2019 (25) reporting no correlation. Irish et al. 2011, identified that applicants to GPHST are more likely to have undertaken a four month placement in general practice during foundation training than their counterparts and applicants to GPHST make their decision to specialise during the first two years after graduation (i.e during foundation training) (17). Furthermore, in a national study of UKFPO destination survey data, Alberti et al. 2017, reported a statistically significant correlation between the number of sessions of clinical (authentic) placements in GP and the percentage of its graduates who entered GPHST after foundation programme year 2 in both 2014 and 2015 based on the national UKFPO destination surveys (21). Alberti et al. 2017 suggest that an increased use of, and investment in, undergraduate GP placements would help to ensure that the UK meets its target of 50% of medical graduates entering general practice (21). However, using the same data, Vaidya et al. 2019, concluded that the number of weeks spent in GPHST did not predict the percentage of graduates entering into general practice higher speciality training directly after foundation training and that there is a far greater proportion of GPHST posts available in relation to the relative time spent in placements during medical school in comparison to other specialities (25). Vaidya et al. therefore concluded that curriculum adjustments designed to increase recruitment into GPHST need to focus on more than solely increasing the length of time going forward including by giving due consideration to the type of undergraduate general practice teaching on offer, e.g- clinical teaching and the incorporation of general practice training within foundation training (25). One of the challenges is that the length of time spent in speciality placements may not impact career choice preference in a linear way such that ten weeks may not be more influential than three and as, reported by Burford et al. 2017, negative experiences in a placement may be superseded by another experience in another placement at another date or other study, for example an intercalated degree (185).

Derbyshire et al. 2014 carried out a national survey of all UK medical schools with the aim of identifying the geographical distribution of undergraduate teaching practices and their distance from the host medical school (23). Derbyshire et al. 2014 found that teaching practices are widely distributed, with there being at least one teaching practice in 64% of all geographical postcodes (23). This geographical spread of undergraduate teaching practices comes at the price of distance: the median distance between a school and its teaching practices is 28 km, although the data are skewed by some metropolitan English schools that place students throughout the UK (the mean and maximum distances are 46km and 1421km respectively) (23). Derbyshire et al. 2014 reported that in England, Scotland, and Wales, 34% of teaching practices are inaccessible by public transport according to the study's definition, which was that either it was not possible to get to the practice by public transport or a journey time of > 1 hour 30 minutes (23). All 33 UK medical schools responded;

all 4392 teaching practices contributed to teaching, with a median (min-max) of 142 (17-385) practices per school. The median (min-max) distance between a school and a teaching practice was 28 km (0-1421 km), 41 (0:00-23:26) minutes' travel by car and 1 hour 12 (0:00-17:29) minutes' travel by public transport (23). All teaching practices were accessible by public transport in one school and 90-99% were in a further four schools; 24 schools had >20% of practices that were inaccessible by public transport (23). For individual practices, the most obvious implication is that geography need not be a bar to becoming a teaching practice (23); some medical schools can accommodate an enormous geographical distribution of placements. Notwithstanding these opportunities, practices need to be confident that they can provide a high-quality educational experience that is aligned with the curriculum of the medical school whose students they wish to take (23). Schools are already aware that their students face a considerable travel burden which could become another barrier to widening participation to General Practice as a long-term career choice (23). In addition to the well documented travel burden and socioeconomic difficulties for some students given on average 2300 miles for the typical student, Harding et al. 2015 collected data from 9 English medical schools to calculate the university costs of running their general practice programmes and estimated central programme management costs of around £5000 per student year (186). This is due to the cost of administrative support for general practice programmes as medical schools maintain direct relationships with up to 385 practices, as opposed to perhaps a dozen teaching trusts (186). Administrative support includes: a) recruitment and training of suitable practices and GPs, b) identifying practice/teacher availability and allocating students to practices, c) quality control of placements, d) managing complaints and causes for concern, e) payment and career development of clinicians who supervise clinical teaching (186). There are also additional costs for GP practices including taking clinicians out of clinical service to teach and estate costs involved in providing space and facilities to teach (186).

Given that it is likely that if a graduate learns in an underserved area, they are more likely to choose to work in an underserved area, Derbyshire et al. 2014 recommended that undergraduate medical schools may need to manage the aforementioned burden by mitigating against excluding socioeconomically disadvantaged students from pursuing a long term career in GP and applying to GPHST by considering financial support for travel or peripheral accommodation for distant General Practice placements (23). Learning within deprived communities, would perhaps support later returning to work in these communities at a later stage. Crompton et al. 2015 established the Difficult and Deprived Areas Programme (DDAP) in the geographical area of Teeside which places fourth year students in general practice and community settings in post-industrial, deprived areas for 14 weeks, allowing students to learn about psychosocial determinants of health, health-seeking

behaviours in deprived areas and pursue community interests whilst gaining an excellent clinical grounding with the aim of giving medical students a supported experience as a member of the team working in a deprived setting (183). However, evaluation data has not been published to show whether this intervention has equitably increased access to GPHST and practice. Some United States of America evidence literature suggests that ethnic minority doctors are more likely to work in underserved communities with patients of the same ethnic background; although anecdotal evidence suggests the same pattern of in the UK, formal studies are ongoing (187). Devine et al. 2020 published a national Analysis of Teaching of Medical Schools (AToMS) survey which included over 47,000 timetabled teaching events in 25 UK medical schools (standard entry medicine 5 year course) and reported that a typical UK medical student receives 3960 timetabled hours of teaching during their 5-year course although medical schools differed in duration, format, and content of teaching. Two main factors underlay most of the variation between schools, Traditional vs PBL teaching and Structured vs Unstructured teaching (188). A curriculum map comparing medical schools was constructed using those factors and PBL schools differed on several measures, having more PBL teaching time, fewer lectures, more GP teaching, less surgery, less formal teaching of basic science, and more sessions with unspecified content (188). A subsequent national MedDifs study led by McManus et al. 2020 found that undergraduate schools that taught more GP did have more graduates entering GPHST, but those graduates performed less well in MRCGP examinations, the negative correlation resulting from numbers of GP trainees and exam outcomes being affected by both non-traditional teaching and greater historical production of GPs (24).

Applicant motivations for applying to General Practice

There has been much research around applicant motivations for apply to General Practice. Irish et al. 2011 cited the three top reasons for choosing a career in general practice as: variety, continuity of care and work-life balance (17). Watson et al. 2011 reported that the most important reason for both women (76.6%) and men (63.2%) choosing GP as a career in the UK is compatibility with family life (18). Other reasons given by Watson et al. were: 'challenging medically diverse discipline' (women 59.8%, men 61.8%, P = 0.350), 'the one-to-one care general practice offers' (women 40.0%, men 41.2%, P = 0.570), 'holistic approach' (women 41.4%, men 30.1%, P<0.001), 'autonomy and independence' (women 18.0%, men 34.8%, P<0.001), 'communication' (women 20.6%, men 12.2%, P<0.001), 'negative experiences in hospital' (women 12.8%, men 9.8%, P= 0.036), and 'good salary' (women 7.8%, men 14.9%, P<0.001) (18). A quantitative study (Smith et al. 2015) of 15,765 UK trained doctors who graduated between 1999 and 2012 were asked whether each of 15 factors had a great deal of influence on their career choice, a little influence or no influence on it (19). Of

note, intending GPs rated: (a) 'working hours and conditions' (odds ratio 11.1) and 'domestic circumstances' (odds ratio 6.0) as more important than intending surgical specialty doctors and (b) the 'Availability of career posts' as more important than doctors intending to work in the medical specialties, surgical specialties or other hospital specialties (19). Intending specialists, other than GPs, rated 'A particular teacher or department' as more important in influencing their specialty choice than intending GPs (odd ratios ranged from 2.2 to 4.1) (19). The findings echoed other research which found that intending GPs choose general practice for its variety, continuity of care and work-life balance (189) or for its 'variety and time for own family' (19). The authors called upon further research to focus, in greater depth, on the differing motivations of ethnic minority and White doctors (19).

Gale et al. 2017 published a longitudinal study drawing upon UKMED data to investigate which demographic and educational factors are associated with junior doctors' decisions to apply for GP training for all doctors who entered UK medical schools in the 2007/2008 academic year and who made first-time specialty training applications in 2015 (20). Data from the UKMED extract for this study included sex, ethnicity, school type, place of secondary education, IMD Quintile, UCAT z score, parental occupation, graduate entry, medical school, EPM, foundation school and ARCP satisfactory progression (20). Four multivariate logistic regression models were developed: 1) All entrants to medical school who applied to GPHST, 2) Non-graduate entrants to medical school who applied only for GPHST, 3) All entrants to medical school who applied solely to GPHST, 4) Non-graduate entrants who applied solely to GPHST (20). Statistically significant independent predictors for each variable are outlined below:

Model 1- All medical school entrants who applied to GPHST with other specialities
Being from a BAME background, UK secondary educated and progressing satisfactorily at ARCP were associated with higher odds of having applied to GPHST, while being male, intercalating during medical school or being placed in the top two EPM quartiles were associated with lower odds (20).

Model 2- Non graduate entrants only who applied to GPHST with other specialities
Being from a BAME background was associated with higher odds of having applied to GP training, while being male, coming from an area of low deprivation, having a high UCAT score, intercalating during medical school or being placed in the top two EPM quartiles were associated with lower odds. The odds varied significantly among both medical schools and foundation schools (20).

Model 3- All medical school entrants who applied solely to GPHST

In addition to variation between medical and foundation schools, being UK secondary educated was associated with higher odds of having applied to GP training, while being male, coming from the highest social classes (NS-SEC4/5), being on a graduate entry programme at medical school, or intercalating were associated with lower odds of application solely to GP training (20).

Model 4- Non graduate entrants only who applied solely to GPHST

In addition to variation between medical and foundation schools, being from a BAME background was associated with higher odds of having applied to GP training, while being male, independent school educated, having a high UKCAT score or intercalating during medical school were associated with lower odds of application solely to GP training (20).

In general, the odds of applying to GPHST were increased with particular demographic factors (being female, non-white or secondary educated in the UK) whilst particular educational factors reduced the odds of application (non-graduate entry, intercalation and above-median academic performance during medical school). After adjusting for these factors, both the medical school and the foundation school attended were independently associated with the odds of applying to GPHST (20). Gale et al. 2017 recommended further research to confirm these differences in application cohorts other than 2015 and, if a trend is established, then to understand the reasons why these differences may exist to support the development of strategies to improve recruitment of GP trainees and inform policies to widen participation in medicine and improve recruitment of junior doctors to GP training posts in order to address service need (20). Conversely, scholars including Bauer et al. 2021 (190) and Willig 2023 (191) have argued that with large data set (over a longer time period for example) with non-linear relationships and where one is seeking to understand intersectional factors in the context of subjects' decision making (e.g- in the context of applications for GPHST), decision tree analyses would be a more promising analytical approach for exploring intersectionality in the context of predicting application patterns to GPHST in comparison than the logistic regression approach adopted by Gale et al. 2017. The main difference between logistic regression and decision trees is that logistic regression models the relationship between the predictor variables and the outcome variable as a linear function, while decision trees create a hierarchical tree structure to model the relationships between the variables. Scholars have yet to apply decision tree analyses to identify predictors of sole and direct applications to GPHST, accounting for intersectional, longitudinal demographic and educational variables.

Critically, Gale et al. did not disaggregate ethnic minority groups leaving a gap in the literature as it is established that ethnic minorities covers a large range of ethnic groups, each with potentially different access to GPHST. It is also pertinent to build on the works of Gale et al. 2017 through exploration whether other inequalities lenses such as religious beliefs, sexual orientation, disability, free school meals, income support, parental degree solely and intersectionally amount to differing odds in GPHST applications. Moreover, although Gale et al. 2017 included consideration of some pre-undergraduate demographic and education factors, they did not include UCAS tariff or IMD domain and sub-domain data and whilst there was some consideration of the undergraduate medical school attended, there was no consideration of academic performance during medical school and whilst there was consideration of the postgraduate foundation school and ARCP progression, there was no consideration of the speciality rotations undertaken (20).

Other longitudinal studies have explored access to GPHST in relation to other speciality training programmes. These studies have focused on the extent to which:

(a) Pre-undergraduate sociodemographic factors, undergraduate course type and postgraduate region of foundation training are predictors of the length of time between foundation training and speciality training programmes

Cleland et al. 2019 published a longitudinal UKMED study, of UK home doctors who graduated between 2010 and 2015 and completed the Foundation Programme between 2012 and 2017, investigated the extent to which UK home graduates' socioeconomic status impact on the length of time between completion of foundation training and entry into all speciality training programmes including General Practice. Multivariable regression analyses including sex, age, ethnicity (ethnic minorities v non-ethnic minorities), parent education, medical programme, high school type, foundation school region) were used to predict the odds of taking time out of training based on various sociodemographic factors (192). The study found that doctors undertaking General Practice were not likely to take a break in the training pathway instead being more likely to enter GPHST immediately following foundation training (192). In fact, the proportion of trainees who took time out of the training pathway was lower in those whose preference was in General Practice (28.6%) and pathology specialties (35.7%) (192).

(b) Pre-undergraduate socioeconomic factors are predictors of accepted offers into speciality training, reporting higher odds of applying to GPHST among families where no parent was educated to degree level and mature students

Kumwenda et al. 2019 published a UK wide longitudinal cohort study (n=6065) aiming to identify the relationship between socioeconomic background, academic performance and accepted offers into speciality training, including General Practice, using UKMED data relating to doctors who accepted offers to a speciality training post after completing F2 between 2012-2014 (108). X^2 tests were used to examine the relationships between sociodemographic characteristics, academic ability and the dependent variable, specialty choice. Multiple data imputation was used to address the issue of missing data. Multinomial regression was employed to test the independent variables in predicting the likelihood of choosing a given specialty. Participants pursuing careers in more competitive specialties had significantly higher academic scores than colleagues pursuing less competitive ones. After controlling for the presence of multiple factors (sex, age, graduate on entry, high school type, parental occupation, free school meals, income support, parental degree, POLAR, ethnicity, UK domicile, UK place of primary medical qualification, programme type, foundation school region) trainees who came from families where no parent was educated to a degree level had statistically significant lower odds of choosing careers in medical specialties relative to General Practice. Students who entered medical school as school leavers, compared with mature students, were more likely to choose surgical specialties over general practice. The data indicate a direct association between trainees' sociodemographic characteristics, academic ability and career choices. The findings can be used by medical school, training boards and workforce planners to inform recruitment and retention strategies (108).

(c) Women were more likely to apply for, be offered and accept an offer for GPHST

Woolf et al. 2019 published a longitudinal study aiming to explore sex differences in 2015 speciality training recruitment in several specialities including General Practice (application, offer and acceptance), among UK medical graduates who had entered a UK medical school in 2007-2008 (193). Woolf et al. 2019 found that sex segregation between medical specialities is due to differential application (193). With respect to GPHST, Woolf et al. 2015 found that women were 1.5x more likely to apply for GPHST, 1.4x more likely to be offered a GPHST national training number and 1.3x more likely to accept an offer of a GPHST national training number (193). After adjusting for age, socioeconomic status (parental SEC, free school meals, school type, POLAR3),

ethnicity (ethnic minority v white), pre-medical school attainment (HESA tariff points, UKCAT score, GAMSAT score), graduate status, pre-medical school country of domicile, medical school attended, Foundation Programme application scores (EPM, SJT, degree points, publication points) and medical school fitness to practice declaration, women were 1.5x more likely to apply for GPHST, 1.2x more likely to be offered a GPHST national training number and 1.4x more likely to accept an offer of a GPHST national training number (193).

Whilst these studies were designed to draw comparisons between GPHST and other specialities, they provide helpful context but leave gaps in the literature particularly in relation to access to GPHST through other equalities lenses including by IMD domain and subdomains, religion, sexual orientation, ethnicity, age, disability etc... Studies have not yet developed intersectional decision tree models that can captures and analyse the complex, multi-layered effects of different intersecting social categories, such as race, sex, and disability, on outcomes. Bauer et al. 2021 reported that decision tree methods were more promising for investigating intersectionality across a large number of intersections in comparison with regression which was the most frequently used in the literature (190).

Public image of the role of a GP

Negative comments towards General Practice as a career have a potential impact on poor recruitment rates to GPHST deterring a demographic of talented eligible applicants (194) (22). A thematic analysis, published in the British Journal of General Practitioners, of newspaper articles mentioning GPs or general practice (n=403) from late October 2016 to early October 2017 along with a sample of articles on hospital medicine (n=100) identified that GPs were often portrayed as responsible for a UK general practice in crisis which was rapidly eroding through privatisation and fragmentation, with low morale and high burnout, and leaving gaps in patient care (22) whilst hospital specialties were also illustrated as under pressure, but this crisis was depicted as being the fault of the government. GP leaders interviewed in the press were usually defending their specialty; hospital doctors were usually sharing their expertise' (22). The authors recommended using the media as a force for positive influence with regards to changing perceptions of GPs and recruiting more inclusively. Alberti et al. 2017 undertook a qualitative study of foundation doctors and GP trainees within one HEE region and reported the existence of negative comments towards General Practitioners within clinical settings which are having a potential impact on poor recruitment rates to GP training (194). Alberti et al. opined that additional time spent in GP as undergraduates and

postgraduates and positive role models could particularly benefit recruitment and that any undermining of GP as a career choice should be approached with a zero-tolerance policy (194).

Recruitment for GPHST

Studies led by Patterson et al. 2000 (195), Patterson et al. 2001 (196), Patterson et al. 2005 (197) and Plint & Patterson et al. 2009 (198) have proposed approaches to recruitment for GHST but do not consider the issues of equity, diversity and inclusivity or how to manage unconscious bias within the recruitment process. Patterson et al. 2000 proposed a competency based recruitment model for GPHST based upon three studies conducted in the Midlands to define GP competencies: including (1) critical incidents focus groups with GPs (n=35), (2) behavioural coding of GP-patient consultations (n=33), and (3) critical incidents interviews with patients (n=21) (195). Data collected provided strong evidence for a competency model comprising 11 categories with six of these which the authors felt could be targeted at the selection stage (empathy, sensitivity, communication skills, clinical expertise, problem solving, professional integrity, coping with pressure) and the remaining five more appropriate for training (e.g- legal and ethical issues) (195). It is important to note that the authors did not provide a demographic breakdown of their participants and so it is not possible to draw conclusions about equity of access to GPHST. The proposed competency based recruitment model of Patterson et al. 2000 involved: 1) an application form requesting biographical information, six structured competency questions (experience relating to each competency) and a personal statement giving the candidate an opportunity to outline commitment to a career in GP, 2) two referees' reports providing performance ratings based on each of the six competencies , 3) assessment centre comprising a series of work related simulation exercises where the behaviour of candidates is assessed on the six competencies (195). Patterson et al. 2005 validated the aforementioned model by asking whether performance at the assessment centre predicts performance in a job and whether doctors recruited through this process perform better in post than those recruited through a traditional selection process of application form and panel interview (196). For trainees recruited via both methods, Patterson et al. 2005, used supervisor ratings of trainee job performance three months into their work using a 48 item inventory consisting of behavioural indicators associated with each of the six competencies (196). This inventory showed good internal reliability (Cronbach's α 0.83) (196). Patterson et al. 2005 found that performance ratings of targeted competencies at the assessment centre predicted trainer ratings of performance in the job and those trainees recruited through the new competency-based process performed significantly better in the job than those recruited through traditional national recruitment

processes (196). In the study, no regard is given to disaggregating recruitment performance by protected characteristic such as deprivation, sex, ethnicity or disability and so we do not know whether the process contributes equitable access to GP training from either of the selection processes. A predictive validity study in South Yorkshire and East Midlands region (doctors; n=167 and GP trainers; n=20) found that those trainees recruited through the new competency-based process performed significantly better in the job than those recruited through traditional national recruitment process (197). Again, predictive validity appears to have been considered from the lens of Roberson and Smith 2001 (199) with no consideration given to equity of access through equalities lenses including for example: deprivation, disability, ethnicity or sex. Plint & Petterson et al. 2009 explored critical success factors for designing selection processes into postgraduate speciality training within General Practice seeking to apply this to other specialisms: 1) corporate commitment to national process, 2) legitimate authority and locus of control, 3) process of incremental convergence, rather than imposition, 4) development and adoption of validated selection method, 5) representative infrastructure operating the process, 6) electronic recruitment solution only possible when selection process established. Interestingly, a recruitment process which leads to a workforce that is diverse and representative of the workforce which it serves was not considered in the study (198). Furthermore, Plint & Petterson et al. 2009 cite 3 future challenges of the GP recruitment process: 1) Long term validation studies of selection process, 2) evolution of selection methods, 3) utility analysis in managed NHS economy. Critically, again, attracting a diverse GP workforce which is representative of the population which It serves and ensuring geographical service equity particularly in areas of high deprivation was not considered, not included as a success factor nor a future challenge (198).

In conclusion, central research questions emerge from the literature relating to access to GPHST solely and intersectionally by age, sex, deprivation, ethnicity, disability, sexual orientation and religion with respect to: a) trends in applications between 2013-2020, b) sole applications to GPHST comparative to those made in combination with other specialties, c) direct and non-direct applications to GPHST, d) Successful offer of a GPHST national training number. Further quantitative research is needed to address these questions with implications for ensuring a GP workforce that is representative of the population it serves.

2.5 **Experience during GP Higher Specialist Training:**

The NHS Next Stage Review led by Lord Ara Darzi highlighted the need for more care to be carried out within the community and a pressing need for sound training within GPHST and beyond to support this (200). By ensuring that the education and training provided during GPHST is fit for purpose, newly-qualified GPs will be well equipped to serve the needs of the population in an increasingly challenging workplace (201). RCGP's curricula is the largest of any medical royal college but, at 3 years, GPHST is the shortest training programme of any speciality (202). During GPHST, trainees undergo summative assessment through the MRCGP AKT and CSA to enable being granted a Certificate of Completion of Training (CCT). The literature has highlighted observed variations in academic performance in the MRCGP AKT and CSA between different groups of doctors, termed differential attainment, using odds ratios and pass rates. Odds ratios, as used by scholars including Ellis 2020 (203), Ellis 2022 (8), Siriwardena 2023 (30) to compare the odds of success versus failure between aggregated ethnic minority trainees and White trainees but are limited in their ability to compare more than two groups simultaneously, can be skewed by small group sizes, and do not measure equity. BAPIO pointed to MRCGP CSA pass rates showing 93.5% for White candidates, 76.4% for South Asian, and 72.7% for Black candidates, arguing these variations reflect differential attainment. However, pass rates only indicate the proportion of students meeting a minimum standard without showing score distributions or assessing the equity of these variations. Supporting this, the High Court ruled that "the statistical differences which exist do not of themselves establish direct discrimination" but rather "all that they do, is to demonstrate that there is a difference of outcome". The real question is to what extent any observed variations or observed differences of outcome are equitable. This section will discuss and critically appraise the literature relating to the extent to which there is equity of experience during GPHST, equity in MRCGP AKT and CSA examination performance and approaches for calculating and monitoring inequity in attainment.

Equity of training experience during General Practice Higher Specialist Training

Equity of training experience during GPHST sounds straightforward at face value but each year, the annual NTS shows significant variation in trainee experience by placement (204). Despite a single set of national training standards (201), studies including MacVicar et al. 2015 have demonstrated that variations in trainee experience are likely to be accounted for by the diverse geographical needs of the population, for example, in practices within deprived areas where trainees have unique learning needs including: (a) promoting and maintaining therapeutic optimism, (b) engaging and tackling health literacy, (c) applying evidence-based medicine in the context of tackling multi-morbidity, (d)

prevention and (e)tackling health inequalities (27). It follows that training experience ultimately impacts on performance in the summative MRCGP examinations. Research led by Woolf et al., 2016 (28) and Warwick et al., 2014 (29) highlights that IMG trainees face additional barriers including biases and lack of support which adversely impacts their training experiences and performance in associated high stakes examinations including MRCGP AKT and CSA.

Woolf et al. 2016 carried out a qualitative study using semi-structured focus groups and interviews among 137 participants (96 trainees, 41 trainers) which aimed to explore trainee doctors' experiences of postgraduate training and perceptions of fairness in relation to ethnicity and country of primary medical qualification. Participants were purposely sampled from a framework comprising: doctors from all stages of training in GP, medicine, obstetrics, gynaecology, psychiatry radiology, surgery or foundation, in 4 geographical areas, from white and black and minority ethnic backgrounds who qualified in the UK and abroad (28). Most trainees described difficult experiences, but ethnic minority UK graduates and IMGs described additional difficulties that hindered their learning and performance including within royal college membership examinations such as the MRCGP AKT and CSA including: relationships with senior doctors, cultural differences, lack of trust from seniors, workplace-based assessment, recruitment vulnerable to bias and being more likely to face separation from family and support outside of work (28). Perceived causes of lower attainment within royal college membership examinations such as the MRCGP AKT and CSA included: relationships with senior doctors, lack of trust, bias, belonging and fitting in, relationships with peers, hidden curriculum: the culture of medicine, fairness of assessments and recruitment, impact of work on well-being, work life balance and fear of living up to negative expectations (28). Woolf et al. 2016 recommended non-stigmatising interventions which should focus on trainee–trainer relationships at work and organisational changes to improve trainees' ability to seek social support outside work (28). Although this study included a large and diverse sample, comprising trainees from white and black and minority ethnic backgrounds, UK and international graduates, across six medical specialities, four geographical areas in England and Wales, and all training grades as well as trainers, programme directors and postgraduate dean, there was a low recruitment rate from some specialities such as radiology and the timing took place during the junior doctor contract dispute which may have led to trainees vocalising greater discontent with their training than usual, although the findings did not suggest doctors from dissimilar backgrounds perceived the new contract differently (28).

The findings of Woolf et al. 2016 are similar to Warwick et al. 2014 which presented the findings of 2 focus groups, each with six current IMG GP trainees, finding that IMGs feel induction should be an

on-going, iterative process based on educational, rather than managerial principles and having this at the earliest possible opportunity in the GP placement would benefit IMG GP trainees, most of whom have little or no understanding of UK GP when they commence their training (28) (29). In the wake of COVID19, GP educators and trainees have identified novel ways to facilitate remote learning, clinical supervision, assessment and support with wellbeing in GP although there has been little formal evaluation of these or the impacts on training experience and performance in the MRCHP AKT and CSA (205).

Whilst the literature has, through qualitative works, explored the nature of barriers faced by IMG trainees, more work is needed to understand the variation of training experiences faced by UK graduates through each of the equalities lenses (deprivation, sex, ethnicity (level 1 and level 2), age, religion, sexual orientation). It is also necessary to search for deeper understanding of the extent to which there are observed variations in UK graduates': performance in the MRCGP AKT and CSA through the equalities lenses, longitudinal performance across key high stakes assessments from pre-undergraduate to postgraduate medical education and predictors of performance in the MRCGP AKT and CSA based upon longitudinal metrics from across pre-undergraduate education, undergraduate education and postgraduate education.

Longitudinal performance and performance in high stakes examinations necessary for progression during GPHST: MRCGP AKT and MRCGP CSA

The MRCP AKT and MRCGP CSA are two key high stakes licensing examinations during GPHST which are necessary for progression. Munro et al. 2009 undertook an examination of the reliability of the MRCGP AKT written examination by reviewing examination results from 1998 to 2003 finding a Cronbach's alpha coefficient indicative of high reliability (206). Munro et al. 2017 reported that the MRCGP CSA fulfils criteria relating to feasibility, reliability and validity (207). However, both of these studies did not consider equalities lenses. Woolf et al. 2016 called for more work to be done to examine the fairness of assessments including MRCGP AKT and CSA which will be discussed later in this chapter (28).

Hope et al. (2021) modelled changes in attainment gaps during medical school, by comparing z-scores in first year and fourth year medical school examinations and testing for statistical significance using Welch's t-test, in four Scottish medical schools for four student demographic categories, finding a tendency for attainment gaps to grow during undergraduate medical education, suggesting that educational factors at medical schools may contribute to differential attainment (DA)

(208). Hope et al. (2021) reported that the attainment gap grew significantly during medical school for white versus non-white students (t(449.39)=7.37, p=0.001, d=0.49 and 95% CI 0.34 to 0.58), for internationally domiciled versus Scottish-domiciled students (t(205.8)= -7, p=0.01, d=0.61 and 95% CI -0.75 to -0.42) and for male versus female students (t(1336.68)=3.54, p=0.01, d=0.19 and 95% CI 0.08 to 0.27) (208). International, non-white and male students received higher marks than their comparison group at the start of medical school but lower marks by final assessment (208). Published works have not thus far explored changes in attainment gaps longitudinally for trainees in GPHST between pre-undergraduate and undergraduate or between undergraduate and postgraduate education [UCAS tariff (pre-undergraduate) to EPM (undergraduate) and EPM (undergraduate) to MRCGP AKT (postgraduate)]. Importantly, this could reveal information about whether observed variations in performance at MRCGP pre-exist in undergraduate and pre-undergraduate assessments, which would suggest that these variations were already present earlier in their educational journey, rather than solely emerging during postgraduate training. Such insights could indicate that disparities in educational outcomes are rooted in factors present before and during undergraduate education, thereby informing targeted interventions at earlier stages to address these gaps.

Kumwenda et al. 2017 published a longitudinal retrospective cohort study with the use of logistic regression to examine predictors of the EPM decile among doctors who graduated from 33 UK medical schools between 2012 and 2013. Variables within the modelling included candidates' demographics as well as their scores from pre-undergraduate education UCAS tariff, UCAT and GAMSAT (where relevant) (209). Kumwenda et al. 2017 reported that students from independent and state schools enter with similar pre-entry grades but once in medical school, students from state-funded schools are likely to outperform students from independent schools (209). Students from independent schools had higher mean UCAT scores (M=2535.1, SD=209.6) than students from state-funded schools (M=2506.1, SD=224.0, p<0.001) (209). Similarly, students from independent schools came into medical school with higher mean GAMSAT scores (M=63.9, SD=6.9) than students from state-funded schools (M=60.8, SD=7.1, p<0.001) (209). However, the modelling showed that students from state-funded schools were almost twice as likely (OR=2.01, 95% CI 1.49 to 2.73) to finish in the highest rank of the EPM ranking than those who attended independent schools (209). This evidence calls for further work to evaluate changes in attainment gaps longitudinally across key high stakes examinations such as academic performance during pre-undergraduate education (UCAS tariff) and academic performance in undergraduate education (EPM), academic performance in

undergraduate medical education and undergraduate performance (EPM) in postgraduate medical education (MRCGP AKT).

Published studies examining performance in the MRCGP AKT and CSA have thus far largely relied upon data from the GPNRO database which includes data from IMG doctors and is limited in metrics relating to demographic data and longitudinal data such as ONS household deprivation metrics including the overall IMD, IMD domains, subdomains and previous academic performance, for example, UCAS tariff and EPM, thus limiting the conclusions which can be drawn in the literature from the predictive analysis of MRCGP AKT and CSA performance. Studies have thus far found that performance in the MRCGP AKT and MRCGP CSA can be predicted by performance in assessments included within the application process for GPHST: namely the Multi-Specialty Recruitment Assessment (MSRA) (Siriwardena et al. 2023 (30), Tiffin et al. 2024 (210)) and GPHST Situational Judgement Test (GPHST SJT) (Patterson et al. 2018 (1)) and Clinical-problem solving test CPHST (Patterson et al. 2018 (1)). Siriwardena et al. 2023 used GPNRO data (sex, ethnicity, disability, qualification country and GPHST selection data from the GPNRO database) to study 3,429 doctors applying to GPHST in 2016 using GPNRO data, including demographic and selection data, to identify predictors of MRCGP AKT and CSA among different groups of doctors including IMG doctors (30). The multivariate logistic regression models developed by Siriwardena et al. 2023 revealed that MSRA scores were highly predictive of performance in MRCGP AKT and CSA (30). Siriwardena et al. 2023 found that ethnic minority doctors (of UK graduate and IMGs) performed significantly better than White British doctors in the MRCGP AKT (OR=2.05; 95% CI=1.03 to 4.10, p<0.042), but no significant differences were found in the CSA (30). Males performed worse than females in the MRCGP CSA (OR=0.58; 95% CI=0.39 to 0.86, p<0.007) (30). International medical graduates (IMGs) performed less well than UK graduates in the MRCGP CSA (OR=0.27, 95% CI=0.16 to 0.45, p<0.001) but not the AKT (30). Candidates with declared disabilities, mostly specific learning difficulties, performed significantly worse in the MRCGP CSA (OR=0.38: 95% CI=0.24 to 0.61) but not the AKT (p=0.687) (30). The modelling is however limited by the aforementioned limitations of the GPNRO data set. Furthermore, Tiffin et al. 2024 also reported that MSRA scores were predictive of subsequent performance in the CSA, thus recommending a face to face selection process for those with low MSRA scores (210).

Moreover, Patterson et al. 2018, also using GPNRO data, aimed to explore predictors of performance in the MRCGP CSA (n=1874), among IMGs who applied for GPHST between 2008–2012 through univariate and multivariate regression models as well as structural equation modelling (1). Univariable regression analyses found the following characteristics were predictive of MRCGP CSA pass at first time: female, younger age and better performance in the GPHST SJT, CPST, IELTS, and MRCGP AKT. Multivariate analysis identified: last SJT performance, IELTS overall score, and last CPST scores as significant predictors, though the study does not account for the effects of user-experience from resitting the examinations as the last score may have occurred after 5 attempts which would not be a fair comparison with another candidate's last score after their first attempt. On a point of critical appraisal it would have been best if the first-sit scores had been used. Additionally, on another point of critical appraisal demographics were not included in the multivariate analyses despite the fact that men, on average significantly score lower on IELTS overall scores (mean score 7.38 v 7.47; p<.0001) and there was a slight, non-statistically significant trend for women to score more highly in the CPST (mean score 238.26 V 236.48; p=0.1) (1). Path analyses and SEM, used to explore causality, revealed that the GPHST SJT score (standardised beta, 0.26) was a stronger predictor of MRCGP CSA performance than the CPST score (standardised beta, 0.17), with English language fluency influencing CSA scores which was mainly mediated through GPHST SJT performance (1). The study concluded that GPHST SJT performance is a strong predictor of performance in the MRCGP CSA for international medical graduates (1). There were no relevant conclusions for UK graduates. It should also be noted that both studies models do not account for age, socioeconomic status, disaggregated ethnic minority groups (level 1 and level 2 ethnicity), sexual orientation, religion nor previous longitudinal academic performance from pre-undergraduate and undergraduate education. Looking at IMG performance more closely, McManus et al. (2014) conducted a study to investigate the correlation between the performance of IMGs on the GMC's Professional and Linguistic Assessments Board (PLAB) examinations and their performance on the MRCGP AKT and CSA (211). The study analysed data from 3,160 PLAB1 graduates attempting the MRCGP AKT for the first time between 2007 and 2012 and 1,411 PLAB2 graduates attempting the MRCGP CSA for the first time between 2010 and 2012, comparing their

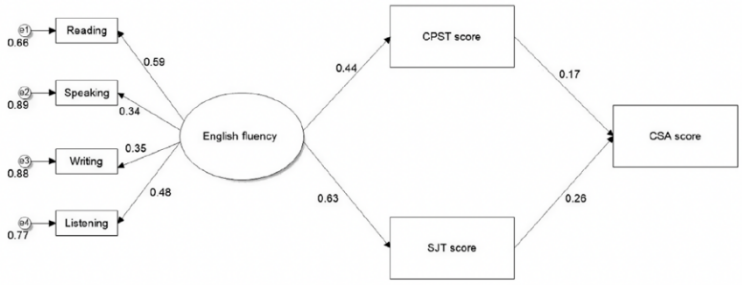


Figure 2- Proposed model examining the relationships among language fluency, performance on the selection assessments and subsequent clinical skills assessment performance. CPST = clinical problem-solving test; CSA = clinical skills assessment; SJT = situational judgement test according to Patterson et al. 2018 (1).

performance with that of 14,235 and 6,935 UK graduates, respectively (211). The results demonstrated a significant correlation between PLAB performance and performance in the MRCGP AKT and CSA examinations (211). However, it was noted that the knowledge and skills of IMG trainees at the MRCGP level were more than one standard deviation lower than those of UK graduates (211). This finding suggests an observed performance gap between IMG and UK trainees in the MRCGP, although the study acknowledged that differences in training quality could not be accounted for. Patterson et al. 2018 (1) also found that performance was lower in the MRCGP AKT and CSA among ethnic minority trainees noting that the effect is significantly more apparent for those who have trained outside the UK and that the literature has failed to identify specific causes given that candidates' ethnicity is strongly confounded with place of medical qualification and a significant proportion of IMGs are of ethnic minority background (1); studies thus far have on the most part, when look at observed variations by ethnicity, focused on variations between IMG and UK graduate performance. Esmail et al. 2013 (212) reported a 4.8x odds ratio of failing the MRCGP CSA among UK graduate ethnic minority trainees in comparison to white UK graduate trainees reported between 2010 and 2012. However, the works of Patterson et al. 2018 and Esmail et al. 2013 left a gap in the literature regarding whether there are observed performance gaps among UK trainees in the MRCGP AKT and CSA by ethnic group by level 1 and level 2 ethnicities. Additionally, notwithstanding the work of Pope et al. 2015 who reported sex differences in both the MRCGP AKT and CSA whereby females outperform males (213), studies have not thus far disaggregated observed performance (pass rates and odds ratios) through other equalities lenses including: sexual orientation, religion, deprivation, graduate v non graduate entry to medical school and disability.

Wakeford et al. 2015 examined the correlation between performance in the MRCGP examinations and the equivalent examinations for postgraduate higher medical specialty training, specifically the Membership of the Royal Colleges of Physicians (MRCP) examinations using separate databases available for MRCGP and MRCP examination performance (214). The study focused on candidates who had taken both sets of exams, typically due to ambitions for dual qualification or changes in specialty interest (214). The findings revealed strong correlations between the MRCGP Applied Knowledge Test (AKT) and the MRCP UK Part 1 and Part 2 written exams (r=0.748 and r=0.698, respectively) (214). Similarly, a notable correlation was observed between the MRCGP Clinical Skills Assessment (CSA) and the MRCP UK Practical Assessment of Clinical Examination Skills (PACES) (r=0.636) (214). When disaggregated by ethnicity, the correlations between the MRCGP AKT and the MRCP UK exams (Part 1, Part 2, and PACES) were similar for both White and Black and minority ethnic candidates (214). However, the MRCGP CSA showed stronger correlations with the MRCP UK

exams for ethnic minority candidates compared to White candidates (214). The high correlations between the MRCGP and MRCP UK exams support the validity of both assessments, indicating they measure similar knowledge domains (214). The study also found that while White candidates generally outperformed ethnic minority candidates, these performance differences were consistent across both the MRCGP and MRCP UK exams (214). This suggests that the observed differential performance is unlikely due to specific features of either exam but rather reflects true differences in ability.

Asghar et al. 2018 conducted a study on candidates who took the MRCGP AKT examinations between 2010 and 2015, including 14,801 candidates across 14 examinations (215). The study aimed to compare the performance of candidates who declared a confirmed diagnosis of dyslexia (n=379, 2.6%) with all other candidates (215). The pass rate for candidates with dyslexia was 83.6%, compared to 95.0% for other candidates. Using multivariate logistic regression, the analysis adjusted for candidate characteristics known to affect examination success, such as age, sex, ethnicity, country of primary medical qualification, stage of training, number of attempts, and time spent completing the test (215). After adjusting for these covariates, the performance of candidates with dyslexia was similar to that of other candidates (215). However, it was found that candidates declaring dyslexia after initially failing the AKT were more likely to have a primary medical qualification from outside the UK (215). The study notes that there has been no exploration beyond 2015 of performance disparities in the MRCGP AKT by equalities lenses, either solely or intersectionally, among candidates with dyslexia compared to those without. Furthermore, it has not been investigated whether there are performance disparities in the MRCGP CSA among candidates with a declared learning disability, including dyslexia, compared to those without.

Studies have not thus far used rich UKMED data to explore the extent to which longitudinal demographic and socioeconomic factors as well as academic performance before and during medical school are predictive of performance in the postgraduate MRCGP AKT and CSA although such work has been carried out in the contexts of postgraduate higher speciality training in medicine (Membership of the Royal College of Physicians (MRCPUK) by Paton et al. 2021 (68) and postgraduate higher speciality training in surgery (Membership of the Royal College of Surgeons (MRCS) by Ellis et al. 2021 (216) and Ellis et al 2022 (217). Paton et al. 2021, developed multilevel logistic regression models to identify predictors of a 'pass at first sitting' for each section of the MRCP (68). Variables for the modelling included: age, sex, BMAT performance and UCAT performance (68). Paton et al. 2021 found that abilities assessed by aptitude and skills and verbal

reasoning may be the most important cognitive attributes of those routinely assessed at selection for predicting future clinical performance in MRCP (UK) (68). It should be noted that Paton et al. 2021 recorded no differences in modelling when adjustments were made for A-level performance. However, it should be noted that the modelling only included participants who had taken both the BMAT and UCAT and did not adjust for socioeconomic status, ethnicity, disability, religion, sexual orientation, deprivation, medical school, EPM score or postgraduate training metrics. With respect to postgraduate training in surgery, Ellis et al. 2021 conducted a retrospective, longitudinal cohort study to explore predictors of success in the MRCS examinations on first attempt (MRCS Part A, n=9730; MRCS Part B, n=4645) from 2007 to 2017 (216). Variables included: Russell Group university (yes or no), undergraduate course classification (SEM, GEM), prior degree status on undergraduate courses (not graduate on entry or graduate on entry), graduate student outcomes (graduate on standard entry course, graduate on graduate entry course) and teaching methodology (not PBL or PBL). The results showed significant differences in MRCS pass rates between medical schools ($p<0.001$), but these differences were also not significant after adjusting for prior A-Level performance (216). Candidates from non-PBL courses were significantly more likely to pass both MRCS Part A (OR 1.53, 95% CI 1.25-1.87) and Part B (OR 1.54, 95% CI 1.05-2.25) at the first attempt after adjusting for prior academic performance (216). Attending an SEM undergraduate programme, having no prior degree, and attending a Russell Group university were independent predictors of MRCS success ($p<0.05$) (216). The study concluded that significant differences in MRCS performance between medical schools are largely due to individual academic ability rather than medical school factors, highlighting the need for further investigation into group-level attainment differences to ensure equity within medical training (216). Ellis et al. (2022) conducted a further longitudinal cohort study to explore the relationship between pre-undergraduate socio-demographic differences and MRCS success using UKMED data for UK graduates attempting MRCS Part A (n=5780) and Part B (n=2600) from 2013-2019 (217). Variables included: sex, ethnicity (level 1), prior degree status on undergraduate courses (not graduate on entry or graduate on entry), parental education (university-educated parents vs no university educated parent), POLAR Quintile (I-II low participation neighbourhood, III-V other neighbourhood), School type (fee paying school vs state funded school), free school meals (yes v no), IMD quintile (I-II most deprived vs III-V least deprived), EPM decile. Again, logistic regression modelling was used to predict pass rates at the first attempt, considering sociodemographic factors such as socioeconomic status and educational background (217). Univariate analyses identified that candidates entitled to free school meals and from the most deprived areas of the UK performed significantly worse at MRCS Part A and Part B (217). Furthermore, univariate analyses identified that candidates from lower higher-education

participation neighbourhoods or who were first-in-family to attend university performed significantly worse at MRCS Part A, while candidates with parents in non-managerial or professional occupations also performed worse at MRCS Part B (217). Additionally, candidates who attended fee-paying schools performed significantly better at MRCS Part A and were 51% more likely to pass MRCS Part B on the first attempt (217). Multivariate regression analyses including all of the aforementioned sociodemographic factors found that predictors of increased success at MRCS Part A included: being male (OR=2.34, 95%CI 1.87–2.92), non-graduate (OR=1.98, 95%CI 1.44–2.74) and a high EPM score (OR 1.55, 95%CI 1.48–1.62) (217). This multivariate regression analyses did not find ethnicity to be an independent predictor of MRCS Part A outcomes (217). However, another multivariate model which included sex, ethnicity, graduate entry to medicine and EPM but did not include other sociodemographic factors including parental education, university educated parent, POLAR quintile, IMD quintile, school type, school type, free school meals, found that Black candidates (OR=0.66; 95% CI 0.45-0.98) and candidates from other minority ethnic groups (OR=0.65: 95% CI 0.47-0.88) were less likely to pass MRCS Part A at the first attempt (217). Multivariate regression analyses of all aforementioned sociodemographic factors including measures of socioeconomic and educational background found that non-graduates (OR 1.77, 95%CI 1.15–2.71), those who attended a fee-paying school (OR 1.51, 95%CI 1.08–2.10) and those with a high EPM scores (OR 1.26, 95%CI 1.18–1.33) were significantly more likely to pass MRCS Part B (217). In addition, Asian (OR 0.49, 95%CI 0.35 to 0.69) and Black (OR 0.41, 95%CI 0.18 to 0.92) candidates were significantly less likely to pass MRCS Part B at their first attempt (217). Ellis et al. 2022 postulated that candidates from less affluent backgrounds are known to enter university with lower high-school grades, perform worse throughout training up to MRCS indicating an accumulation of educational disadvantage over time and that future studies needed to test whether attainment gaps statistically change over time from pre-undergraduate, to undergraduate and ultimately postgraduate education (217). A review of the literature has demonstrated gaps in the literature relating to understanding: performance in the MRCGP AKT and CSA through the equalities lenses, longitudinal performance across key high stakes assessments from pre-undergraduate to postgraduate medical education and predictors of performance in the MRCGP AKT and CSA based upon longitudinal metrics outside of the process for applying to GPHST.

Measuring equity of performance of the AKT and CSA

The literature has, through the use of odds ratios and pass rates (32) described unexplained observed variations in academic performance in the MRCGP AKT and CSA between different groups of doctors, termed differential attainment. Whilst the odds ratio can identify the odds of an event

occurring in two different groups, they are limited in the number of groups which they can compare simultaneously, they have the potential to be skewed by small numbers, they are not capable of taking into account the whole distribution of scores and are not a measure of equity. In using odds ratios, scholars have compared the odds of success v failure in all aggregated ethnic minority trainees compared with White trainees. However, the assumption that all ethnic minority candidates would perform in the same way is not sound and even, when aggregated, the overall sample size of ethnic minority candidates is often considerably lower than the White sample. BAPIO have pointed to MRCGP AKT and CSA pass rate data demonstrating observed variations in academic performance between different groups of doctors, termed differential attainment—93.5% for White candidates, 76.4% for South Asian, and 72.7% for Black (32). On this basis, BAPIO brought an unsuccessful judicial review that the RCGP had breached its' public sector equality duties. However, the High Court ruled that "the statistical differences which exist do not of themselves establish direct discrimination" but rather "all that they do, is to demonstrate that there is a difference of outcome". In other words, the use of pass rates are only able to articulate observed variations in performance but not the extent to which academic achievement is equitable. The real question is to what extent any unexplained variations seen are equitable. Within medical education, scholars have not thus far adopted a robust approach to measure the degree of equity in academic performance, unlike in other sectors which will be explained further.

Equity of training experience during General Practice Higher Specialist Training

The literature examining how to calculate (in)equity in the distribution of academic achievement is focused on two main types of measurements: **1) standard deviation** (OECD (218), Birdsall and Londonn 1997 (219), O'Neill et al. 1995 (220), Lam et al. 1991 (221), Londono et al. 1990 (222), Ram et al. 1990 (223)) and **2) EGini** (Barro and Lee 1991 (34), Thomas et al. 2002 (35), Mesa 2007 (36), Tomul et al. 2011 (37), Zehorit Dadon Golan (38)).

The standard deviation measures the average spread of scores around the mean but does not indicate whether this spread is due to a few very high or very low scores or a more even spread of differences. Tomul et al. 2011 (37) highlighted that as the standard deviation does not provide insights into the nature of the distribution, this makes it less effective for understanding the fairness or equity of the distribution. Furthermore, the standard deviation is sensitive to the scale of measurement. A higher mean can result in a higher standard deviation even if the relative dispersion is the same, making comparisons across different scales challenging. EGini is a more modernly used measurement which is an adaptation of the Gini index. The Gini coefficient is a measure of statistical

dispersion intended to represent inequality among values of a frequency distribution; the Gini coefficient ranges from 0, representing perfect equality to 1 representing perfect inequality (224). The Gini co-efficent can be shown as a percentage from 0-100% called the Gini Index. In a class of 100 students, if the mean score is 70 with a standard deviation of 15, it tells us that scores typically fall within 15 points of the mean. However, it does not tell us if the lower scores are concentrated among a particular group of students (e.g, those from disadvantaged backgrounds). However, if the Gini coefficient for the same class is 0.3, it provides a direct measure of inequality in scores. A lower Gini coefficient would indicate more equal distribution of scores, while a higher coefficient indicates greater inequality, giving a clearer picture of educational equity. The Gini coefficient is often preferred over standard deviation for measuring inequality because it provides a more direct, interpretable measure of inequity, is sensitive to changes across the entire distribution, and focuses specifically on equity. This makes it particularly useful in contexts where understanding and addressing disparities is crucial, such as in education and socio-economic studies.

The most widely used context of the Gini coefficient is within Economics to calculate inequalities in income distribution although scholars have published more tailored Gini coefficients, including for example, for application to Education (3) and Opportunity (225). Starting with income Gini, this formula is used to calculate the Gini coefficient (Deaton et al. 1997 (226)):

$$GINI = \frac{1}{\mu N(N-1)} \sum_{i>j} \sum_{j} |y_i - y_j|$$

Where: GINI is the Gini index, μ is the mean of the variable (continuous variable) (e.g- income, score), N is the total number of observations and whereby (for income GINI) y_i and y_j are dollar values of income of individuals.

Another algebraic way of presenting the Gini coefficient is the measure of inequality according to the ratio of the area formed by the Lorenz curve and the egalitarian line to the area of the entire egalitarian triangle (figure 3). The horizontal axis Is the cumulative population whilst the vertical access is the cumulative percentage of the variable at hand (e.g- income, performance, education etc..).

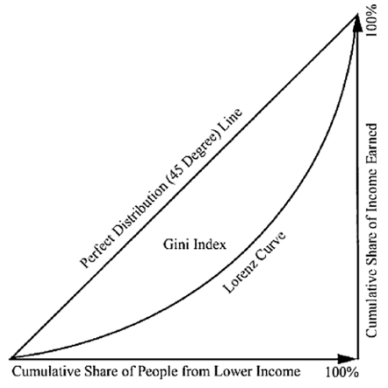


Figure 3- Lorenz Curve and 45 degree line

Scholars attempted to apply this GINI approach to estimate inequalities in education for a given population and to discern

trends in social development through indicators of educational achievement over time (227). However, scholars were unable to directly apply the methodology for calculating Gini index outlined above as quantitative data from surveys on educational attainment, which would provide a variable of continuous attainment data, for the desired populations were not available. As such, a modified EGini formula was put forward by Barro and Lee 1991 (34) capable of handling discrete variables, such as the number of years of schooling:

$$E_L = \left(\frac{1}{\mu}\right)\sum_{i=2}^{n}\sum_{j=1}^{i-1} p_i \left|y_i - y_j\right| p_j$$

Where: E_L is the education Gini based upon educational attainment distribution, μ is the average years of schooling for the concerned population (discrete variable), N is the total number of levels or categories (set at 7: no schooling, primary partial, complete primary, partial secondary, complete secondary, partial tertiary and complete tertiary- all seven groups are mutually exclusive and collectively inclusive of the population at hand), p_i and p_j stand for the proportions of population with certain levels of schooling and whereby) y_i and y_j are the number of years of schooling at different educational attainment levels.

The formula was applied by Thomas et al. 2002 using schooling cycle data (re average years of schooling) from Psacharopoulos and Arriagada 1986 (228) to generate education Gini for 85 countries for population aged over 15 between 1960 and 1990. The same measurement of the degree of educational inequality with respect to the average years of schooling has been reproduced in the Phillippines (Mesa 2007 (36)), Turkey (Tomul et al. 2011 (37)), Israel (Zehorit Dadon-Golan 2019 (38), Taiwan (Lin 2007 (229)), Indonesia (Digdowiseiso 2010 (230), Pakistan (Saeed et al. (231), Papa New Guinea (Sheret 1988 (232)). Scholars have also undertaken calculations of Gini index for segmental groups (e.g- sex or ethnicity) to enable comparisons. For example, Barro and Lee 2015 noted a decline in gender inequality at all educational levels as well as finding that large gaps persist in secondary and tertiary education (233). As opined by Thomas et al. 2011, measuring the educational inequality in years of schooling using the Gini approach is a better measurement in comparison with standard deviation because the standard deviation "does not provide a consistent picture of whether the distribution of education in a country is improving or not" (35). Furthermore, the standard deviation of years of schooling over the years might change and the standard deviation is unable to describe the inequity when the average number of years of schooling changes. Hu et al. 2015 observed that the GINI index would not mask inequality in allocation of college places whereas

the odds ratio would falsely rise or fall due to the 'Matthew Effect', where the increment in the educational odds of the upper class is larger than that of the lower class such that the 'rich get richer', the 'poor get poorer' resulting in an enlarged gap between the two groups (234).

Other indicators beyond average years of schooling have been used as the basis for measuring educational inequality. An example is Dorius 2013 who applied the Gini methodology to primary enrolment rates and years of completed schooling in several countries for 1987-2010 finding that educational inequity followed a normal curve (235). Another example is Mass et al. 1982 who applied the Gini methodology to examined the overall degree of inequity in school enrolments in Eastern Africa whilst also undertaking segmental analyses to explore the effects by urban v rural locations and sex (236).

However, neither a person's average number of years of school attendance nor enrolment can indicate the extent of (in)equity in academic achievement because the quality of schooling might vary significantly. In fact, the sole measurement of number of years of schooling is a very poor indicator of academic achievement because this does not take into consideration financial and learning resources nor outputs (e.g- performance). The value of schooling in one region may not be the same as that in another.

One of the most apt approaches for determining the extent to which education (or educational experience) is equitable, particularly where there are unexplained observed variations, is by using output measures which appropriately measure the level and the quality of educational attainment. The approach has not been widely adopted in the literature due to reported difficulties obtaining the required national or international data which would be needed (Thomas et al. 2002 (35)). David-Hadar 2008, with access to 2001-2002 national matriculation examination data in Israel, calculated Education Gini using the former Gini approach to calculate inequality in academic achievement for four outputs (a) total unit mark, b) total units, c) matriculation diploma mean, d) mathematics attainment) for the entire population and for various subgroups by ethnicity and residence (urban v rural) (237). Dadon-Golan 2019 using national matriculation examination data in Israel from 2001-2011 used the latter EGini approach to calculate educational inequality, defined as the average of multiplying the number of study units by the matriculation grade in each field of study for the entire population having the matriculation diploma, between 7 educational groups based upon the number of units taken for the entire population cross-sectioned by sex, ethnicity, and residential area (38). The advantage of the former approach by David-Hadar 2008 (237) is that it is possible to calculate Gini inequality index for each out output whereas the approach by Dadon-Golan 2019 provides a

more holistic measure of educational inequality which may mask occurrences of significant inequalities in individual components (38). Both studies found the Gini index to be a useful indicator of inequity in academic attainment also providing insights into trends over time including by equalities lenses, thus informing practical policy interventions to reduce inequality in educational achievement. More specifically, Dadon-Golan 2019 (38) reported that: 1) the extent of educational inequality among Israeli male students was larger than female students aligning with the finding of Dobrin 2015 (238) and Dahan et al 2002 (239), 2) the extent of educational inequity among Arabic-speaking students was higher than among Hebrew speaking students lending support to Dvir et al. 2009 (240) and 3) the extent of educational inequality in urban peripheral areas is greater than those living in more affluent city areas which is in-keeping with findings by Cohen-Navot et al. 2001 (241). Of interest, Checchi et al. 2017 reported an association between the calculated Gini index measuring inequality in academic achievement in various OECD international examinations (PISA, PIAAC) with income equity (242).

Using the Gini index to measure inequality in examination performance by inequalities lenses offers a more comprehensive and nuanced perspective on disparities in performance outcomes compared to simply examining standard deviation, raw percentages, odds ratios or averages, as postulated by Atkinson et al. 1970 (243) and Sen et al. 1973 (244). This sensitivity to the distribution means the Gini index can detect variations and disparities in how scores are distributed among individuals within different demographic groups (245). As alluded to by Atkinson et al. 1982 (246) and Sarabia et al. 2002 (247), the Gini index is able to focus on extremes such that it is particularly effective at capturing inequalities at the extremes of the distribution; it identifies disparities that may be masked when looking solely at averages. Furthermore, the Gini index is less sensitive to outliers or extreme values in the data compared to averages. In educational assessments, there may be exceptional cases of very high or low scores, and the Gini index provides a more robust measure of inequality by not overly emphasising these outliers. Moreover, the Gini index incorporates all data points, whereas average percentages may aggregate data in a way that can obscure underlying inequalities (226). Additionally, the Gini index is comparable across different populations, regions, or time periods, making it a valuable tool for benchmarking and tracking progress or monitoring changes in inequality. It allows for meaningful comparisons and assessments of progress. However, studies thus far have not, applied the Gini index methodology, to explore the extent to which there is inequity in MRCGP AKT and CSA examination performance over time across the population and segmentally by (in)equalities lenses including: deprivation, sex, age, disability, religion, sexual orientation and ethnicity. Studies have not thus far calculated the extent to which there is equity in academic achievement in the MRCGP AKT and CSA, $Gini_{AKT}$ and $Gini_{CSA}$,for the population and cross sectionally

by those inequalities lenses. The literature has not postulated a standardised, robust, evidence based approach for calculating inequality in postgraduate examination performance such as the MRCGP AKT and CSA; such Gini metrics would enable an indication and a mechanism for tracking over time which would enable intervention and guide policy making.

The Gini index can also handle intersectional analysis, which is crucial in understanding how different factors (such as deprivation and ethnicity) combine to influence outcomes. It enables the examination of how disparities vary among different subgroups defined by multiple characteristics. Scholars including Munir et al. 2022 have applied intersectional Gini analyses to understand social inequalities in Pakistan, taking into account an intersectional perspective on ethnicity, income and education (248). Performing an intersectional Education Gini analysis involves examining the combined impact of two or more of characteristics on inequality (for example, ethnicity and deprivation etc..). This will involve categorising the population into subgroups based on the two characteristics of interest, for example, ethnicity and deprivation such as: "Ethnic Group A - Low Deprivation," "Ethnic Group A - High Deprivation," "Ethnic Group B - Low Deprivation," and so on. It is then possible to calculate educational inequality separately for each of the defined subgroups. Dimiski et al. 2022 also applied intersectional Gini methodology to explore whether mothers' educational background plays a decisive role on students' performances in mathematics, science and reading for 2015 and 2018 taking into account sex and ethnicity (249). Thus far, scholars have not calculated educational inequality in academic achievement in the MRCGP AKT and CSA using the Gini methodology accounting for intersectional factors.

In conclusion, central research questions emerge from the literature relating to the extent to which there is equity of experience within GPHST solely and intersectionally by age, sex, deprivation, ethnicity, disability, sexual orientation and religion with respect to AKT and CSA performance over time. There are also gaps in the literature relating to understanding: predictors of AKT and CSA performance as well as longitudinal performance across key high stakes assessments from pre-undergraduate to postgraduate medical education namely between the i) UCAS tariff and Educational Performance Measure and between the ii) EPM and AKT. Furthermore, there are gaps in the literature regarding how equity in both MRCGP AKT and CSA academic achievement is calculated, including by way of applying the Gini coefficient methodology to calculate the GP Applied Knowledge Test Gini Coefficient (AKT_{GINI}) and the GP Clinical Skills Assessment Gini Coefficient(CSA_{GINI}) to determine the extent to which there is equity by age, sex, deprivation, ethnicity, disability, sexual orientation and religion.

2.6 Outcomes in GPHST among Diverse Groups

Equitable outcomes from GPHST ensure a workforce able to serve the needs of the population. Despite persistent recruitment and retention challenges in the GP workforce over the past two decades which have been highlighted by reports and scholars, few studies have comprehensively explored predictors of non-standard ARCP outcomes and timely CCT completion including longitudinal data from across the whole GP training pathway from as early as pre-undergraduate education with metrics for each of the equalities lenses.

The GP Workforce: Recruitment and Retention

Several studies in the literature have studied recruitment and retention of GPs over the last two decades; scholars including: Young et al. 1999 (39), Goldacre et al. 2002 (40), Lambert et al. 2016 (41), Owen et al. 2019 (42), Hall et al. 2019 (43), Hanratty et al. 2022 (44), Martin et al. 2022 (45), Rashid et al. 2016 (46), Tavabie et al. 2013 (47) and Sharma et al. 2020 (48) concur that retention of GPs is a significant challenge. However, authors have not disaggregated data by equalities lenses including deprivation, ethnicity, sex and disability and so there is a gap in the literature in respect of gauging a disaggregation of perception. Furthermore, there is some limited published data regarding GMC referrals among GP trainees but this is barely disaggregated by equalities lenses, thus making it difficult to draw meaningful conclusions and also, as noted by Bahrami et al. 2001, revealing several deficiencies in the system for dealing with the educational needs of underperforming GPHSTs (250).

Despite Goldacre et al. 2002 reporting that over half of those who qualified in 1996 regarded GP as a more attractive career than hospital practice and that there is a steadily increasing proportion of graduates pursuing a career in GP over time (40), scholars including Lambert et al. 2016 (41) have reported increased negativity among GPs over time post-graduation that was not seen in hospital doctors. For example, three to five years after graduation, 86.3% of GPHSTs were positive about their prospects compared with 52.9% of surgical trainees but in surveys conducted 12–24 years after graduation, 60.2% of GPs and 76.6% of surgeons were positive about their prospects (41) suggesting potential workforce retention challenges. Furthermore, Rashid et al. 2016, reported that newly qualified GPs would not recommend GP as a career to juniors, thus calling for an urgent review of the strategies being considered to mitigate the workforce difficulties in GP (46).

A literature review undertaken by Young et al. 1999 identified that retention problems in the GP workforce stemmed from: (i) the changing social composition of the workforce and the fact that a large proportion of qualified GPs are significantly underutilised within traditional career structures; and (ii) the considerable differences in the ability of local areas to match labour demand and supply (39). Young et al. argued that addressing these problems would require looking beyond solely making changes to the medical school intake and working towards greater flexibility in a number of areas: (i) time commitment across the working day and week; (ii) long-term career paths; (iii) training and education; and (iv) remuneration and contract conditions (39). These themes have been reiterated by numerous scholars.

Goldacre et al. 2002 reported that older GPs had lower job satisfaction than their contemporaries in hospital practice, while younger GPs were more satisfied than younger hospital doctors with the time available for leisure (40). Corroborating this, Owen et al. 2019 found that age, length of service and lower job satisfaction were associated with intention to leave a career in General Practice (42). In a regional survey of Wessex GPs, work intensity and amount were the most common reasons given for intention to leave sooner than previously planned; 51.0% participants reported working more hours than 2 years previously, predominantly due to increased workload 59.4% of surveyed GPs expressed reduced morale over the last two years, 48.5% said they had brought forward their plans to leave general practice and intention to leave or retire in the next two years increased statistically significantly from 13% to 18% in 4 years while intention to continue working for at least the next 5 years statistically significantly dropped from 63.9% to 48.5% (42). Rashid et al 2016., having surveyed GPs, reported that the main reasons given for early retirement were workload, job related stress, current government health care policies, working long hours, administrative work, high patient demand and risk of litigation (46). Furthermore, Convie et al. 2020 reported that GP doctors demonstrated the lowest compassion satisfaction score, of all specialities surveyed (251). Moreover, Hall et al. 2019, having conducted a survey of practicing GPs (n=232) measuring burnout, wellbeing, occupational demands and support and patient safety, found that 93.8% of GPs were classed as likely to be suffering from a minor psychiatric disorder, 94.7% as suffering from exhaustion and 86.6% as suffering from disengagement (43). Structural equation modelling (SEM) analyses showed that spending a higher number of hours on administrative tasks, seeing a higher number of patients per day, and feeling less supported were associated with higher burnout levels, which in turn was associated with worse perceptions of safety including having reported a near miss in the previous 3 months (43). Additionally, Hanratty et al. 2022 carried out a study quantifying the burnout and spiritual health of 1318 GPs who had worked in the NHS during the COVID19 pandemic

(March 2020-May 2021) finding that burnout is at crisis levels among GPs in the UK NHS (44). With 19% of surveyed GPs at highest risk for burnout, using MBI 'cut off' levels, the authors called for further studies disaggregating data by equalities lenses including deprivation and ethnicity and further studies into the effects of intersectional inequality over time to explore independent predictors of standard ARCP outcomes throughout training and independent predictors of timely CCT (44).

Intriguingly, in 2009, the RCGP in the UK created the First 5 initiative to support new GPs through the first years of independent practice. The initiative is founded upon five key pillars: peer support, mentoring, career guidance, revalidation and tailored continuing professional development (252). Rashid et al. 2016, carried out a follow up survey for First5 GPs and GPHSTs to see what their future career plans are, and their views on the current issues in general practice, on a background of significant workforce problems in general practice (46). The survey ran between 5th of October and the 31st of October 2015. Responses were received from First5 GPs (n=322) and GP trainees (n=249) respectively with just over 60% of First5 GPs and 68% of GP trainees reporting either definitely or possibly considering a move abroad where they feel there is a better outlook for General Practice; the most popular destinations were Australia, Canada and New Zealand (46). The main reasons given for early retirement were workload, job related stress, current government health care policies, working long hours, administrative work, high patient demand and risk of litigation (46). Only about 18% of GPHSTs reported they would still apply for GP training even if 7 day GP access working was in place, 34% would consider other careers and 47% would not recommend general practice to juniors (46). The study concluded that newly qualified GPs are less likely to recommend a career in General Practice and urgent review of the strategies currently being considered to mitigate the workforce difficulties in general practice are considered (46). Critically this study also did not consider disaggregation by equalities lenses such as sex, disability, ethnicity or deprivation leaving a gap in the literature.

Martin et al. 2022 undertook qualitative research exploring how GPs working in urban locations across the UK with >/ 5 years' experience after completion of GP training perceive professional resilience and what workplace factors influenced it. The authors reported findings that improved resilience would require GPs to work fewer clinical hours to support leadership, education and training priorities which may have huge implications for a workforce already in crisis and ultimately, for the healthcare of the UK population (45). As before, there is no consideration of the equalities lenses and whether the same is true across each group. Tavabie et al. 2013 found that a new role of

patient liaison officers was supporting GPs to deliver integrated community care for patients with complex health needs and long-term conditions had the potential to release GPs and GP trainees for new clinical work through reduction in administration carried out by patient liaison officers (47). The implementation of Patient liaison officers was intended to strengthen system resilience and reduce significantly increasing demands, not least from patients, for GPs to be better prepared to manage increasingly complex long-term conditions and competencies now needed by GPs (201). Furthermore, Sharma et al. 2020 conducted a cross-sectional study (n=1,354) sent to GPs and practice managers in Leicester, Leicestershire and Rutland which found a rise in video consultations for remote patient consultations and remote triage post COVID 19 from 3% to 95% and that this had positive implications for time efficiency (48). However, despite their ability to introduce such widescale change virtually overnight, over 10% of respondents reported that the strain had placed their practice at risk of closure (48).

Equity in ARCP progression outcomes and CCT completion

Progression at ARCP is determined based upon acquisition of competencies as set out in the RCGP curriculum (253) including examination performance in the RCGP AKT and CSA, a health declaration and a fitness to practice declaration. Few studies have explored outcomes from GPHST solely and intersectionally by age, sex, deprivation, ethnicity (including level 1 and level 2 ethnic groups), disability, sexual orientation and religion with respect to ARCP progression outcomes and CCT completion. Few studies have explored predictors of standard ARCP progression outcomes and timely CCT completion especially using longitudinal data encompassing demographic, educational and geographical data from pre-undergraduate education.

Siriwardena et al. 2023 using GPNRO data from the 2016 GPHST application cycle, found that once sex, ethnicity, place of primary medical qualification, declared disability, and MSRA scores were accounted for, MSRA was the strongest predictor of ARCP outcomes and there was no statistically significant difference in the receipt of standard ARCP outcomes between ethnic minority and white UK graduate trainees (30). Findings of the MSRA holding predictive value on progression and ARCP outcomes in GPHST have been echoed by other scholars including Botan et al. 2022 (254) (which was essentially the same data analyses overseen by Siriwardena and published a decade later) and Tiffin et al. 2024 (210). Siriwardena et al. 2023 and Botan et al. 2022 chose to categorise ARCP outcomes as ‘standard’ (for example, achieving progress and competencies at the expected rate or gaining all required competencies for completing training) or ‘developmental (non-standard)’ (for example, further development of specific competencies required) or releasing the

candidate from the training programme (30). However, there are several limitations to the work of Siriwardena et al. 2023 and Botan et al. 2022. Firstly, both only regarded ethnicity as white, ethnic minority or mixed ethnic group. As discussed previously, this does not sufficiently disaggregate ethnic group data particularly as ethnic minority encompasses a broad range of subgroups, for which there are likely differences. Secondly, the data used by Siriwardena et al. 2023 and Botan et al. 2022 was from the GPNRO which does not enable access to longitudinal data necessary to account for the potential effects of socioeconomic variables, previous academic performance (UCAS tariff, UCAT subsections, SJT, EPM), detailed geographical data or detailed demographic data which would include equalities lenses such as age, sexual orientation, or religion. Thirdly, the work of Siriwardena et al. 2023 and Botan et al. 2022 only covered the 2016 GPHST recruitment cycle and so it is unclear if the same findings would be observed across other recruitment cycles. Scholars have called for more detailed modelling which accounts for broader demographic, socioeconomic and educational variables beyond just the MSRA to truly understand predictors of ARCP outcomes and CCT completion in GPHST.

Aside from the GPNRO data, there is very limited literature exploring progression during GPHST for trainees with diverse backgrounds according to deprivation, disability, sex, ethnicity, sexual orientation, religion, age whilst accounting for pre-undergraduate, undergraduate and early postgraduate covariates including demographic characteristics, socioeconomic status and educational variables. Furthermore, studies have not thus far explored independent predictors of ARCP Outcomes and CCT completion accounting for co-variates and confounders. Historically, the data architecture has been poor and limited in articulating these nuances although with the rise of big databases such as UKMED, there is an unrivalled opportunity to address these gaps in the literature. As such, it is left open to question as to whether there is an associated differential attainment in ARCP progression outcomes, CCT completion and composition of the workforce.

In conclusion, equitable outcomes from GP training ensure that the GP workforce is representative of the population which it serves. As outlined above, few studies have explored inequalities in outcomes from GP training through each of the equalities lenses (disability, sex, age, religious beliefs, sexual orientation, deprivation or socioeconomic status) both in terms of ARCP progression outcomes and CCT completion. Furthermore, studies have not thus far taken into account the effects of intersectional inequality over time to explore independent predictors of standard ARCP outcomes throughout training and independent predictors of timely CCT.

Chapter 3: Summary of Research Gaps and Research Questions

Chapter 3 Overview: Summary of Research Gaps and Research Questions

This section will outline a summary of the research gaps and the central research questions which warrant exploration having emerged from the comprehensive literature review which has been undertaken exploring access, experience and outcomes from GPHST among diverse groups.

3. Summary of Research Gaps and Research Questions

3.1 Summary of Research Gaps

A detailed review of the literature highlights significant gaps in our understanding of the extent to which there is equity in access, experience, and outcomes from GPHST. Generally, published medical education studies, including those relevant to GPHST, have not disaggregated longitudinal data from across the whole GP training pathway from as early as pre-undergraduate education among diverse groups: ethnic groups, age, sex, disability, deprivation, sexual orientation and religion which has resulted in limited understanding of the extent to which there is equity in access, experience and outcomes from GPHST solely and intersectionally for the aforementioned groups. Furthermore, deprivation metrics used within the literature have been global, overall scores such as the overall IMD as opposed to more granular data with respect to the different deprivation forms.

The existing literature relating to access to GPHST does not take a diverse view through equalities lenses and focuses on: applicant motivation for applying to GPHST, demographic factors which reduce the odds of application to GPHST such as non-graduate entry, intercalation and above-median academic performance during medical school, approaches for recruitment to GPHST and the impacts of the public image of a GP on applications to GPHST. Scholars have also explored the extent to which travel time to GP placements could become a barrier to applications for GPHST and the extent to which time spent in General practice placements or training affects application into GPHST. However, there is limited understanding of access to GPHST among diverse groups solely and intersectionally by: age, sex, deprivation, ethnicity, disability, sexual orientation, and religion. More expressly, there are specific gaps relating to trends in applications to GPHST, comparisons between sole applicants to GPHST and applicants for GPHST with other specialities, direct versus indirect applicants, and the successful offer of GPHST national training numbers. Scholars have yet to apply decision tree analyses to identify predictors of sole and direct applications to GPHST, accounting for intersectional demographic and educational variables.

Despite the extensive and community-focused nature of GP training, unique challenges persist, particularly for trainees with a protected characteristic who face biases and lack of support, impacting on their training experience and performance in high-stakes exams like the MRCGP AKT and CSA. Existing studies primarily rely on limited data from the GP National Recruitment Office, which lacks comprehensive demographic and longitudinal data. Consequently, there are significant gaps in understanding performance in these exams through equality lenses and predictors of success based on longitudinal metrics and equalities lenses. More specifically, scholars have not thus far

researched: a) whether there are changes in equity longitudinally across key assessments from pre-undergraduate to postgraduate education and b) the predictors of performance in the MRCGP AKT and CSA accounting for sociodemographic variables including granular deprivation metrics and academic variables including prior academic performance. There are also gaps in the literature with respect to measuring and tracking equity in academic attainment within medical education and the MRCGP AKT and CSA which are undertaken within GPHST.

Thirdly, despite persistent recruitment and retention challenges in the GP workforce over the past two decades which have been highlighted by reports and scholars, there is a paucity of literature on predictors of non-standard ARCP outcomes and timely CCT completion. There are critical gaps in the literature regarding the extent to which demographic factors, educational factors and the equalities lenses (age, sex, deprivation, ethnicity, disability, sexual orientation and religion), solely and intersectionally have a bearing on ARCP progression outcomes and timely CCT completion.

Addressing these gaps is crucial for developing evidence-based policies and interventions to promote equity in GPHST.

3.2 Research Questions

The following central research questions emerge from the literature review:

1. Explore access to GP Higher Specialist Training (GPHST) solely and intersectionally by age, sex, deprivation, ethnicity, disability, sexual orientation and religion with respect to:
    a. Trends in applications between 2013-2020
    b. Sole applications to GPHST and in combination with other specialties
    c. Direct and non-direct applications to GPHST
    d. Successful offer of a GPHST national training number
    e. Intersectionality informed identification of groups with respect to (b) and (c).

2. Explore experience in GP Higher Specialist Training (GPHST) solely and intersectionally by age, sex, deprivation, ethnicity, disability, sexual orientation and religion with respect to:
    a. Longitudinal performance across key high stakes assessment from pre-undergraduate to postgraduate medical education
        i. Academic performance pre-undergraduate to undergraduate: UCAS tariff and Educational Performance Measure
        i. Academic performance undergraduate to postgraduate: EPM and AKT
    b. AKT and CSA performance, also, identifying the predictors for AKT and CSA performance
    c. Applying the Gini coefficient methodology, calculate the extent of equity in MRCGP AKT and CSA examination performance by age, sex, deprivation, ethnicity, disability, sexual orientation and religion
        ii. GP Applied Knowledge Test Gini Coefficient (AKT_{GINI})
        iii. GP Clinical Skills Assessment Gini Coefficient(CSA_{GINI})

3. Explore outcomes in GP Higher Specialist Training (GPHST) solely and intersectionally by age, sex, deprivation, ethnicity, disability, sexual orientation, and religion with respect to:
    a. ARCP Outcomes
    b. CCT completion
    c. Identify the predictors of (a) and (b)

Chapter 4: Methodology and Methods

Chapter 4 Overview: Methodology and Methods

This chapter outlines the methodology and methods employed in the present studies. With respect to the former, it presents the research paradigm and epistemological basis for the research. With respect to the latter, it details the recruitment of participants, design and setting, data collection and variables, and provides information about the statistical analyses used as well as the rationale for doing so.

4. Methodology and Methods

4.1 Methodology

Research paradigm

The choice of paradigm was driven by the research aims (255) and approaches adopted throughout the peer reviewed works of other scholars in this research field. Exploration of the research questions warrants a quantitative approach to support an appreciation of statistical trends and insights gained from statistical modelling (256). Embracing the use of concrete data and associated statistical analyses gives readers direct assurance of the results and confidence in the conclusions they draw from the studies (257). Moreover, scholars have recommended this approach as "generating information is helpful to users in carrying out their decisions" (258).

Epistemology

A quantitative data driven approach was adopted in the design and execution of these studies. Creswell 2002 asserts that knowledge is based on observation and direct experiment of the objective world via empirically verified associations (259). This is particularly useful for exploring the extent to which equalities lenses including deprivation forms, sex, ethnicity, disability, religious belief, sexual orientation and age solely and intersectionally affect the extent to which there is equity in access, experience and outcomes from GPHST. Furthermore, the data driven approach supports initial superficial exploration, revealing a signal, followed by a further deep-dive to facilitate understanding the relationships between more granular data including deprivation sub-domains and detailed disaggregation of ethnic subgroups on trainee access, experience and outcomes (260). This is contrary to a realist approach which is founded upon critical realism and assumes that knowledge is a historical product (261). The realist approach advocates evaluation based upon a consideration of emotive and political contexts as opposed to objective statistical data, modelling and outcomes (261). A data driven approach uses science to gain an understanding of the world, hence being able to predict it using quantitative methods and statistical modelling including multivariate analyses capable of examining intersectionality (262) (263) (264).

Data studies are shaped by phenomenalism's focus on observable phenomena, causality's pursuit of true cause-effect relationships, and objectivism's commitment to empirical, unbiased insights (260) (265). Data studies, for example using the UKMED database, allow dispassionate exploration of social phenomena such as deprivation and inequalities to analyse data in a range of different ways, appreciating intersectionality, whilst minimising the subjectivity of judgements by considering the relationships between knowledge, truth, belief, reason, evidence, and reliability. The use of

statistical techniques allows for objective systematic examination of patterns and relationships in the data which is well suited to the objectives of this research. Within what can be an emotive landscape, a data driven approach enables researchers to draw evidence-based conclusions and contribute valuable insights relating to the complexities of GP training and equity in access, experience, and outcomes.

A data driven approach is well-suited for research on intersectionality due to its emphasis on empirical data collection, objectivity, and quantitative analysis. When studying the complex interplay of multiple social identities and their impact on various outcomes, quantitative methods enable researchers to systematically examine patterns, disparities, and causal relationships. This allows for the rigorous assessment of how different intersecting identities contribute to disparities in access, opportunities, and well-being, providing wide scale empirical evidence that can support the trends behind more ad hoc qualitative findings to inform policies and interventions aimed at addressing social inequalities based on intersecting identities. Additionally, focus on large-scale data sources can facilitate comprehensive analyses that encompass diverse samples and account for the multifaceted nature of intersectionality.

4.2 Methods

Recruited participants, design and setting

Participants were recruited from the UKMED database with an inclusion criteria of: (a) application to General Practice training with ORIEL recruitment data available (earliest GP training recruitment records start from 2013) and (b) living in England when they applied to medical school (earliest date 2007). The GP register data is updated daily. Data for this study was extracted on 26/01/2022.

Three national England wide retrospective cohort studies are presented.

1. **Study One**

   Study one presents an in-depth national multicentre England wide retrospective cohort study of all individuals who (a) elected to apply for GP Training on their first round of higher speciality training application with an ORIEL recruitment data profile in UKMED and (b) who lived in England when they applied to medical school (n=10,902) with the aim of exploring equity in access to GPHST by inequalities lenses solely and intersectionally. Study one explores access to GP Higher Specialist Training (GPHST) between 2013-2020 solely and intersectionally by age, sex, deprivation, ethnicity, disability, sexual orientation and religion with respect to: a) trends in applications between 2013-2020, b) sole applications to GPHST comparative to those made in combination with other specialties, c) direct and non-direct applications to GPHST, d) Successful offer of a GPHST national training number and e) Intersectionality informed identification of groups with respect to (b) and (c).

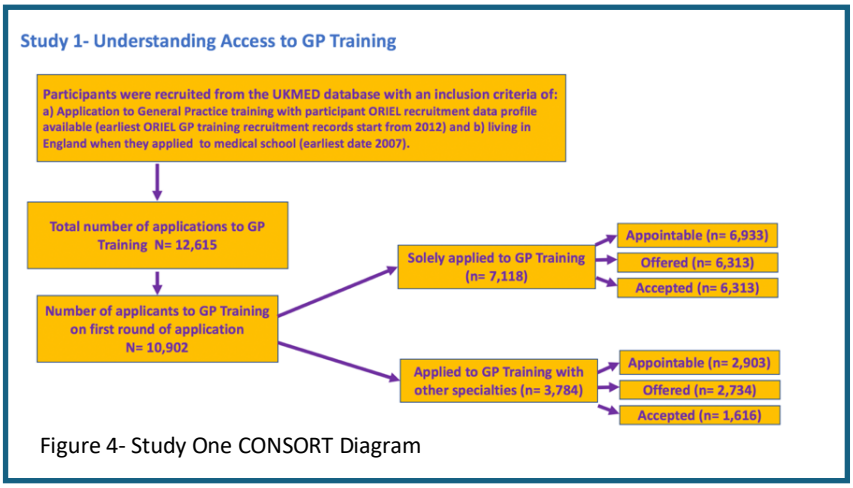


Figure 4- Study One CONSORT Diagram

2. **Study Two**

   An in-depth national multicentre England wide retrospective cohort study of all individuals who (a) accepted a GP Training post via ORIEL since the earliest time of GP Training records (2013) with an ORIEL recruitment data profile available in UKMED and (b) who lived in England when they applied to medical school (n=12,416) with the aim of exploring equity in experience during GPHST by inequalities lenses solely and intersectionally. Study two explores the extent

to which there is equity of experience in GPHST solely and intersectionally by age, sex, deprivation, ethnicity, disability, sexual orientation and religion with respect to: a) AKT and CSA performance, also, identifying the predictors for AKT and CSA performance, b) longitudinal performance across key high stakes assessment from pre-undergraduate to postgraduate medical education namely i) UCAS tariff and Educational Performance Measure and ii) EPM and AKT. Study two also applies the Gini coefficient methodology to calculate the GP Applied Knowledge Test Gini Coefficient (AKT_{GINI}) and the GP Clinical Skills Assessment Gini Coefficient(CSA_{GINI}) to determine the extent to which there is equity in MRCGP postgraduate examination performance by age, sex, deprivation, ethnicity, disability, sexual orientation and religion.

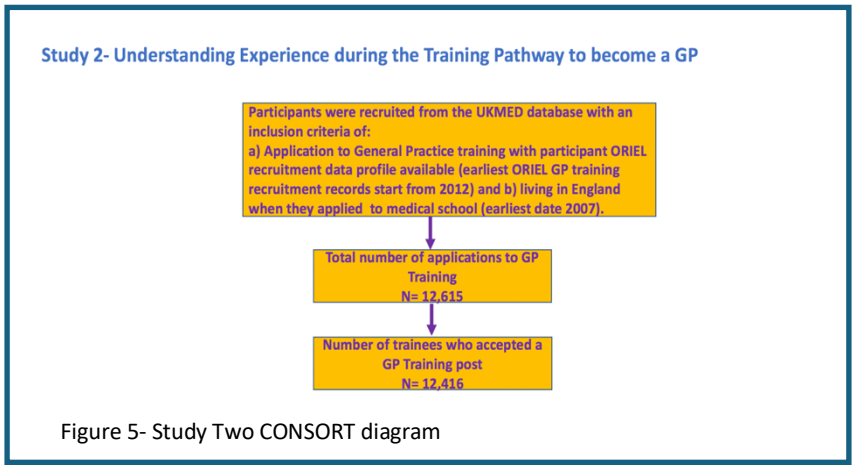


Figure 5- Study Two CONSORT diagram

3. Study Three

An in-depth national multicentre England wide retrospective cohort study of: (a) all individuals with an expected CCT date on or before 26/1/2022 who had (b) accepted a GP Training post via ORIEL since the earliest time of GP Training records (2013) with an ORIEL recruitment data profile available in UKMED and (c) who lived in England when they applied to medical school (n=7,418) with the aim of exploring equity in outcomes to GPHST by inequalities lenses solely and intersectionally. Study three investigates outcomes in GPHST solely and intersectionally by age, sex, deprivation, ethnicity, disability, sexual orientation and religion with respect to: i)

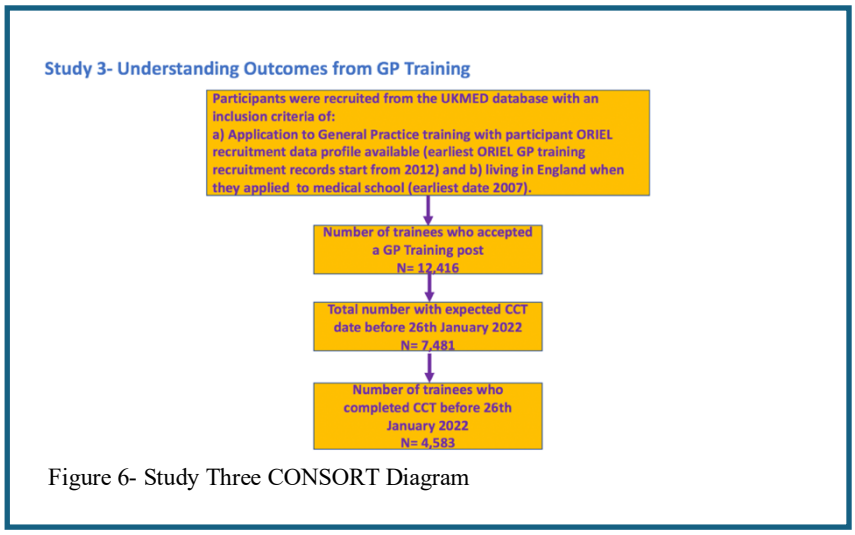


Figure 6- Study Three CONSORT Diagram

ARCP Outcomes, ii) CCT completion as well as the predictors of non-standard ARCP outcomes and timely CCT completion.

Data collection and variables

The UKMED database holds data on GP trainees including UCAS application, data, medical school data, postgraduate training data until the Certificate of completion of training is gained and the participant becomes a member of the specialist register. The use of linked individual-level data from the UK Medical Education Database enables a national-level analysis, drawing on data from sources including medical school assessment, FP selection and postgraduate assessment outcomes. UKMED is a partnership between data providers from across the education and health sectors. The data collated through UKMED are provided by:

- The Higher Education Statistics Agency
- UK Clinical Aptitude Test
- Graduate Australian Medical Schools Admissions Test
- General Medical Council
- UK Foundation Programme Office
- Health Education England, Postgraduate Deaneries and Local Education and Training Boards
- UK National Recruitment Offices

By linking these data, it is possible to create a large-scale, long-term body of information, in a database. Researchers make proposals to gain access to specific data from the database, with all proposals subject to a formal evaluation procedure including peer review of the novelty of the study, its scientific merit and contribution to policy. The scope of the research that can be undertaken through UKMED is potentially broad, ranging from analyses of selection tests in predicting future performance, to studying how socioeconomic background might affect an applicant's chance of acceptance to medicine and progression through their career. Understanding individuals' performance at different points during their study and medical career is helpful to understanding the factors that make doctors more or less likely to progress and succeed within the training pathways.

Index of Multiple Deprivation Score (IMD): Historically UKMED has contained the overall IMD data. This UKMED research proposal, which was approved with excellent peer review feedback, influenced the addition of the granular IMD domain and subdomain data to the unique longitudinal data extract provided resulting in a highly novel, granular UK wide longitudinal data set to support a unique

contribution to knowledge via this study. The overall Index of Multiple Deprivation includes seven unequally weighted domains including: Health and Disability (13.5%), Education and Training (13.5%) (with subdomains for Children and Young People's (CYP) deprivation and Adult Skills deprivation), Crime (9.3%), Barriers to Housing and Services (BHS) (9.3%) (including domains for wider Barriers to Housing and Services and Geographical Barriers), Living Environment (LE) (9.3%) (with subdomains for Indoor LE deprivation and Outdoor LE deprivation), Employment (22.5%) and Income (22.5%) (266). Each domain and sub-domain is on a scale of 1 (10% most deprived postcodes) - 10 (10% least deprived postcodes). Further detailed descriptions of IMD metrics are published by the UK Ministry of Housing, Communities and Local Government (119) (267). A summary diagram of the domains, indicators and statistical methods used to create the Indices of Deprivation is shown in figure 1 (267).

UCAS Tariff

UCAS tariff points are a way of measuring the relative value of all post-16 qualifications in the UK including GCSE and A-Level qualifications. The UCAS Tariff assigns a numerical score to the possible grades that can be achieved in each type of qualification (268).

UCAT

The University Clinical Aptitude Test (UCAT) is an admissions test, used by a consortium of UK Universities and non-UK associate member universities to help select applicants for their medical and dental degree programmes. The UCAT is comprised of five sections: Verbal reasoning, Decision reasoning, Quantitative Reasoning, Abstract Reasoning and Situational Judgement. The first four sections are assigned a quantitative score whilst the last section is assigned a band. The UCAT is used in collaboration with other admissions processes such as the UCAS tariff (61).

Educational Performance Measure (EPM)

Performance during medical school is measured within each medical school by the Educational Performance Measure which also known as the EPM. The EPM, out of is comprised of three components: a) a quantitative measure of the students' performance throughout medical school, in relation to their peers, using multiple assessments of their knowledge and practical skills over time; students are awarded 34 points for the 10th (lowest) decile to 43 points for students in the 1st (highest) decile, b) 0-5 points for additional degrees depending upon the grade achieved and c) 0-2 points available for additional publications (1 point per PUBMEDID cited 1st author publication). The EPM is used as part of the selection process into foundation training (269). The EPM decile is the only nationally available metric for educational attainment during medical school. However, a key

limitation is that it is norm referenced; it evaluates individual performance relative to the group. As such, it does not measure absolute competency but only indicates how one performs compared to peers, regardless of whether specific learning objectives are met. The EPM decile is influenced by the group composition making it inconsistent for comparisons across cohorts or medical schools.

Situational Judgement Test (SJT)

The Situational Judgement Test (SJT) is a test taken in the final year of medical school for employment as part of the selection process for entry to the Foundation and Specialised Foundation Programme (SFP) to test the attributes needed to work as a foundation doctor (16).

MRCGP Applied Knowledge Test (AKT) and Clinical Skills Assessment Score (CSA)

The Membership of the Royal College of General Practitioners (MRCGP) licensing examination is mandatory for all GPHST trainees to achieve their CCT and join the GP Specialist Register. The MRCGP examination comprises an Applied Knowledge Test, AKT, (200 Single Best Answer Questions) and a Clinical Skills Assessment, CSA, (OSCE). Participants must pass both the AKT and CSA to achieve their CCT and join the GP Specialist Register (15).

Postgraduate Training placements and ARCP Outcomes

The ARCP process is the means by which doctors in training are reviewed each year to ensure that they are offering safe, quality patient care, and to assess their progression against standards set down in the curriculum for their training programme. Each year during foundation training and GP training, trainees are given an outcome of 1-6 (figure 7). For trainees in training, outcomes 1,2 and 6 are described as standard ARCP outcomes whereas outcomes 3,4 or 5 are described as non-standard ARCP outcomes or developmental outcomes (116).

ARCP OUTCOME	Outcome Explanation
OUTCOME 1	Satisfactory progress – Achieving progress and the development of competences at the expected rate
OUTCOME 2	Development of specific competences required – Additional training time not required
OUTCOME 3	Inadequate progress – Additional training time required
OUTCOME 4	Released from training programme – With or without specified competences
OUTCOME 5	Incomplete evidence presented – Additional training time may be required
OUTCOME 6	6a. Gained all required competencies for the programme (clinical) 6b. Gained all required competencies for the programme (academic) 6c. Gained all required competencies for the programme (non-clinical)
OUTCOME 7	7.1 Satisfactory progress in or completion of the LAT / FTSTA placement 7.2 Development of specific competences required – additional training time not required 7.3 Inadequate progress by the trainee – additional training time 7.4 Incomplete evidence presented – LAT / FTSTA placement
OUTCOME 8	Out of programme for clinical experience, research or a career break (OOPE/OOPR/OOPC)
OUTCOME 9 Post-CCST	9.1 Satisfactory progress in or completion of post-CCST training 9.2 Development of specific competencies required- additional training time not required 9.3 Inadequate progress by the trainee- additional training time required 9.4 Incomplete evidence presented

Figure 7- ARCP Outcome Explanations

Length of time to Certificate of Completion of Training

The length of time to CCT is defined as the period from provisional registration until membership on the GMC register. Data to the GMC register is updated daily. Data for this study was extracted on 26/01/2022. Timely CCT in this study is defined as up to 90 days after the expected CCT date.

4.3 Statistical analysis

Baseline characteristics were presented as mean and standard deviation (SD) for continuous variables and median and interquartile range (IQR) for non-parametric data. Normality was assessed by Shapiro-Wilk. For categorical and ordinal variables with non-parametric distribution, Fisher's exact test and Mann Whitney U test were used respectively for comparisons between two groups. Multiple data imputation was used to address the issue of missing data. Statistical analyses were carried out using SPSS V.24.

Study One

Kendall's tau B was used to measure the trends between year of application to GPHST with both age and deprivation domain deciles. Descriptive analyses were used to quantify overall trends between 2013-2020 of applicants by sex, disability, ethnicity and sexual orientation.

Fisher's exact test was used to investigate whether there is a statistically significant difference in: (a) sole applicants to GPHST in comparison with those who applied in combination with other specialities, (b) direct applicants from foundation training to GPHST in comparison with applicants who applied to GPHST later down the line, (c) applicants who were offered a GPHST training number in comparison with those who were not. Analyses were carried out by sex, ethnicity (level 1 and level 2), disability, sexual orientation, religion and quintiles for deprivation forms (overall IMD, domains and subdomains).

Mann Whitney U test was used to identify whether there is a statistically significant difference in age between: (a) sole applicants to GPHST in comparison with those who applied in combination with other specialities, (b) direct applicants from foundation training to GPHST in comparison with applicants who applied to GPHST later down the line and (c) applicants who were offered a GPHST training number.

Two decision tree models were constructed using a CHAID algorithm analysis to model the interaction between multiple intersecting factors. Decision trees are a nonparametric method that does not presuppose any distribution for the data. The CHAID algorithm, as described by Kass (1980), works by identifying the optimal combination of continuous and/or categorical independent variables to predict a binary outcome (270). It uses "if-then" logic and divides each independent

variable into exclusive groups, ensuring each group is as similar as possible. The CHAID algorithm involves a process of merging, splitting, and stopping based on specific criteria (270). Initially, it merges categories of each predictor variable that are not significantly different, based on a series of steps involving cross-tabulation, χ^2-tests of independence, and Bonferroni adjustments for controlling Type I error rate. If a category is too small, it's combined with a similar category. Following the merging phase, CHAID selects the most significant predictor variable to split the data into distinct nodes, using χ^2-tests and adjusted P values. A predictor is chosen for the split if its P value is below a predefined threshold; if not, the node becomes terminal. Finally, the stopping phase is determined by user-defined rules, such as reaching the maximum tree depth, a node being too small, or resulting child nodes being below the minimum size. The CHAID algorithm was applied to both train and test datasets, often with a typical split where 50% of the data is used for training to build the model, and the remaining 50% is used for testing to evaluate/validate the model's performance. The algorithm stops growing the tree when these conditions are met. CHAID accuracy was expressed as percentages.

Study Two

Spearman's correlations were used to explore whether there is a correlation between age and performance in the MRCGP AKT and CSA. Mann Whitney U tests were used to identify whether there is a statistically significant difference by sex (male v female), deprivation (most deprived quintile v all other quintiles) and disability (disability v no disability). Fisher's exact test was used to investigate whether there is a statistically significant difference by ethnicity, religion, sexual orientation.

Longitudinal differential attainment during undergraduate training (UCAS to EPM) and postgraduate training (EPM to AKT) was evaluated through the equalities lenses: sex, age, ethnicity (ethnic minority v White) and each level 1 ethnic group v the reference category (White), IMD, Adult Skills deprivation, CYP deprivation, Income deprivation, Employment deprivation, Income support, free school meals, disability, sexual orientation and religion. To allow like for like comparisons of performance from UCAS tariff to EPM and EPM to AKT, scores were converted to Z-scores. A Z-score is a standardised measurement, where a score of zero indicates the candidate has received exactly the mean mark on the assessment. A Z-score of +/−1 indicates they have received a mark one standard deviation above or below the mean, respectively. This is analytically helpful because it allows for comparisons where relative (rather than absolute) differences are important. If a candidate receives a mark of 85 on one assessment and 95 on two different assessments, it is

difficult to know which one they performed better on and particularly how they performed in relation to their peers in both contexts. If the X-score for each assessment is zero, this indicates that performance is of the same level relative to their peers and that they are both average. Cohen's d was calculated to determine effect sizes. Welch's t-test was used for significance testing as a robust alternative to other t-tests.

Two binary logistic regression analyses were run, involving all participants in study 2, to predict the characteristics of passing the MRCGP AKT and MRCGP CSA successfully on first attempt. Variables entered into the modelling included: demographics (Sex, Ethnicity, Age, Graduate on entry to Medical school, Type of School, deprivation domains and subdomains, disability, sexual orientation, religion, UCAT bursary), educational performance (UCAS tariff, UCAT test subsection scores, SJT score, EPM decile), training (undergraduate region of training, type of undergraduate course, postgraduate region of training, LTFT, Academic trainee, Military trainee). Modelling was carried out using level 1 and level 2 ethnicity categorisations. In binary logistic regression analyses predicting the characteristics of passing the MRCGP CSA on first attempt, an additional variable was added, namely, performance in MRCGP AKT on first attempt.

The extent of (in)equity in academic attainment in the MRCGP AKT and CSA is calculated by $GINI_{AKT}$ and $GINI_{CSA}$. $GINI_{AKT}$ and $GINI_{CSA}$ coefficients are calculated by the equation below which is described in the study by Deaton 1997 and further discussed by Thomas et al. (2001) (35) and applied to the measurement of inequalities in academic attainment by David-Hadar 2008 (237). The Gini index is the Gini coefficient multiplied by 100, which expresses the Gini coefficient as a percentage.

$$GINI = \frac{1}{\mu N(N-1)} \sum_{i>j} \sum_{j} |y_i - y_j|$$

Where $GINI_{AKT}$ and $GINI_{CSA}$ are the AKT GINI and CSA GINI respectively
μ is the mean of the variable (score e.g)
N is the total number of observations
Y_i and y_j are scores of individuals in the AKT and CSA respectively

As educational attainment data for the MRCGP AKT and CSA is available to us in this study at national level, and this constitutes a continuous variable, and we are interested in the extent to which attainment is equitable distinctly for each examination, there was no need to modify the aforementioned formula to treat education as a discrete variable as has been the case in Baro and Lee 1993 (34), Mesa 2007 (36), Thomas et al. 2001 (35) where data relating to educational

attainment was not available or the educational data under consideration only existed in a discrete format (e.g-number of years of schooling) or whereby, as is the case with Dadon-Golan 2019 (38), academic attainment from a number of examinations have been collated with EGini being applied to explore the extent to which there is equity between average performance across 7 groupings made according to the number of units taken.

$GINI_{AKT}$ and $GINI_{CSA}$ are calculated for each year from 2014-2020 for the AKT and 2015-2020 for the CSA for each of the equalities lenses: sex (male, female), age (graduate entrant to medicine v non graduate entrant to medicine), level 1 ethnicities (Asian or Asian Black, Black or Black British, Mixed, White), Disability (disability, no declared disability), Sexual orientation (Heterosexual, LGBTQ+), Religion (religion, no religion), Deprivation (most deprived quintiles for IMD, CYP, Adult skills deprivation, Income and Employment, all other respective quintiles).

Study Three

Fisher's exact test was used to identify whether there is a statistically significant difference by age (graduate entry medicine v non graduate entry medicine), ethnicity, disability, sex, religion, sexual orientation and religion between individuals with: (a) standard ARCP progression outcomes at every progression point in comparison to those with 1 or more non-standard ARCP outcomes, (b) CCT completion in comparison with those who did not complete CCT and (c) timely CCT completion in comparison to those who did not complete CCT timely. Spearman rank correlations were used to identify whether there were statistically significant correlation associations between pre-medical school deprivation forms and length of time to CCT.

Two binary logistic regression analyses were run, involving all participants in study 3, to predict the characteristics of non-standard ARCP outcomes during training and timely CCT completion respectively. Variables entered into the modelling included: demographics (Sex, Ethnicity, Age, Graduate on entry to Medical school, Type of School, deprivation domains and subdomains, disability, sexual orientation, religion, UCAT bursary), educational performance (UCAS tariff, UCAT test subsection scores, SJT score, EPM decile), training (undergraduate region of training, type of undergraduate course, postgraduate region of training, LTFT, Academic trainee, Military trainee). Modelling was carried out using level 1 and level 2 ethnicity categorisations.

Patient and Public Involvement

UKMED engage patients and the public when developing processes around research involving participant data including data studies of this kind. Medical education studies of this kind are used to improve patient care and outcomes, for example, through policies relating to learning and development and workforce planning. Participant data is anonymised, and participants have the right to opt-out their confidential information from being used for research purposes.

Ethical Approval

Ethical approval was obtained following peer review of the academic proposal by Queen Mary University of London (appendix 1) and reciprocal ethical approval was provided by the University of Lancaster (appendix 2).

Chapter 5: Results

Chapter 5 Overview: Results

This chapter outlines the results from the three studies which are presented within this thesis. This chapter is structured to present all the findings from each study, rather than emphasising only the key findings, to ensure transparency and comprehensiveness, particularly given the focus across all three studies on equalities. This approach allows for a nuanced understanding of how equities manifest across various dimensions, ensuring that subtler patterns of equity are not overshadowed by more prominent results. By outlining all outcomes, the chapter avoids selective reporting, reducing potential bias and capturing the full spectrum of data, which is crucial for a subject as complex and multi-faceted as explorations of (in)equity. This approach also ensures that less obvious but still significant areas of (in)equity are highlighted, providing a foundation for a thorough and inclusive discussion. Explaining this reasoning aligns the structure of the chapter with the study's commitment to rigor and its ethical responsibility to fully explore and address the dimensions of (in)equity uncovered.

5.1 Study One Results

This section presents the findings of the comprehensive analyses of access to GPHST through each of the equalities lenses: sex, age, ethnicity, socioeconomic status, disability, sexual orientation and religion. Analyses are presented for: trends in applications for GPHST, commitment to applying solely for GPHST, the timing of application for GPHST and successful offer of a GPHST national training number. Results from two tree analyses are presented demonstrating the complex intersectionality of factors among those who apply solely to GPHST and directly to GPHST from foundation training.

Table 3 summarises the descriptive demographic data of the study population for each year from 2013-2020 disaggregated by applicants who applied solely for GPHST (n=7118, 65.3%) and those who applied for GPHST in combination with other specialities (n=3784, 34.7%) by sex, course type, teaching style, prior degree status, school type, ethnicity (level 2), ethnicity (level 1), sexual orientation, disability, free school meals, parental education, income support, Overall Index of Multiple Deprivation, IMD domains: LE, Income, Health and Disability, Crime, Education, Employment, BHS and IMD subdomains: Indoor LE, Outdoor LE, CYP, Adult Skills, Geographical Barriers, wBHS.

5.1.1 Observed trends in all applications to GPHST throughout the study period (2013-2020)

Sex: Generally, throughout the study period between 2013-2020, on average about 60% of applications to GPHST were consistently made by women and about 40% made by men.

Age: Applicants to GPHST became younger during the study period (τ_b = -0.130, p <0.001).

Ethnicity: Over the study period, looking at the high-level ethnicity coding (level 1), it is evident there was a general reduction in the proportion of White applicants from 2013 (78%) to 2020 (57%) and an increase in the proportion of applications from non-White groups. The biggest increases can be seen among applicants of Black ethnic group from 2013 (1.2%) to 2020 (5.7%) and Asian origin from 2013 (10.8%) to 2020 (30.8%) (figure 8).

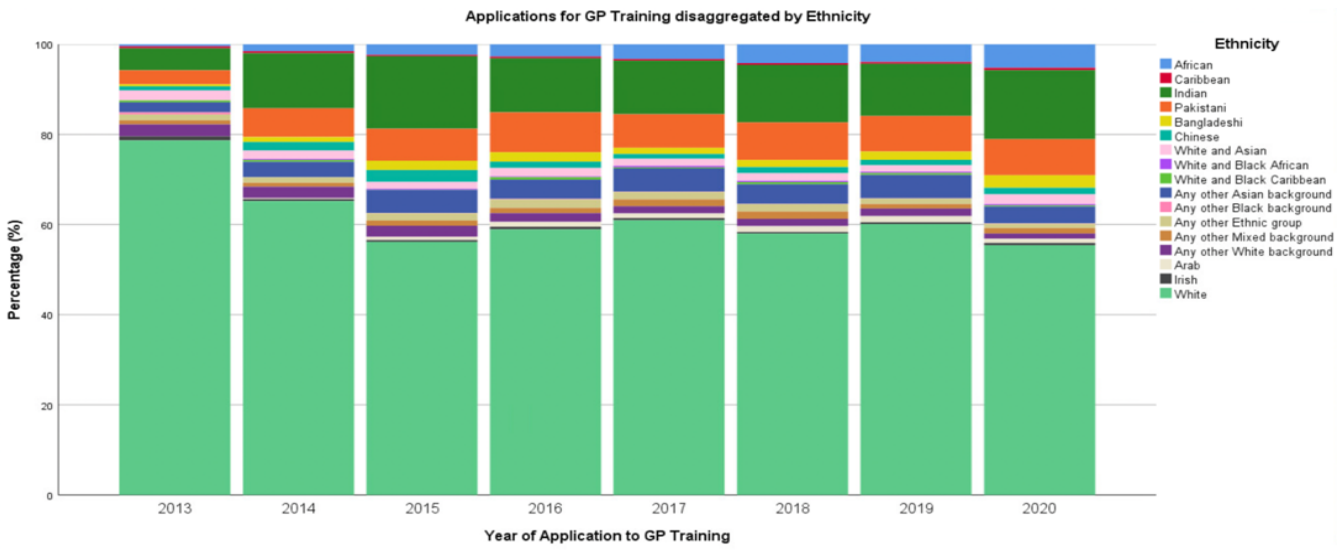


Figure 8- A graph of applications for GPHST between 2013 and 2020 disaggregated by Level 2 Ethnicity

Deprivation: Throughout the study period from 2013-2020, there was no statistically significant change in the proportion of applicants for to GPHST who lived pre-medical school in the most deprived areas according to the overall IMD (τ_b = 0.010, p = 0.152). However, over the study period from 2013-2020, there was a statistically significant greater proportion of applicants to GPHST from areas of higher CYP deprivation (τ_b = 0.147, p <0.001), Adult Skills deprivation (τ_b = 0.148, p <0.001) and Education skills deprivation (τ_b = 0.146, p = <0.001). Conversely, over the study period from 2013-2020, there were a statistically significant reduction in the number of applicants to GPHST from areas of higher Geographical barriers deprivation (τ_b = -0.055, p <0.001), LE deprivation (τ_b = -0.057, p <0.001), Indoor LE deprivation (τ_b = -0.065, p<0.001), Outdoor LE deprivation (τ_b = -0.037, p<0.001) and Employment deprivation (τ_b = -0.082, p<0.001). Nevertheless, over the study period from 2013-2020, there was no statistically significant change in the proportion of applicants for to GPHST who lived pre-medical school in the most deprived areas: BHS deprivation (τ_b = 0.002, p =0.796)**,** wBHS deprivation (τ_b = -0.002, p =0.819)**,** Income deprivation (τ_b = 0.003, p =0.652), Health and Disability deprviation (τ_b = 0.008, p=0.236) and Crime deprivation (τ_b = 0.001, p=0.854).

Disability: Over the study period, there was a steady increase in the proportion of applicants to GPHST with a declared disability between 2013 (4%) to 2020 (10.8%).

Sexual Orientation: Over the study period, there was an increase in the proportion of applicants to GPHST declaring sexual orientation of Lesbian/Gay between 2013 (0.4%) to 2020 (3.1%). There was

also an increase in the proportion of applicants to GPHST declaring sexual orientation of Bisexual from 2013 (0%) to 2020 (1.3%).

Religion: Over the study period, here was an increase in the proportion of applicants from non-Christian believers with the biggest increases among Islam and Hinduism.

5.1.2 Sole application to GPHST, Direct application to GPHST and Successful offer of a GPHST National Training Number

Table 4 summarises the descriptive demographic data over the study period from 2013-2020 disaggregated by those who applied to GPHST directly after foundation training (n=7189, n=65.9%), those who applied to GPHST indirectly further down the line after time out of training (n=3713, n=34.1%) and those who were successfully offered a GPHST National Training Number (n=9047, 83.0%) by sex, course type, teaching style, prior degree status, school type, ethnicity (level 2), ethnicity (level 1), sexual orientation, disability, free school meals, parental education, income support, Overall Index of Multiple Deprivation, IMD domains: LE, Income, Health and Disability, Crime, Education, Employment, BHS and IMD subdomains: Indoor LE, Outdoor LE, CYP, Adult Skills, Geographical Barriers, wBHS. Odds ratios are presented (table 5) for: a) sole application to GPHST v application to GPHST with other specialities (figure 9) , b) Direct application to GPHST v application to GPHST later down the line (figure 10) , c) Successful offer of a GPHST National training number (figure 11), disaggregated by equalities lenses of course type (graduate entry or standard entry medicine) as a surrogate for age, sex, ethnicity (level 1), ethnicity (level 2), deprivation, disability, sexual orientation and religion.

5.1.2.1 Sole application to GPHST

Sex: Female trainees were more likely than male trainees to apply solely for GPHST than in conjunction with other specialities [OR 1.119 (1.031 to 1.213), p=0.007].

Age: Applicants who applied solely to GPHST were statistically younger than those who applied to GPHST with other specialities [U(3784,7118)=11747528.50, z=-11.066, p<0.001]. SEM graduates who tended to be younger were more 1.4x likely to apply solely for GPHST [OR 1.398 (1.260-1.552), p=0.0001] in comparison with GEM graduates who tended to be older having undertaken a previous higher education qualification first.

Level 1 ethnicity: White trainees were 1.4x more likely than all ethnic minority trainees to apply solely for GPHST [OR 1.353 (1.246 to 1.469), p<0.0001]. Asian or Asian British groups were 1.3x more likely than White trainees to apply for GPHST in conjunction with other specialities [OR 1.341 (1.225 to 1.467), p<0.0001]. Trainees from any other ethnic group were less than half as likely as White trainees to apply solely for GPHST [OR (0.4711 (0.368-0.604), p=0.0001]. There was no statistically significant difference in sole applications to GPHST v applications made to GPHST in conjunction with other specialities among Black or Black British trainees (p=0.121) or Mixed ethnicity trainees (p=0.089).

Level 2 ethnicity: White trainees were 1.4x more likely than all ethnic minority trainees to apply solely for GPHST [OR (1.401 (1.291-1.520), p=0.0001]. Some disaggregated ethnic groups were less likely to apply solely to GPHST in comparison to their White counterparts: Pakistani [OR 0.720 (0.619-0.837), p=0.0001], Indian [OR 0.813 (0.719-0.920], p=0.001], Any other White Ethnic Group [OR 0.547 (0.410-0.729), p=0.0001], Chinese [OR 0.471 (0.344-0.646), p=0.0001], Arab [OR 0.445 (0.301-0.657), p=0.0001, Any other Asian ethnic group [OR 0.613 (0.508-0.741), p=0.0001] and Any other Mixed Group [OR 0.677 (0.476-0.962), p=0.030] and Any other ethnic group [OR 0.471 (0.344-0.646), p=0.0001]. In fact, the aforementioned groups were more likely than their White counterparts to apply for GPHST in combination with other specialities: Pakistani 1.4x [OR 1.389 (1.195-1.616), P<0.0001], Indian 1.2x [OR 1.230 (1.087-1.392), p=0.001], Any other white ethnic group 1.8x [OR 1.829 (1.372-2.439), p<0.0001], Chinese 2.1x [OR 2.122 (1.548-2.909), p<0.0001], Arab 2.2x [OR 2.247 (1.521-3.318), p<0.0001], Any other Asian ethnic group 1.6x [OR 1.630 (1.349-1.971), p<0.0001], Any other mixed group 1.5x [OR 1.478 (1.040-2.102), p=0.030], Any other ethnic group 2.1x [OR 2.122 (1.548-2.909), p<0.0001]. There was no statistically significant difference in the proportion of sole applications to GPHST as opposed to applications made for GPHST with other specialties from the following ethnic groups in comparison to their White counterparts: Irish (p=0.305), Bangladeshi (p=0.217), African (p=0.067), Caribbean (p=0.946), Any other Black Ethnic group (p=0.925), White and Asian ethnic group (p=0.775), White and Black African (p=0.290), White and Black Caribbean (p=0.609).

Deprivation (most deprived quintile v least deprived quintile): GPHST applicants who lived pre-medical school in the most deprived quintiles for Adult Skills Deprivation [OR 1.159 (1.015-1.324), p=0.030] were 1.2x more likely to apply solely to GPHST. GPHST applicants who lived pre-medical school in the most deprived quintiles for the following deprivation forms were less likely to apply

solely for GPHST in comparison with trainees from the least deprived quintiles: Overall IMD [OR 0.770 (0.671-0.882), p=0.0002], LE [OR 0.712 (0.632-0.802), p=0.0001], Indoor LE [OR 0.785 (0.697-0.884), p=0.0001], Outdoor LE [OR 0.241 (0.216-0.269), p=0.0001], Income [OR 0.764 (0.671-0.869), p=0.0001], Employment [OR 0.809 (0.703-0.931),p=0.003], Crime [OR 0.669 (0.588-0.760), p=0.0001] and Education [OR 0.846 (0.721-0.991), p=0.039].. There was no statistically significant difference between applications made solely for GPHST from applicants who lived pre-medical school in the most deprived quintiles for: BHS (p=0.057), wBHS (p=0.925), Geographical Barriers (p=0.901), CYP (p=0.225) and Health and Disability (p=0.060).

Deprivation (most deprived quintile v all other quintiles): GPHST applicants who lived pre-medical school in the most deprived quintiles for the following deprivation forms were less likely to apply solely for GPHST in comparison with trainees from all other quintiles: IMD [OR 0.812 (0.717 to 0.920), p=0.001], LE (OR 0.759 (0.693 to 0.832), p<0.0001), Indoor LE [OR 0.814 (0.742 to 0.893), p<0.0001], Outdoor LE [OR 0.733 (0.671 to 0.801), p<0.0001], Income [OR 0.816 (0.726 to 0.916), p=0.001, Employment [OR 0.849 (0.746 to 0.967), p=0.013], Health and Disability [OR 0.873 (0.769 to 0.991), p=0.036], Crime [OR 0.820 (0.736 to 0.913), p=0.0003]. There was no statistically significant difference between applications made solely for GPHST from applicants who lived pre-medical school in the most deprived quintiles for: Education (p=0.071), CYP (P=0.572), Adult (p=0.287), BHS (p=0.177), Geographical Barriers (p=0.148) and wBHS (p=0.140) in comparison with all other quintiles.

Disability: Trainees with declared disability were more likely to apply solely for GPHST [OR 1.182 (1.020 to 1.370), p=0.027] in comparison to those without a declared disability.

Sexual Orientation: There was no statistically significant difference between the odds of making a sole application to GPHST solely versus in conjunction with other specialities among trainees declaring a Bisexual sexual orientation (p=0.753) or a Lesbian/Gay sexual orientation (p=0.518) in comparison with Heterosexual trainees.

Religion: Trainees declaring they have no religious belief were 1.2x more likely than trainees with one of the 6 main worldwide religious beliefs (Buddhism, Christianity, Hindu, Judaism, Islam, Sikh) to apply solely to GPHST rather than in combination with other specialities [OR 1.161 (1.057-1.276), p=0.002]. When disaggregated, trainees declaring a religious belief of Islam [OR 0.718 (0.624-0.825), p=0.0001] and Hinduism [OR 0.837 (0.701-0.999), p=0.049], were less likely to apply solely to GPHST

and more likely to apply to GPHST in combination with other specialities. In actual fact, trainees declaring an affiliation with Islam were 1.4x more likely to apply for GPHST in combination with other specialities [OR 1.393 (1.212 to 1.602), p<0.0001] and Hinduism were 1.2x more likely to apply for GPHST in combination with other specialities [OR 1.195 (1.001 to 1.428), p=0.049]. There was no statistically significant difference in the proportion of applications made to GP training solely and in conjunction with other specialities between trainees who declared they had no religious affiliation and trainees who declared a religious affiliation with: Buddhism (p=0.461), Sikh (p=0.770), Christian (p=0.320), Judaism (p=0.389).

5.1.2.2 Direct application to GPHST

Sex: There was no statistically significant difference between the proportion of male and female trainees applying to GPHST directly (p=0.103).

Age: Applicants who applied directly to GPHST were statistically younger than those who applied to GPHST later [U(3713,7189)=11972483.50, z=-8.881, p<0.001].

Level 1 Ethnicity: White trainees were less likely than ethnic minority trainees to apply to GPHST directly after foundation training [OR 0.631 (0.579-0.687), p=0.0001]. Ethnic minority trainees were 1.5x more likely to apply to GPHST directly after foundation training [OR 1.586 (1.457-1.727), p<0.0001]. When ethnic groups are disaggregated, trainees declaring their ethnicity as Asian or Asian British [OR 1.850 (1.679-2.038), p=0.0001] and Any other ethnic group [OR 1.749 (1.321-2.315), p=0.0001] were more likely than trainees declaring their ethnicity as White to apply to GPHST directly from foundation training. There was no statistically significant difference in the proportion of those applying directly to GPHST after foundation training as opposed to later down the line between trainees declaring their ethnicity as White and: Black or Black British [OR 0.902 (0.734-1.109), p=0.328] or Mixed [OR 0.828 (0.667=1.029), p=0.089].

Level 2 Ethnicity: White trainees were less likely than ethnic minority trainees to apply to GPHST directly after foundation training [OR 0.634 (0.583-0.689), p=0.0001]. When ethnic groups were disaggregated according to Level 2 ethnicity, the following groups were more likely to apply to GPHST directly after foundation training: Pakistani 1.9x more likely [OR 1.914 (1.618-2.265), p=0.0001], Indian 1.9x more likely [OR 1.850 (1.619-2.114), p=0.0001], Bangladeshi 1.8x more likely [OR 1.813 (1.302-2.526), p=0.0004], Chinese 2x more likely [OR 1.966 (1.361-2.840), p=0.0003], Arab

1.9x more likely [OR 1.926 (1.224-3.031), p=0.005] and Any other Asian Ethnic Group 1.8x more likely [OR 1.806 (1.460-2.234), p=0.0001] and Any other ethnic group 1.7x more likely [OR 1.665 (1.169-2.372), p=0.0047]. There was no statistically significant difference between in the proportion of those applying directly to GPHST after foundation training as opposed to later down the line between trainees declaring their ethnicity as White and: Irish (p=0.753), Any other White ethnic group (p=0.144), Any other Black ethnic group (p=0.766), White and Asian (p=0.796), White and Black African (p=0.290), White and Black Caribbean (p=0.334), Any other mixed group (p=0.775).

Deprivation (most deprived quintile v least deprived quintile): GPHST applicants who had lived pre-medical school in the most deprived quintiles for the following deprivation forms were less likely to apply for GPHST directly after training in comparison with trainees from the following least deprived quintiles: IMD [OR 0.785 (0.687 to 0.896], p=0.0003], Education [0.790 (0.672 to 0.929), p=0.004], wBHS [OR 0.419 (0.383 to 0.459), p<0.0001], LE [OR 0.855 (0.777 to 0.940), p=0.001], Indoor LE [OR 0.837 (0.794 to 0.961), p=0.006], Outdoor LE [OR 0.839 (0.765 to 0.921), p=0.0002], Income [OR 0.792 (0.700 to 0.900), p=0.0002}, Employment [OR 0.823 (0.718 to 0.943), p=0.005], Health and Disability [OR 0.774 (0.676 to 0.885), p=0.0002], Crime [OR 0.851 (0.760 to 0.952), p=0.005]. There was no statistically significant difference between trainees applying to GPHST directly after training from the most deprived quintiles of the following deprivation forms in comparison with all other respective quintiles: CYP (p=0.156), Adult skills (p=0.064), BHS (p=0.429), Geographical Barriers (p=0.426).

Deprivation (most deprived quintile v all other quintiles): GPHST applicants who had lived pre-medical school in the most deprived quintiles for the following deprivation forms were more likely to apply for GPHST directly after training in comparison with trainees from the following all other quintiles: IMD [OR 1.275 (1.117=1.455), p=0.0003], LE [OR 1.170 (1.064-1.287), p=0.001], Indoor LE [OR 1.145 (1.040-1.259), p=0.006], Outdoor LE [1.284 (1.152-1.431), p=0.0001], Income [OR 1.264 (1.117-1.430), p=0.0002], Employment [OR 1.216 (1.061-1.393), p=0.005], Health and Disability [OR 1.293 (1.131-1.479), p=0.0002], Health and Disability [OR 1.293 (1.131-1.479), p=0.0002], Crime [OR 1.175 (1.050-1.316), p=0.005], Education [OR 1.267 (1.077-1.489), p=0.004]. There was no statistically significant difference between trainees applying to GPHST directly after training from the most deprived quintiles of the following deprivation forms in comparison with all other respective quintiles: CYP (p=0.156), Adult (p=0.064), BHS (p=0.429), Geographical Barriers (p=0.426), wBHS (p=0.311).

Disability: There was no statistically significant difference in the proportion of trainees applying to GPHST directly after foundation training between trainees with a declared disability and those without (p=0.528).

Sexual Orientation: Heterosexual trainees were more likely than trainees of other sexual orientation to apply to GPHST directly after foundation training [OR 1.856 (1.475-2.336), p=0.0001]. Bisexual trainees were less likely than Heterosexual trainees to apply directly to GPHST after foundation training [OR 0.472 (0.301 to 0.742), p=0.001]. Lesbian/Gay trainees were also less likely than Heterosexual trainees to apply directly to GPHST after foundation training [OR 0.570 (0.432 to 0.753), p=0.0001].

Religion: Applicants who declared their religion as one of the 6 main worldwide religions (Buddhism, Christianity, Hinduism, Judaism, Islam and Sikhism) were 1.5x more likely to apply directly to GPHST [OR 1.537 (1.401-1.685), p<0.0001] in comparison with applicants who declared they had no religious beliefs. When disaggregated, in comparison to trainees with no religion, trainees declaring their religion as Buddhism were 2.4x more likely to apply to GPHST directly after foundation training [OR 2.368 (1.273 to 4.406), p=0.007], Islam were 2.2x more likely to apply to GPHST directly after foundation training [OR 2.227 (1.911 to 2.597), p<0.0001], Sikhism were 2.9x more likely to apply to GPHST directly after foundation training [OR 2.881 (2.010 to 4.130), p<0.0001], Hinduism were 1.9x more likely to apply to GPHST directly after foundation training [OR 1.862 (1.523 to 2.276), p<0.0001] and Christian were 1.3x more likely to apply to GPHST directly after foundation training [OR 1.348 (1.211 to 1.501), p=0.0001]. There was no statistically significant difference between the stage of application to GPHST among trainees declaring a religious affiliation with Judaism (p=0.112).

5.1.2.3 Successful Offer of GPHST National Training Number

Sex: Overall, female applicants were more likely to be offered a GPHST training number in comparison with male trainees [OR 1.387 (1.253 to 1.535), p<0.0001].

Age: Applicants who were offered a GPHST training number were statistically more likely to be older [U(1855,9047)=7089742.000, z=-10.609, p<0.001].

Level 1 Ethnicity: There was no statistically significant difference in the likelihood of being offered a GPHST training number between White applicants and Ethnic minority applicants (p=0.130). When ethnic groups are disaggregated there is no statistically significant difference in likelihood of being

offered a GPHST training number between White applicants and applicants from: Mixed ethnicity (p=0.076), Asian or Asian British ethnicity (p=0.877), Black or Black British ethnicity (p=0.077) or Any other ethnic group (p=0.107).

Level 2 Ethnicity: When ethnic groups are disaggregated, there was no statistically significant difference between the proportion of national training numbers offered by White ethnic groups and each of the ethnic groups except African [OR 0.733 (0.562-0.957), p=0.023] and Any other ethnic group [OR 0.600 (0.415-0.865), p=0.006] which were less likely than applicants of White ethnicity to be offered a GPHST national training number. However, it is important to note the caveat that both groups have relatively small n numbers.

Deprivation (most deprived quintile v least deprived quintile): GPHST applicants who had lived pre-medical school in the most deprived quintiles for the following deprivation forms were less likely to be offered a GPHST training number in comparison with applicants from the least deprived quintile: LE [OR 0.858 (0.740-0.995), p=0.043], Income [OR 0.843 (0.730=0.975), p=0.021], Crime [OR 0.824 (0.701-0.968), p=0.019], Adult Skills [OR 1.225 (1.033-1.453), p=0.020]. There was no statistically significant difference in the likelihood of being offered a GPHST training number from the most deprived quintiles of the following deprivation forms in comparison with applicants from the least deprived quintiles: IMD (p=0.144), Indoor LE (P=0.087), Outdoor LE (p=0.163), Employment (p=0.612), Health and Disability (p=0.320), Education (p=0.282), CYP (p=0.161), BHS (p=0.455), Geographical Barriers (p=0.421) and wBHS (p=0.183).

Deprivation (most deprived quintile v all other quintiles): GPHST applicants who had lived pre-medical school in the most deprived quintiles for the following deprivation forms were less likely to be offered a GPHST training number in comparison with applicants from all other quintiles: IMD [OR 0.846 (0.725 to 0.987), p=0.034], LE [OR 0.833 (0.743 to 0.934), p=0.002], Indoor LE [OR 0.856 (0.762 to 0.961), p=0.009], Outdoor LE [OR 0.859 (0.768 to 0.961), p=0.008] and Income [OR 0.843 (0.730 to 0.975), p=0.021]. There was no statistically significant difference in the likelihood of being offered a GPHST training number from the most deprived quintiles of the following deprivation forms in comparison with applicants from all other quintiles: Education (p=0.175), CYP deprivation (p=0.161), Adult skills (p=0.161), BHS (p=0.738), Geographical barriers (p=0.479), wBHS (p=0.072), Employment (p=0.409), Health and Disability (p=0.320) and Crime (p=0.126).

Disability: There was no statistically significant difference in the proportion of applicants offered a GPHST training number with a declared disability and those without (p=0.276).

Sexual Orientation: Heterosexual trainees were more likely than trainees of other sexual orientation to successfully get a national training number in GPHST [OR 1.451 (1.096-1.921), p=0.009]. Trainees declaring their sexual orientation as lesbian/gay were less likely to successfully get a national training number in GPHST [OR 0.690 (0.492-0.969), p=0.032]. There was no statistical significance in successfully being offered a GPHST national training number for trainees declaring their sexual orientation as bisexual (p=0.121) in comparison with trainees declaring their sexuality as heterosexual.

Religion: There was no statistically significant difference in being offered a GPHST national training number among applicants with no declared religious affiliation and with one of the 6 main worldwide religions (Buddhism, Christianity, Hinduism, Judaism, Islam and Sikhism) (p=0.422). When disaggregated, in comparison to trainees with no religion, there was no statistically significant difference in offer of a GPHST training number among applicants declaring their religion as follows: Buddhist (p=0.388), Christian (p=0.306), Hinduism (p=0.140), Judaism (p=0.650), Islam (p=0.319), Sikhism (p=0.455).

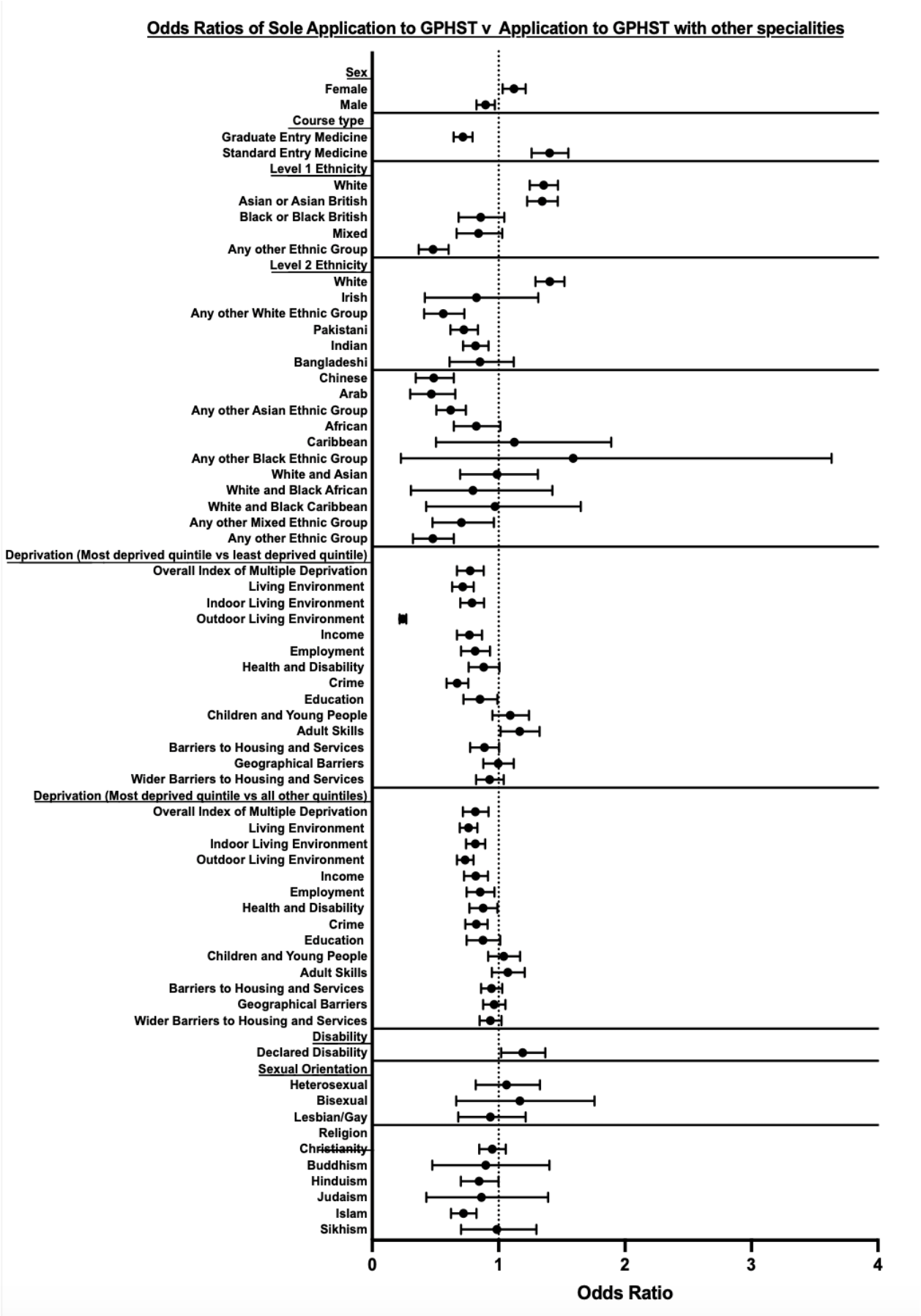


Figure 9: Study One: Odds Ratios of Sole Application to GPHST v Application to GPHST with other specialities

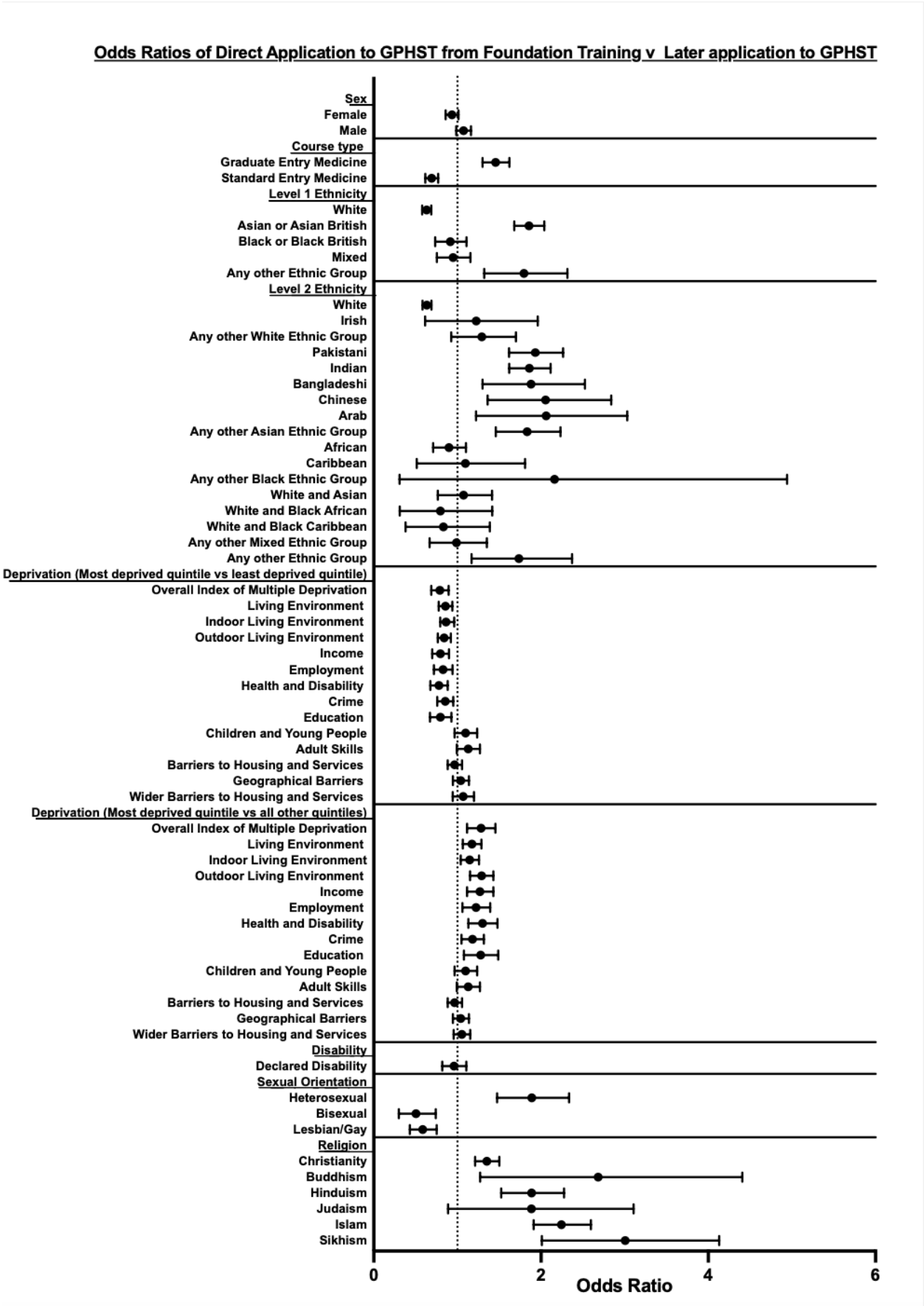


Figure 10: Study One: Odds Ratios of Direct Application to GPHST from foundation training v later application to GPHST

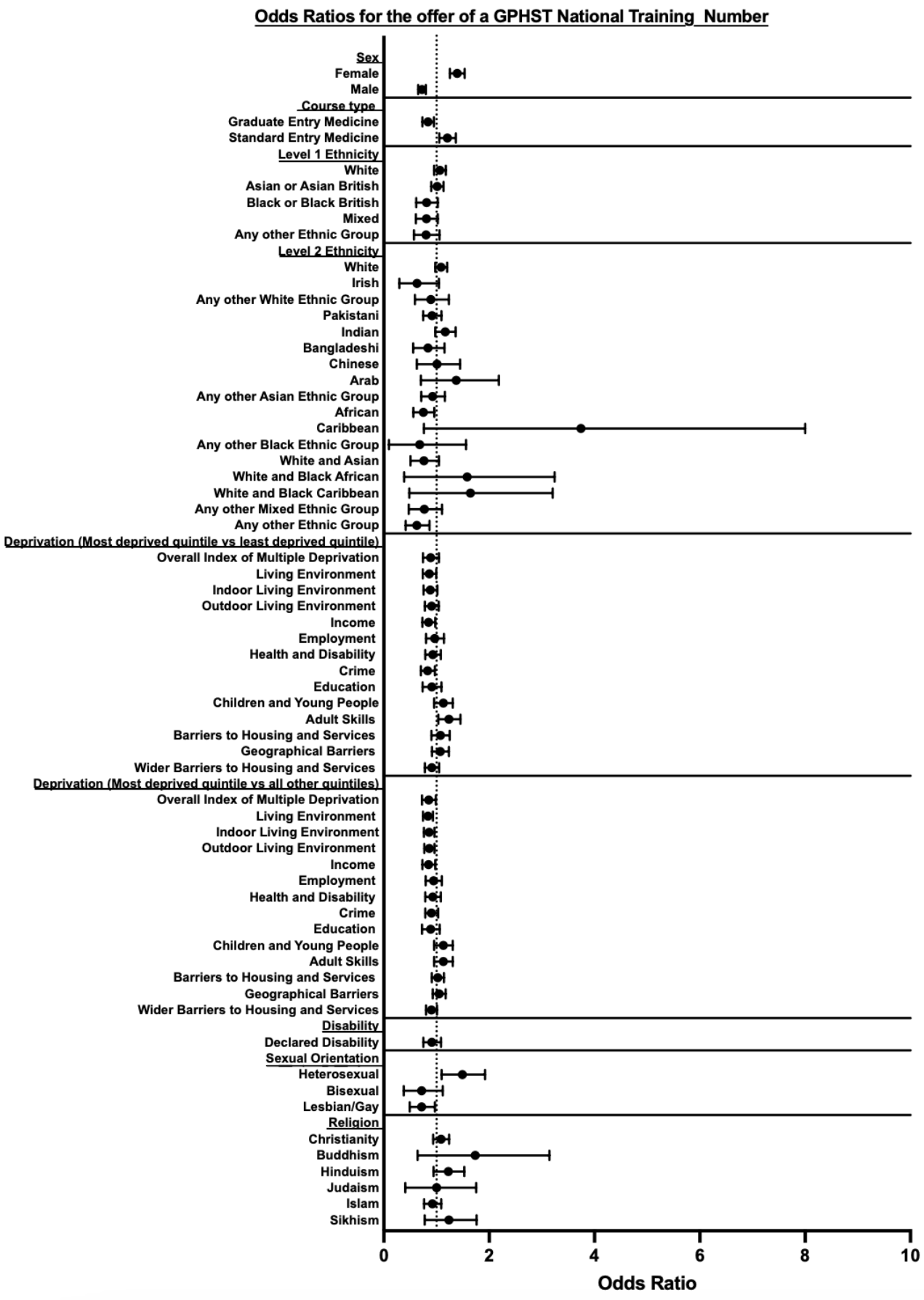


Figure 11- Study One: Odds ratios for the offer of a GPHST National Training Number

5.1.3 Decision tree analysis: Intersectionality and direct applications to GPHST

The decision tree algorithm partitioned the data into statistically significant subgroups that were mutually exclusive and exhaustive. The tree analysis in figure 12 shows the 3-level CHAID tree with a total of 23 nodes, of which 14 were terminal nodes. Six major predictor variables reached significance to be included in this model including Age, Ethnicity, Religion, EPM decile, UCAS tariff, wBHS deprivation decile. The following variables did not reach significance for inclusion in the model: Sex, Sexual orientation, Disability, Deprivation (all other IMD domains and subdomains except for the aforementioned), UCAT bursary, School type, UCAT (all subsection scores), Course type and SJT score. The model had an overall classification accuracy of 96.3% with its ability to predict direct entry to GP training at 100%.

The first level of the tree was split into four branches according to age: </=29, 30-32, 33-35, >35. The prevalence of direct application to GPHST was 68.5%, 61.5%, 68.0%, 77.4% respectively.

As seen in the second level of the tree, the next best predictor variables for direct entry into GPHST were Ethnicity (ages </=29, 33-35) and Religion (age 30-32). Direct application to GPHST was more prevalent among the subsets of subjects categorised by ages </=29 and 33-35 who reported an ethnic group of Indian, Pakistani, Bangladeshi, Chinese, Caribbean, African or Arab (80.7%, 77.3% respectively) in comparison to the subsets of subjects who reported an ethnic group of British or Irish (58.7%, 62.2% respectively). For the subset of subjects categorised by age 30-32, the proportion of direct applications to GPHST was higher among subjects who reported a religious affiliation [Christian or Jewish (59.7%), Buddhist, Hindu. Sikh or Muslim (76.9%)] in comparison to those who declared no religion (53.9%).

As seen in the third level of the tree, the next best predictor variables for direct entry to GPHST were: EPM decile, UCAS tariff and wBHS deprivation. Direct application to GPHST was less prevalent among subjects within the top EPM deciles 1-4 irrespective of age, religion or ethnicity [age 29-32 and a religious group of: Buddhist, Hindu, Sikh or Muslim (73.4%); age</=29 and an ethnic group of British, Irish, African or Arab (52.1%)] in comparison with 72.5% and 85.3% respectively for subjects with EPM deciles > 4. Direct applications to GPHST were more prevalent among subjects whose age was 30-32 with Religious beliefs of Christian or Jewish with a UCAS tariff > 505 (64.7%) in comparison with a lower UCAS tariff </=505 (56.3%) whereas in the subset of subjects who declared no religion, the proportion of direct applications to GPHST was higher among subjects with a lower UCAS tariff [UCAS tariff </=505 (72.4%); UCAS tariff > 505 (52.6%)]. Direct application to GPHST was more

prevalent among sets of subjects within the most deprived quintile for wBHS deprivation [age 33-35 and British/Irish (65.1%); age 33-35 and Chinese, Indian, Pakistani, Bangladeshi, African, Arab or Caribbean (81.0%) in comparison with 55.8% and 64.5% respectively.

Terminal nodes (nodes that do not split any further) are the ends of each pathway where the prevalence is equated to the likelihood of sole application for GPHST. Decision rules for direct application to GPHST, presented in table 6, show the "if-then" logic for each of the 14 terminal nodes. The terminal nodes are chronologically sorted by the proportion of direct applications to GPHST, where the highest proportion of 85.3% occurred in node 19 and the lowest proportion of 52.1% which occurred in node 12 respectively.

5.1.4 Decision tree analysis: Intersectionality and sole application for GPHST

The decision tree algorithm partitioned the data into statistically significant subgroups that were mutually exclusive and exhaustive. The tree analysis in figure 13 shows the 3-level CHAID tree with a total of 22 nodes, of which 14 were terminal nodes. Seven major predictor variables reached significance to be included in this model including: Age, Ethnicity, Course Type, LE deprivation, Income deprivation, Disability and UCAS tariff. The following variables did not reach significance for inclusion in the model: Deprivation (all other IMD domains and subdomains except the aforementioned two), Sex, Sexual Orientation, UCAT bursary, UCAT (all subsection scores), SJT score, Religion, School type and EPM score. The model had an overall classification accuracy of 75.8% with its ability to detect direct entry to GP training of 96.3%.

The first level of the tree was split into four branches according to age </=30, 30-31, 32-35, >35. The prevalence of direct application to GPHST was 72.3%, 68.2%, 63.2%, 55.2% respectively.

As seen in the second level of the tree, the next best predictor variables for sole application to GPHST were Ethnicity [</=30, 30-31] and Course type [>35]. The proportion of sole applications to GPHST were higher among subjects who declared an ethnic group of British or Irish (80.7%) in comparison to the subset of subjects who declared an ethnic group of Chinese, Indian, Pakistani, Bangladeshi, African, Arab or Caribbean (65.1%); *p=0.000*.

For the subset of subjects categorised by age </=30 or 30-31, the next most important predictor of sole application to GPHST was their ethnic group. The subset of subjects categorised by age</=30 and who reported an ethnic group of British or Irish had a higher prevalence of sole application to

GPHST (80.7%) in comparison to the subset of subjects categorised by age</=30 and who reported an ethnic group of Chinese, Indian, Pakistani, Bangladeshi, African, Arab or Caribbean (65.1%). Likewise, the subset of subjects categorised by age 30-31 and who reported an ethnic group of British or Irish, had a higher prevalence of sole application to GPHST (73.3%) in comparison to the subset of subjects who reported an ethnic group of: Indian, Pakistani, Bangladeshi (62.0%) or Chinese, Arab, African, Caribbean (39.6%); *p=0.000.* For the subset of subjects categorised by age >35, the next most important predictor of sole application to GPHST was the type of Undergraduate course undertaken. Subjects who undertook Standard Entry Medicine, Medicine with a Preliminary Year or Foundation Course were more likely to apply solely for GPHST (60.6%) in comparison with Graduate Entry Programmes or Medicine with a Gateway Year (51.2%); *p=0.018*.

As seen in the third level of the tree, the most important predictors of sole application to GPHST are: Living Environment Deprivation decile, Income Deprivation decile, Disability and UCAS tariff.
In general, where these most important predictors arose, the proportion of sole applications to GPHST were lower with higher Living Environment deprivation, Income deprivation and Disability wheres a higher proportion of sole applications to GPHST were seen with a lower UCAS tariff.
Sole applications to GPHST were lower among the subset of subjects categorised by age</=30, British/Irish and living in the most deprived quintile for Living Environment (67.3%) in comparison with the least deprived quintile (79.2%). Sole applications to GPHST were also lower among the subset of subjects categorised by age>35, Graduate Entry Programme/Medicine with a Gateway Year and living in the most deprived quintile for Income deprivation (39.7%) in comparison with the least deprived quintile (52.6%). Additionally, sole applications to GPHST were lower among the subset of subjects categorised by age 30-31, Indian/Pakistani ethnicity and declared disability (47.3%) in comparison to those without a declared disability (64.9%). Among the subset of subjects who were age</=30 and who declared an ethnic group of Chinese, Indian, Pakistani, Bangladeshi, African, Arab or Caribbean, the proportion of subjects opting for sole application to GPHST was higher among subjects with a lower UCAS tariff [UCAS </=507, 65.3%; UCAS tariff 508-598, 74.0%; UCAS tariff > 598, 48.6%]. Furthermore, among the subset of subjects who were age 30-31, who declared an ethnic group of British, Irish, Caribbean, Bangladeshi or African, sole application to GPHST, the proportion of subjects opting for sole application to GPHST was also higher among subjects with a lower UCAS tariff [UCAS tariff <479, 79.5%; UCAS tariff >/=479, 68.5%]

Terminal nodes (nodes that do not split any further) are the ends of each pathway where the prevalence is equated to the likelihood of sole application for GPHST. Decision rules for sole

application to GPHST, presented in table 7 , show the “if-then” logic for each of the 14 terminal nodes. The terminal nodes are chronologically sorted by the proportion of sole applications to GPHST, where the highest proportion of 79.5% occurred in node 17 and the lowest proportion of 39.6% and 39.7% which occurred in node 9 and 22 respectively.

Figure 12- Study One: Decision tree analysis for direct applications to GPHST

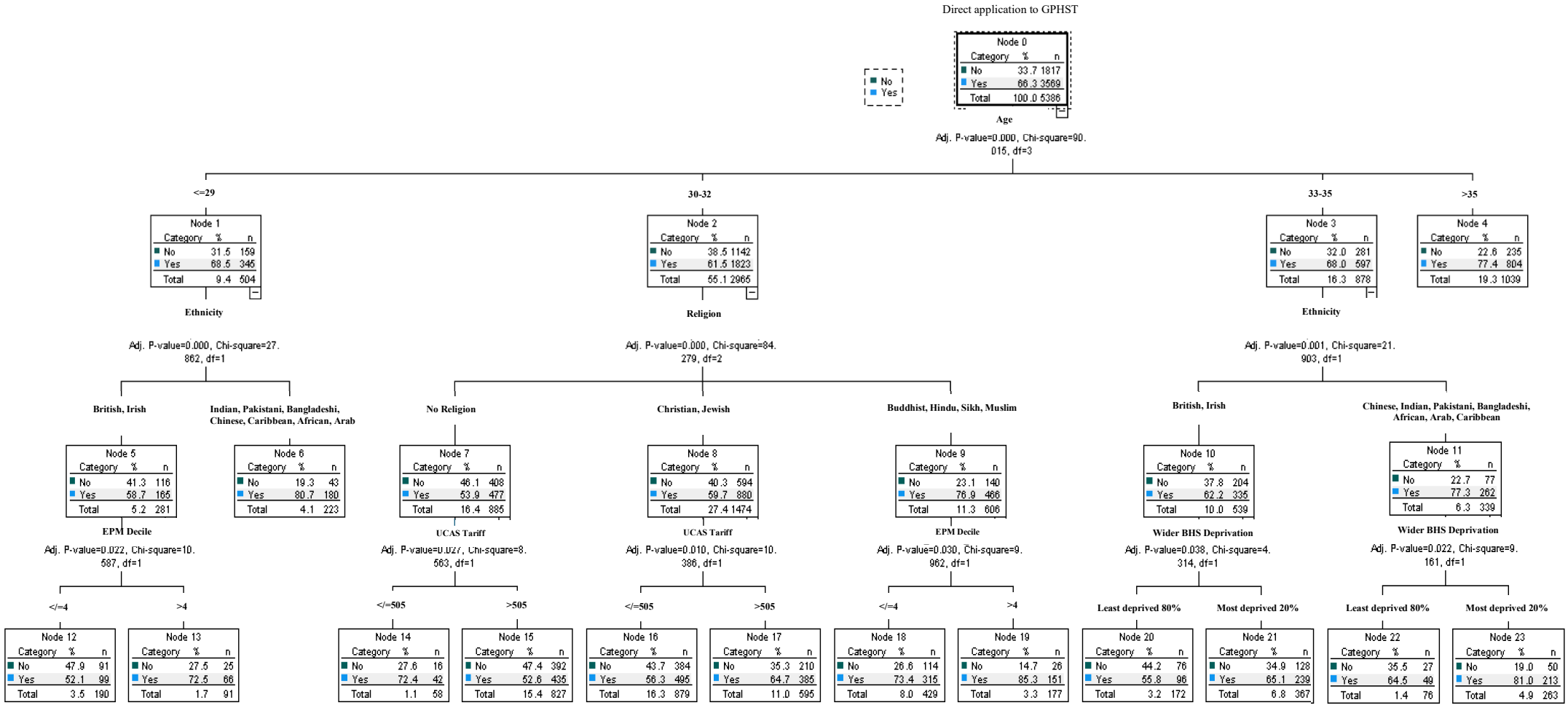
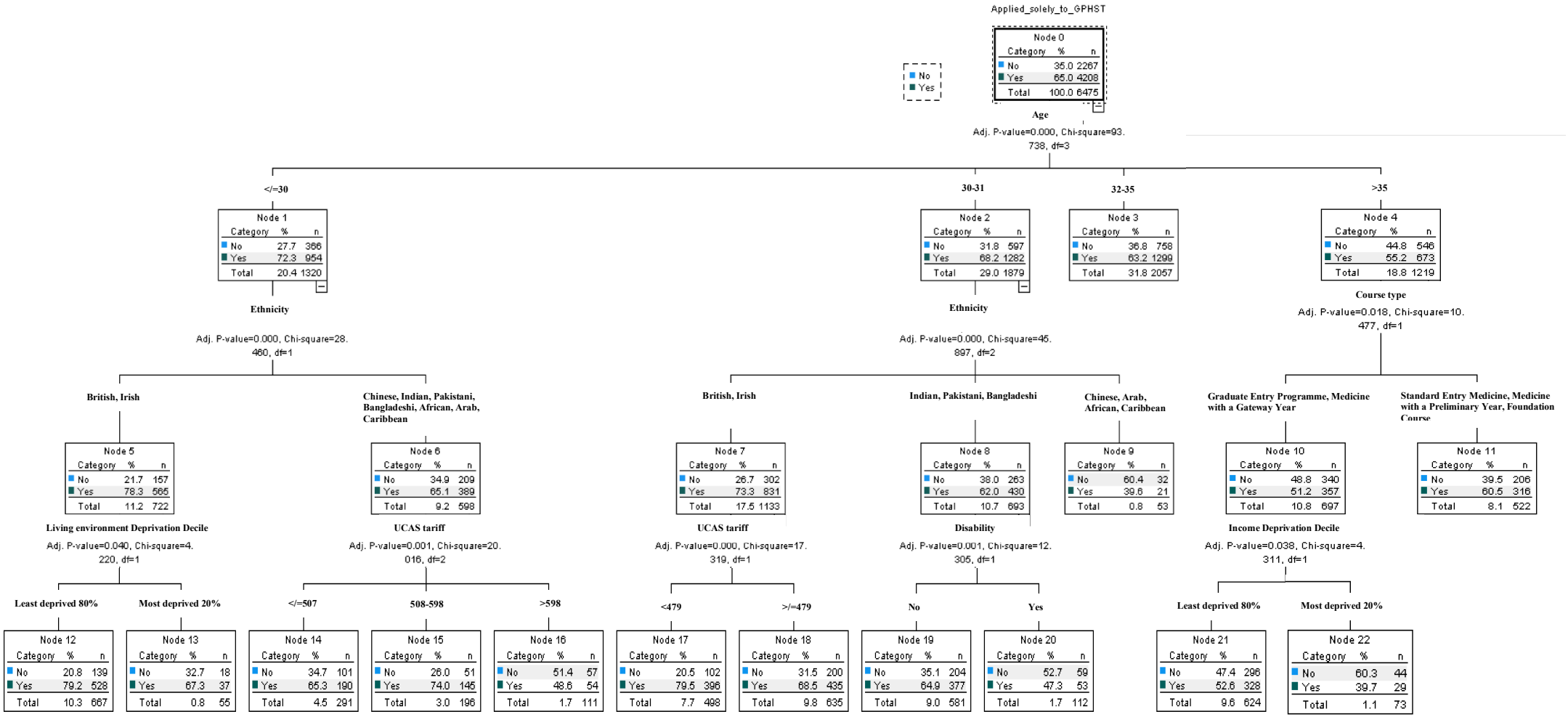


Figure 13- Study One: Decision tree analysis for sole applications to GPHST



5.2 Study Two Results

This section presents the findings of the comprehensive analysis relating to the extent to which there is equity of experience during GPHST through each of the equalities lenses: sex, age, ethnicity, socioeconomic status, disability, sexual orientation and religion. Analyses are presented for: AKT and CSA performance, predictors of AKT and CSA performance, longitudinal performance across key high stakes assessments from pre-undergraduate to postgraduate medical education and a calculation of the extent to which any variations in AKT and CSA performance are equitable by way of calculating the GP Applied Knowledge Test Gini Coefficient (AKT_{GINI}) and the GP Clinical Skills Assessment Gini Coefficient (CSA_{GINI}).

Table 8 summarises the descriptive demographic data of the study population which is comprised of trainees who had accepted a GP Training post via ORIEL since the earliest time of GP Training records (2013) with an ORIEL recruitment data profile (n=12,416). Summary data is provided for examination performance in relevant longitudinal high stakes examinations from pre-undergraduate to postgraduate (MRCGP AKT and CSA) education disaggregated by sex, course type, teaching style, prior degree status, school type, ethnicity (level 2), ethnicity (level 1), sexual orientation, disability, free school meals, parental education, income support, Overall Index of Multiple Deprivation, IMD domains: LE, Income, Health and Disability, Crime, Education, Employment, BHS and IMD subdomains: Indoor LE, Outdoor LE, CYP, Adult Skills, Geographical Barriers and wBHS.

5.2.1 Measuring differential attainment: a longitudinal analysis of assessment results from UCAS tariff to EPM and EPM to AKT

UCAS tariff and EPM Decile

Table 9 shows the z-score changes during medical school study (from UCAS tariff to EPM Decile). The magnitude of the attainment gap between UCAS tariff and EPM Decile widened significantly for male vs female (t(10576.31)=3.58, p=0.000, d=0.07, 95% CI (6.900 to 23.577)), participants entering medical school as an undergraduate vs a graduate (t(11926.10)=32.41, p=0.001, d=0.40, 95% CI (-2.054 to -1.958), ethnic minority vs white (t(10541.420)=28.23, p=0.000, d=0.55, 95% CI (0.657 to 0.755)), participants who declared an affiliation with a religious group (t(5321.21)=30.13, p<0.001, d=0.50 ,95% CI (0.327 to 0.443)) vs those who declared no religion and participants who lived pre-medical school in the most deprived quintiles of the following deprivation forms: IMD (t(2122.192)=3.60, p=0.000, d=0.16, 95% CI(0.0732 to 0.248)], Adult Skills [t(1076.331)=5.00, p=0.000, d=0.31, 95% CI (0.155 to 0.355)], Income [t(2678.550)=4.51, p=0.000, d=0.17, 95% CI (0.106

to 0.269)] and Employment [t(1920.545)= 5.35, p=0.000, d=0.24, 95% CI (0.155 to 0.334)] compared to the respective least deprived quintiles. Interestingly the magnitude of the attainment gap between UCAS tariff and EPM decile narrowed significantly for participants who lived pre-medical school in the most deprived quintile for CYP deprivation: [t(2435.858)= -2.45, p=0.014, d=0.61, 95% CI (-0.193 to -0.021)] compared to the least deprived quintile. No statistically significant differences were observed for participants with: sexual orientation, declared disability, income support or free school meals at the time of application to medical school.

EPM Decile and AKT

Table 10 shows the z-score changes during postgraduate training (from EPM decile to MRCGP AKT). The magnitude of the attainment gap between the EPM decile and the MRCGP AKT widened significantly for female vs male (t(3555.128)=4.16, p=0.000, d=0.14, 95% CI (0.063 to 0.177)), participants on income support at the time of applying to medical school vs those who were not on income support (t(732.225)=2.56, p=0.011, d=0.19, 95% CI (0.028 to 0.209)), participants who were on free school meals vs those who were not (t(394.150)=2.52, p=0.012, d=0.25, 95% CI (0.032 to 0.260)) and participants who lived pre-medical school in the most deprived quintiles for the following deprivation forms: IMD [(t(761.723)=3.83, p=0.000, d=0.28, 95% CI (0.095 to 0.294)], Income [t(906.996)=3.84, p=0.000, d=0.25, 95% CI (0.091 to 0.280)], Employment [t(719.892)=2.42, p=0.016, d=0.18, 95% CI (0.024 to 0.231)] and Children and Young People [t(588.177)=4.10, p=0.000, d=0.36, 95% CI (0.107 to 0.306)] compared to the respective least deprived quintiles. No statistically significant differences were observed among ethnic minority vs white participants, participants entering medical school as a gradate vs an undergraduate, participants declaring heterosexual orientation vs LGBTQ+, participants with a declared disability vs those without, participants declaring no affiliation to a religion in comparison to those who declared an affiliation and participants who lived pre-medical school in the most deprived quintile for Adult Skills vs their counterparts.

5.2.2 Performance in the AKT and CSA: Univariate Analyses

AKT performance

The odds of success in the MRCGP AKT are outlined in table 11 and figure 16 whilst the odds of failure in the MRCGP AKT are outlined in table 12 and figure 18.

Sex: Female trainees were 1.2x more likely to pass the AKT on first attempt [OR 1.218 (1.028 to 1.442), p=0.023] in comparison with male trainees. Scores in the first attempt of the AKT were

higher among female trainees *(M=155.60 (SD 16.27))* in comparison with male trainees *(M=153.69 (SD 16.36))* [U(1859,3175)=2742348.000, z=-4.197, p=0.000].

Age: There was an effect of age on AKT scores. AKT scores were lower among older candidates (r_s *(5033)* = -0.140, p<0.001). There was no statistically significant difference in the likelihood of passing the AKT on first sit between trainees who had completed Graduate entry medicine v other medical courses *(p=0.891).*

Level 1 ethnicity: Ethnic minority trainees were more likely than White trainees to fail the AKT on first attempt [OR 2.918 (2.451 to 3.475), p<0.0001]. When ethnic groups are disaggregated, Asian or Asian British groups were 3x more likely to fail their first attempt at the AKT in comparison to White counterparts [OR 3.005 (2.499 to 3.613),p<0.0001], Black or Black British trainees were 7x more likely to fail their first attempt at the AKT in comparison to White counterparts [OR 6.921 (4.875 to 9.827), p<0.0001], Mixed ethnic trainees were 1.8x more likely to fail their first attempt at the AKT in comparison to White counterparts [OR 1.781 (1.116 to 2.842), p=0.016] and trainees from Any other ethnic group were 2.7x more likely to fail their first attempt at the AKT [OR 2.682 (1.601-4.493),p=0.0002]

Level 2 ethnicity: Trainees of White ethnicity were more likely to pass the AKT on first attempt in comparison with non-White trainees [OR 3.089 (2.592-3.682), p<0.0001]. When ethnic groups are disaggregated, trainees were more likely to fail the AKT on first attempt as follows: Indian 2.8x more likely [OR 2.849 (2.250 to 3.608), p<0.0001], Pakistani 2.9x more likely [OR 2.940 (2.195 to 3.940), p<0.0001], Bangladeshi 2.5x more likely [OR 2.546 (1.346 to 4.814), p=0.004], Any other Asian 4.7x more likely [OR 4.694 (3.376 to 6.527), p<0.0001], Chinese 3.3x more likely [OR 3.336 (1.887 to 5.897), p<0.0001], Caribbean trainees 5.2x more likely [OR 5.183 (1.973 to 13.615), p=0.0008], African 5.5x more likely [OR 5.511 (3.633 to 8.359), p<0.0001], White and Black African 4.4x more likely [OR 4.397 (1.389 to 13.920), p=0.012], any other Mixed Group 2.5x more likely [OR 2.481 (1.145 to 5.372), p=0.021] and Any Other Ethnic group [OR 3.359 (1.866-6.047), p<0.0001]. There was no statistically significant difference in AKT pass rate between White trainees and: Irish (p=0.301), Any other Black trainees (p=0.844), Arab (p=0.310), White and Black Caribbean (p=0.888) and White and Asian (p=0.372).

Deprivation: Mean pre-medical school admission deprivation scores with error bars for GP trainees who passed the AKT on first attempt v GP trainees who failed the AKT on first attempt are shown in

figure 14. GP Trainees who passed the MRCGP AKT on first attempt were more likely to have lived pre-medical school in less deprived areas (Mean Decile Score provided to enable comparisons and Mann Whitney U statistical test applied to Deprivation Scores test whether there is a statistically significant difference between the two means):

- Index of Multiple Deprivation Score: *(M(pass)*=6.77, SD=2.66), *(M (fail)=5.78, SD=2.86),* [U(637,4387)=1117219.000, z=-8.249, p=0.000]
- Children and Young People's Deprivation Score: (M (pass)=7.05, SD=2.71), *(M (fail)=6.63, SD=2.74)*, [U(637,4387)=1267514.500, z=-3.793, p=0.000]
- Adult Skills Deprivation Score: (M (pass)=6.97, SD=2.69), *(M (fail)=6.70, SD=2.73)*, [U(637,4387)=1309918.000, z=-2.553, p=0.011]
- Wider Barriers to Housing and Services Deprivation Score: (M (pass)=5.58, SD=3.03), *(M (fail)=4.90, SD=3.07)*, [U(637,4387)=1250106.000, z=-4.302, p=0.000]
- Indoor Deprivation Score: (M (pass)=5.41, SD=2.99), *(M (fail)=4.62, SD=3.03)*, [U(637,4387)=1181668.000, z=-6.302, p=0.000]
- Income Deprivation Score: (M (pass)=6.80, SD=2.78), *(M (fail)=5.77, SD=3.03)*, [U(637,4387)=1123431.500, z=-8.005, p=0.000]
- Employment Deprivation Score: (M (pass)=6.68, SD=2.62), *(M (fail)=5.79, SD=2.77)*, [U(637,4387)=1136016.500, z=-7.637, p=0.000]
- Health and Disability Deprivation Score: (M (pass)=6.73, SD=2.67), *(M (fail)=5.87, SD=2.83)* , [U(637,4387)=1150081.000, z=-7.226, p=0.000]
- Crime Deprivation Score: (M (pass)=6.20, SD=2.79), *(M (fail)=5.42, SD=2.88)*, [U(637,4387)=1174392.000, z=-6.515, p=0.000]
- Outdoor Deprivation score: (M (pass) =5.33, SD=3.00), *(M (fail)=4.52, SD=3.03),* [U(637,4387)=1175423.500, z=-6.485, p<0.001]

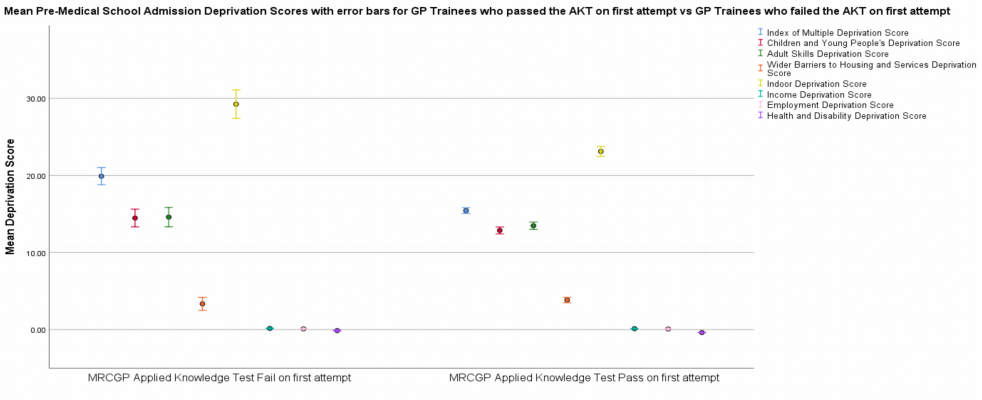


Figure 14- Study Two: Mean pre-medical school admission deprivation scores with error bars for GP trainees who passed the AKT on first attempt v GP trainees who failed the AKT on first

Deprivation (most deprived quintile v least deprived quintile): Trainees were more likely to fail the AKT on first attempt if they lived pre-medical school, in comparison to all other deprivation quintiles, in the most deprived quintiles for: IMD [OR 2.525 (1.923 - 3.315), p<0.0001], Education [OR 2.052 (1.505 - 2.800), p=0.0001], wBHS [OR 1.937 (1.518 - 2.472), p<0.0001], Living Environment [OR 2.113 (1.632 - 2.736), p<0.0001], Indoor Deprivation [OR 1.979 (1.533 - 2.554), p<0.0001], Outdoor Deprivation [OR 2.005 (1.55 - 2.592), p<0.0001], Income Deprivation [OR 2.722 (2.096 - 3.534), p<0.0001], Employment Deprivation [2.684 (2.019 - 3.567), p<0.0001] Health and disability Deprivation [OR 12.445 (1.867 - 3.202), p<0.0001], BHS deprivation [OR 1.364 (1.023-1.819), p=0.034] and Crime Deprivation [OR 2.241 (1.717 - 2.925), p<0.0001]. Trainees were more likely to pass the AKT on first attempt if they lived pre-medical school in the most deprived quintile for Geographical barriers Deprivation [OR 0.715 (0.555 - 0.922), p<0.0001]. There was no statistically significant difference in passing the AKT on first attempt among trainees who lived pre-medical school in the most deprived quintiles for CYP deprivation (p=0.166) and Adult Skills Deprivation (p=0.281).

Deprivation (most deprived quintile v all other quintiles): Trainees were more likely to fail the AKT on first attempt if they lived pre-medical school, in comparison to all other deprivation quintiles, in the most deprived quintiles for: IMD [OR 1.967 (1.558 to 2.484), p<0.0001], Education [OR 1.752 (1.307-2.349), p=0.0001], wBHS [OR 1.697 (1.418 --2.031), p<0.0001], Living Environment [OR 1.758 (1.475 to 2.096), p<0.0001], Indoor Deprivation [OR 1.694 (1.419 to 2.022), p<0.0001], Outdoor Deprivation [OR 1.744 (1.465 to 2.078), p<0.0001], Income Deprivation [OR 2.131 (1.711 to 2.653), p<0.0001], Employment Deprivation [OR 1.917 (1.509 to 2.436), p<0.0001] Health and disability Deprivation [OR 1.957 (1.552 to 2.469), p<0.0001] and Crime Deprivation [OR 1.747 (1.415 to 2.157), p<0.0001]. Trainees were more likely to pass the AKT on first attempt if they lived pre-medical school in the most deprived quintile for Geographical barriers Deprivation [OR 1.969 (1.627 to 2.384), p<0.0001]. There was no statistically significant difference in passing the AKT on first attempt among trainees who lived pre-medical school in the most deprived quintiles for CYP deprivation (p=0.580), Adult Skills Deprivation (p=0.537) and BHS deprivation (p=0.414).

Disability: Trainees who declared a disability scored lower on the first attempt of the AKT *(M=151.35, SD=17.63)* in comparison to trainees who declared no disability *(M=155.24, SD=16.10).* This constituted a statistically significantly lower performance on first sit of the AKT among candidates who declared a disability [U(288,4424)=556494.500, z=-3.602, p=0.000]. Trainees with a declared disability were more likely to fail the AKT on first attempt in comparison to trainees without a declared disability [OR 1.646 (1.206 to 2.248), p=0.002}.

Sexual Orientation: First attempt AKT scores were highest among Lesbian/Gay trainees *(M=156.17, SD=15.30)* and lowest among Bisexual trainees *(M=153.06, SD=17.03) with* Heterosexual trainees scoring in-between *(M=155.07, SD=16.38).* Trainees who declared their Sexual Orientation as Bisexual were 3.3x more likely to fail the AKT on first attempt [OR 3.272 (1.060 to 10.098), p=0.039] in comparison with trainees declaring their sexual orientation as Heterosexual. There was no statistically significant difference in pass rates of the AKT on first attempt trainees declaring their sexual orientation as lesbian/gay (p=0.322) with those who declared their sexual orientation as Heterosexual.

Religion: Trainees who declared no religious affiliation scored more highly on the first attempt of the AKT (M=158.90, SD=14.52)) in comparison to trainees who declared a religious affiliation with one of the 6 main worldwide religions *(Buddhism (M=149.07, SD=15.99)*, Christianity *(M=155.19, SD=16.24)*, Hindu *(M=149.93, SD=17.04)*, Judaism *(M=152.0, SD=16.14)*, Islam *(M=147.68, SD=17.42)*, Sikhism *(M=151.98, SD=18.68).* Trainees who declared a religious affiliation were 2.5x more likely to fail the AKT on first attempt [OR 2.540 (2.023 to 3.190), p<0.0001] in comparison with trainees who declared no religious affiliation). When disaggregated, trainees declaring an affiliation with Buddhism were 4.4x more likely to fail [OR 4.380 (1.821 to 10.536), p=0.001], Christian were 1.8x more likely to fail [OR 1.800 (1.385 to 2.341), p<0.001], Hindu were 3.3x more likely to fail [OR 3.272 (2.327 to 4.560), p<0.0001], Muslim 3.8x more likely to fail [OR 3.814 (2.856 to 5.093), p<0.0001] and Sikh were 3.6x more likely to fail on first attempt [OR 3.631 (2.155 to 6.117), p<0.0001]. There was no statistically significant difference in pass rate between trainees with no religious affiliation and trainees with affiliation to Judaism (p=0.154).

CSA performance

The odds of success in the MRCGP AKT are outlined in table 11 and figure 17 whilst the odds of failure in the MRCGP AKT are outlined in table 12 and figure 19.

Sex: Scores in the first attempt of the CSA were higher among Female trainees (M=87.78 (SD 8.59)) in comparison with Male trainees (M=83.96 (SD 8.87)) [U(1349,2137)=1094923.000, z=-11.978, p=0.000]. Female trainees were 2.2x more likely to pass the CSA on first attempt [OR 2.197 (1.721 to 2.804), p<0.0001] in comparison with male trainees.

Age: There was an effect of age on CSA scores. CSA scores were lower among older candidates (r_s *(3486)*= -0.068, p<0.001). There was no statistically significant difference in the likelihood of passing

the CSA on first sit between trainees who had completed Graduate entry medicine v other medical courses *(p=0.567).*

Level 1 ethnicity: Ethnic minority trainees were less likely than White trainees to pass the CSA on first attempt [OR 3.140 (2.431 to 4.055), p<0.0001]. When ethnic groups are disaggregated, in comparison with White trainees, Asian or Asian British were 3.2x more likely to fail their first attempt at the CSA [OR 3.213 (2.458 to 4.199), p<0.0001], Black or Black British trainees were 4x more likely to fail their first attempt [OR 3.996 (2.216 to 7.206), p<0.0001] and trainees of Any other ethnic group were 3.7x more likely to fail their first attempt [OR 3.729 (1.905-7.341), p=0.0001]. There was no statistically significant difference between White trainees passing the CSA on first attempt, in comparison with Mixed trainees (p=0.356).

Level 2 ethnicity: Trainees of White ethnicity were more likely to pass the CSA on first attempt in comparison with non-White trainees [OR 3.140 (2.431-4.055), p<0.0001]. When ethnic groups are disaggregated, in comparison with White trainees, Indian trainees were 2.9x more likely to fail their first attempt [OR 2.852 (2.018 to 4.033), p<0.0001], Pakistani trainees were 3.4x more likely to fail their first attempt [OR 3.391 (2.253 to 5.105), p<0.0001], Bangladeshi trainees were 6.9x more likely to fail their first attempt [OR 6.939 (3.660 to 13.155), p<0.0001], Any other Asian trainees were 3.2x more likely to fail their first attempt [OR 3.164 (1.871 to 5.352), p<0.0001], Chinese were 5.5x more likely to fail their first attempt [OR 5.523 (2.895 to 10.536), p<0.0001], Arab were 6.1x more likely to fail their first attempt [OR 6.123 (2.211 to 16.956), p=0.0005], Caribbean trainees were 8.3x more likely to fail [OR 8.327 (2.564 to 27.047), p=0.0004], African trainees were 3.8x more likely to fail [OR 3.754 (1.912 to 7.372), p=0.0001], 'Any other white' trainees were 3.1x more likely to fail [OR 3.123 (1.504 to 6.485), p=0.002], 'Any other mixed group' were 3.2x more likely to fail [OR 3.203 (1.095 to 9.366), p=0.034] and 'Any other ethnic group' were 3.7x more likely to fail [OR 3.739 (1.905 to 7.341), p=0.0001]. There was no statistically significant difference in passing the CSA on first attempt between White trainees and White and Asian trainees (p=0.785).

Deprivation: Mean pre-medical school admission deprivation scores with error bars for GP trainees who passed the CSA on first attempt v GP trainees who failed the CSA on first attempt are shown in figure 15. GP Trainees who passed the MRCGP CSA on first attempt were more likely to have lived pre-medical school in less deprived areas:

- Index of Multiple Deprivation score: *(M (pass)=6.68, SD=2.69)*, *(M (fail)=5.84, SD=2.88)*, [U(287,3191)=380918.500, z=-4.761, p=0.000]

- Children and Young People's Deprivation Score: *(M (pass)=7.18, SD=2.66), (M (fail)=6.79, SD=2.74)*, [U(287,3191)=423344.500, z=-2.121, p=0.034]
- Wider Barriers to Housing and Services Deprivation Score: *(M (pass)=5.57, SD=3.06), (M (fail)=4.62, SD=3.07)*, [U(287,3191)=386280.500, z=-4.396, p=0.000]
- Indoor Deprivation Score: *(M (pass)=5.32, SD=2.99), (M (fail)=4.28, SD=2.95)*, [U(287,3191)=365069.000, z=-5.698, p=0.000]
- Income Deprivation Score: *(M (pass)=6.72, SD=2.81), (M (fail)=5.85, SD=3.09)*, [U(287,3191)=389121.500, z=-4.221, p=0.000]
- Employment Deprivation Score: *(M (pass)=6.53, SD=2.62), (M (fail)=5.90, SD=2.75)*, [U(287,3191)=399218.000, z=-3.602, p=0.000]
- Health and Disability Deprivation Score: *(M (pass)=6.68, SD=2.71), (M (fail)=5.86, SD=2.75)*, [U(287,3191)=380614.000, z=-4.744, p=0.000]
- Outdoor Deprivation Score *(M (pass)=5.30, SD=2.99), (M (fail)=4.24, SD=2.92),* [U(287,3191)=364845.500, z=-5.711, p<0.001]
- Crime Deprivation Score (M (pass)=6.18, SD=2.82), *(M (fail)=5.26, SD=2.68)*, [U(287,3191)=370484.500, z=-5.365, p<0.001]

Conversely, GP Trainees who passed the MRCGP CSA on first attempt were more likely to habitate pre-medical school in more deprived areas:

- Adult Skills Deprivation Score: (M (pass)=7.08, SD=2.64), *(M (fail)=6.97, SD=2.67)*, [U(287,3191)=447942.500, z=-0.612, p=0.541]

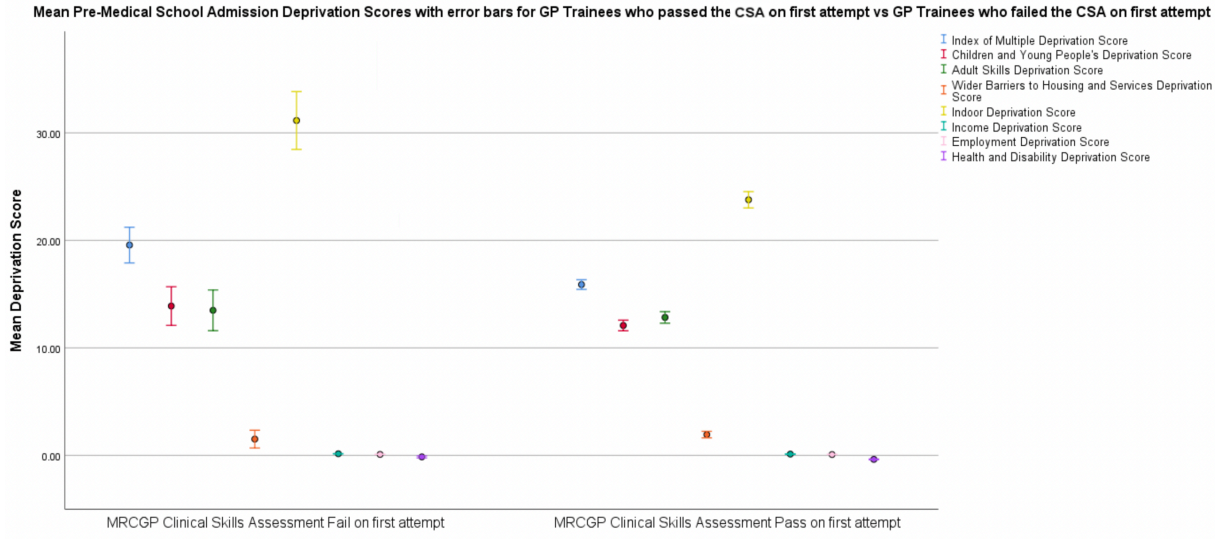


Figure 15- Study Two: Mean pre-medical school admission deprivation scores with error bars for GP trainees who passed the CSA on first attempt v GP trainees who failed the CSA on first attempt.

Deprivation (most deprived quintile v least deprived quintile): Trainees were more likely to fail the CSA on first attempt if they lived pre-medical school, in comparison to the least deprived quintiles, in the most deprived quintiles for: IMD [OR 2.410 (1.627-3.570), p<0.0001], LE [OR 2.173 (1.498-3.152), p<0.0001], Indoor LE [OR 2.124 (1.468-3.073), p<0.0001], Outdoor LE [OR 2.063 (1.426-2.983), p<0.0001], Income [OR 2.072 (1.439-2.984), p<0.0001], [OR 1.819 (1.209-2.737), p=0.004], Health and Disability [OR 2.527 (1.497-3.402), p<0.0001], Crime [OR 2.597 (1.713-3.983), p<0.0001] and wBHS [OR 2.049 (1.439-2.919), p<0.0001]. Trainees were less likely to fail the CSA on first attempt if they lived pre-medical school, in comparison to the least deprived quintiles, in the most deprived quintiles for: Geographical Barriers [OR 0.507 (0.352-0.730), p<0.0001]. There was no statistically significant difference in passing the CSA on first attempt among trainees who lived pre-medical school in the most deprived quintiles for: Education (p=0.131), CYP (p=0.143), Adult (p=0.859) and BHS (p=0.792).

Deprivation (most deprived quintile v all other quintiles): Trainees were more likely to fail the CSA on first attempt if they lived pre-medical school, in comparison to all other deprivation quintiles, in the most deprived quintiles for: IMD [OR 1.853 (1.331-2.581), p=0.0003], LE [OR 1.966 (1.532-2.524), P<0.0001], Indoor LE [OR 1.964 (1.529-2.512), p<0.0001], Outdoor LE [OR 1.943 (1.514-2.494), p<0.0001], Income [OR 1.918 (1.404-2.621), p<0.0001], Employment [OR 1.577 (1.110-2.240), p=0.011], Health and Disability [OR 1.571 (1.110-2.223), p=0.011], Crime [OR 1.520 (1.116-2.070), p=0.008], wBHS [OR 1.752 (1.357-2.262), p<0.0001]. Trainees were less likely to fail the CSA on first attempt if they lived pre-medical school, in comparison to all other deprivation quintiles, in the most deprived quintiles for: Geographical Barriers [OR 0.628 (0.467-0.845), p=0.002].]. There was no statistically significant difference in passing the CSA on first attempt among trainees who lived pre-medical school in the most deprived quintiles for: Education (p=0.342), CYP (p=0.361), Adult Skills (p=0.720), BHS (p=0.230).

Disability: Trainees who declared a disability scored lower on the first attempt of the CSA *(M=85.84, SD=9.32)* in comparison to trainees who declared no disability *(M=86.39, SD=8.85). However, this did not constitute a statistically significant difference in* performance in the first sit of the CSA between applicants with a declared disability and applicants who did not declare a disability (p=0.089).

Sexual Orientation: First attempt CSA scores were highest among Lesbian/Gay trainees *(M=87.82, SD=8.76)* and lowest among Bisexual trainees *(M=81.33, SD=5.09) with* Heterosexual trainees scoring in-between *(M=86.41, SD=8.91)*. There was no statistically significant difference in pass rates of the

CSA on first attempt between heterosexual trainees and trainees declaring their sexual orientation as bisexual (p=0.438) or lesbian/gay (p=0.628).

Religion: Trainees who declared no religious affiliation scored more highly on the first attempt of the CSA *(M=88.09, SD=8.33)* in comparison to trainees who declared a religious affiliation with one of the 6 main worldwide religions *(Buddhism (M=80.95, SD=8.40)*, Christianity *(M=87.34, SD=8.99)*, Hindu *(M=83.30, SD=9.05)*, Judaism *(M=83.07, SD=8.70)*, Islam *(M=82.21, SD=8.46)*, Sikhism *(M=86.25, SD=9.03).* Trainees who declared a religious affiliation with one of the 6 main worldwide religions (Buddhism, Christianity, Hindu, Judaism, Islam, Sikh) were 2.1x more likely to fail the CSA on first attempt [OR 2.113 (1.517 to 2.944), p<0.0001] in comparison with trainees who declared no religious affiliation). When disaggregated, in comparison to trainees with no religion, trainees declaring an affiliation with Buddhism were 5.1x more likely to fail the CSA on first attempt [OR 5.125 (1.641 to 16.010), p=0.005}, Muslim were 3.6x more likely to fail the CSA on first attempt [OR 3.571 (2.383 to 5.352), p<0.0001] and Hinduism were 2.7x more likely to fail the CSA on first attempt [OR 2.655 (1.601 to 4.402), p=0.0002}. There was no statistically significant difference in pass rate between trainees with no religious affiliation and trainees with the following religious affiliations: Christian (p=0.120), Sikh (p=0.215) and Judaism (P=0.134).

Figure 16- Study Two: Odds Ratios of success on first attempt at the MRCGP AKT

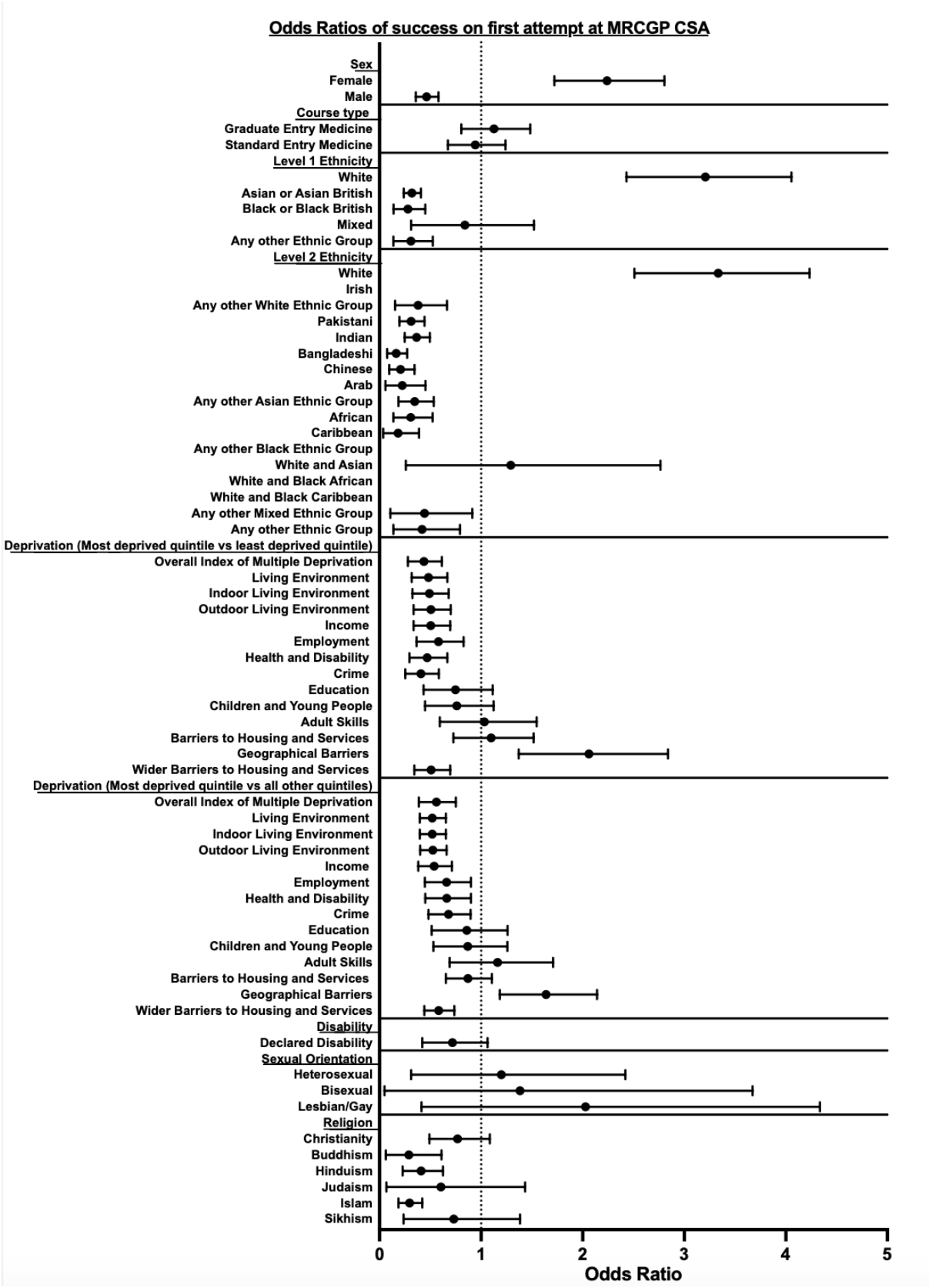


Figure 17- Study Two: Odds Ratios of success on first attempt at the MRCGP CSA

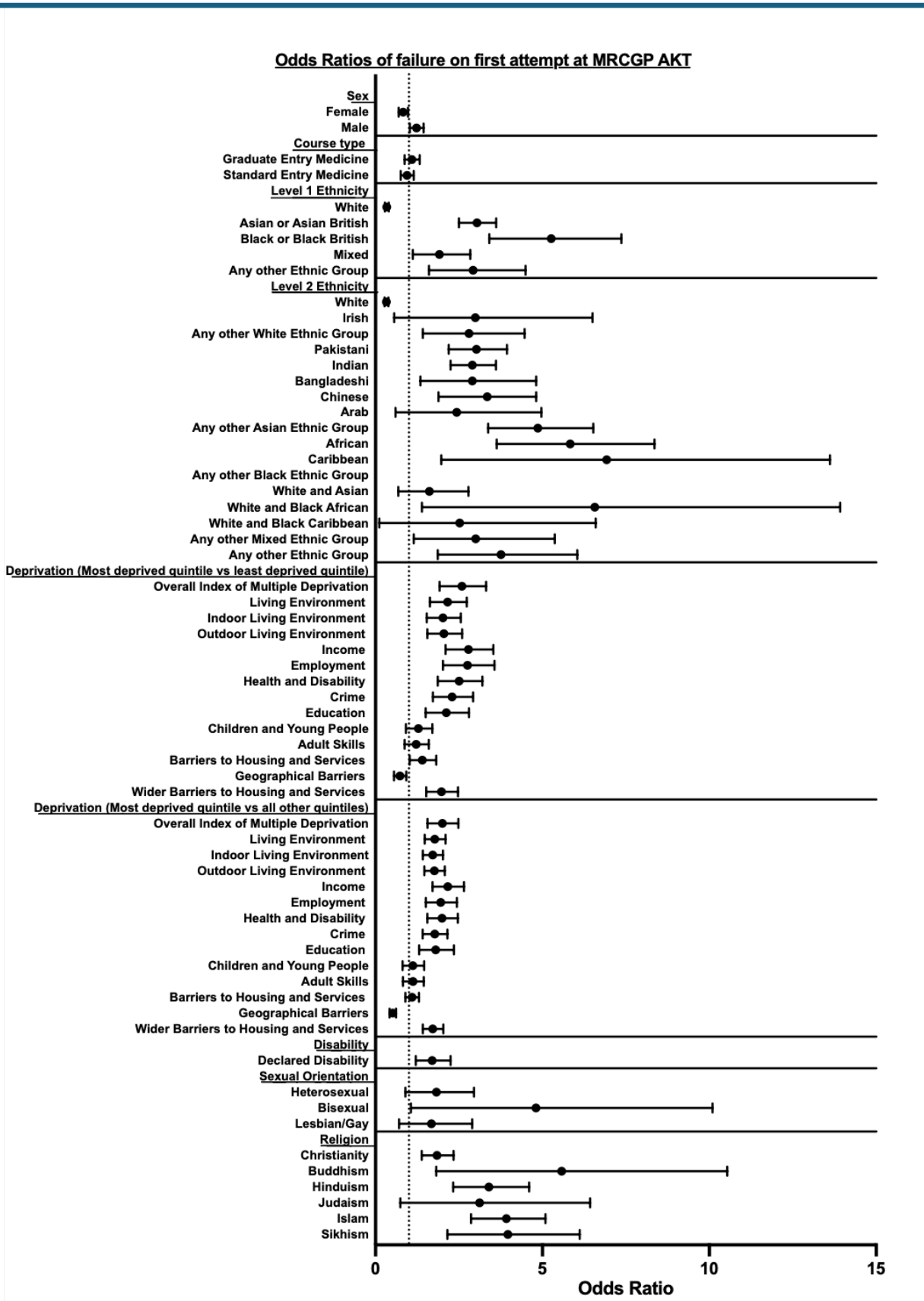


Figure 18- Study Two: Odds Ratios of failure on first attempt at the MRCGP AKT

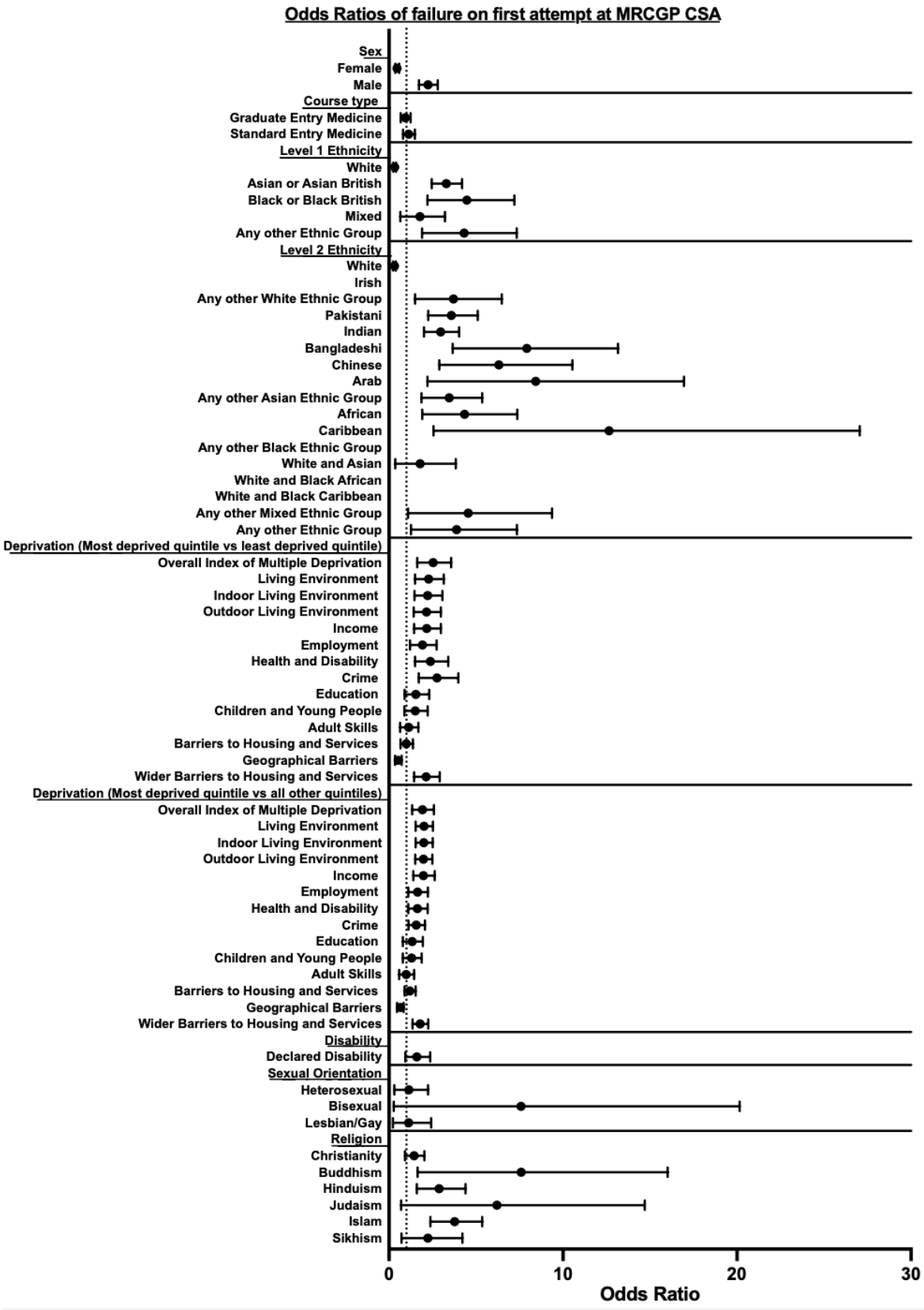


Figure 19- Study Two: Odds Ratios of failure on first attempt at the MRCGP CSA

5.2.3 Measuring equity in AKT & CSA performance through equalities lenses: AKT_{GINI} and CSA_{GINI}

Tables 13-14 and figures 20-26 present and graph the results of AKT_{GIni} and of CSA_{GIni} at national level for the years 2016–2020 divided into subgroups according to sex, course type, ethnicity (level 1), disability, sexual orientation, religion and deprivation: IMD, CYP, Adult Skills, Income, Employment.

Sex

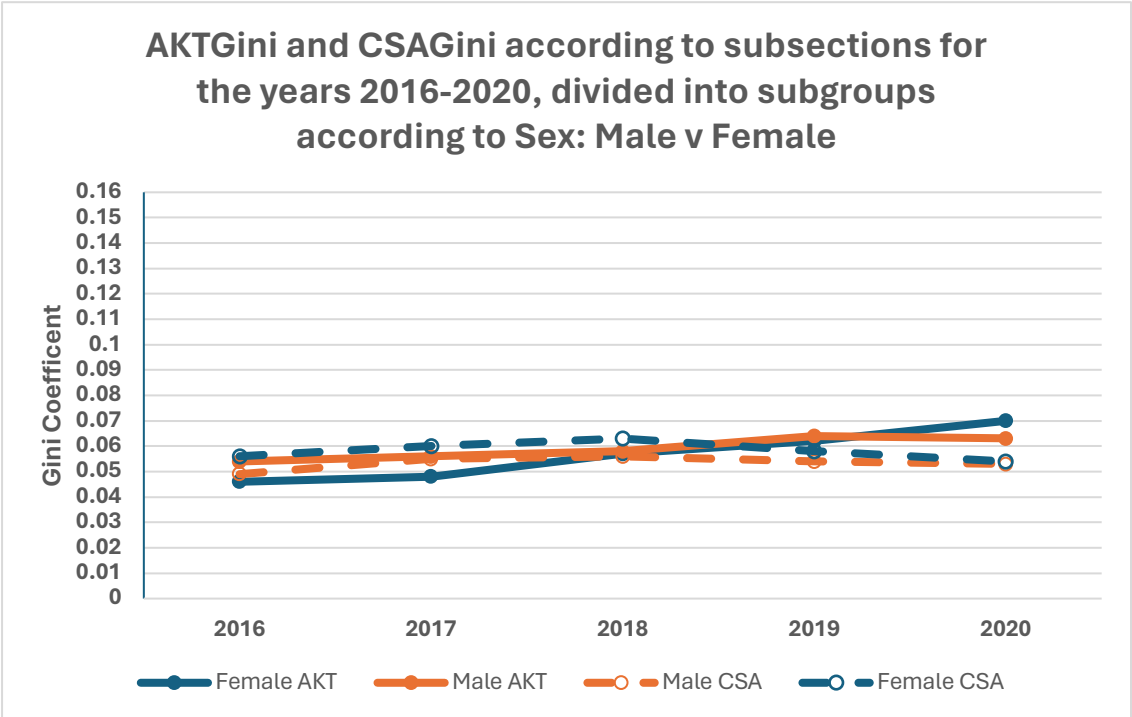
AKT_{GINI}

Generally between 2016 and 2019, inequity in AKT performance, as measured by the AKT_{GINI} coefficient, is higher among male candidates than female candidates with an incremental trend of inequity among both male (from 0.054 in 2016 to 0.063 in 2020) and female (0.046 in 2016 to 0.07 in 2020) participants. More specifically, between 2016 and 2020, the overall inequity in AKT performance as measured by the AKT_{GINI} coefficient increases by 16.7% for males and 52.2% for females respectively.

CSA_{GINI}

Generally between 2016 and 2019, inequity in CSA performance, as measured by the CSA_{GINI} coefficient, is higher among female candidates than male candidates. The gap in inequity in CSA performance, as measured by CSA_{GINI}, closed between 2016-2020 (0.07 in 2016 and 0.01 in 2020).

Figure 20- Study Two: AKT_{Gini} and CSA_{Gini} according to subsections for the years 2016-2020, divided into subgroups according to Sex: Male v Female



Age

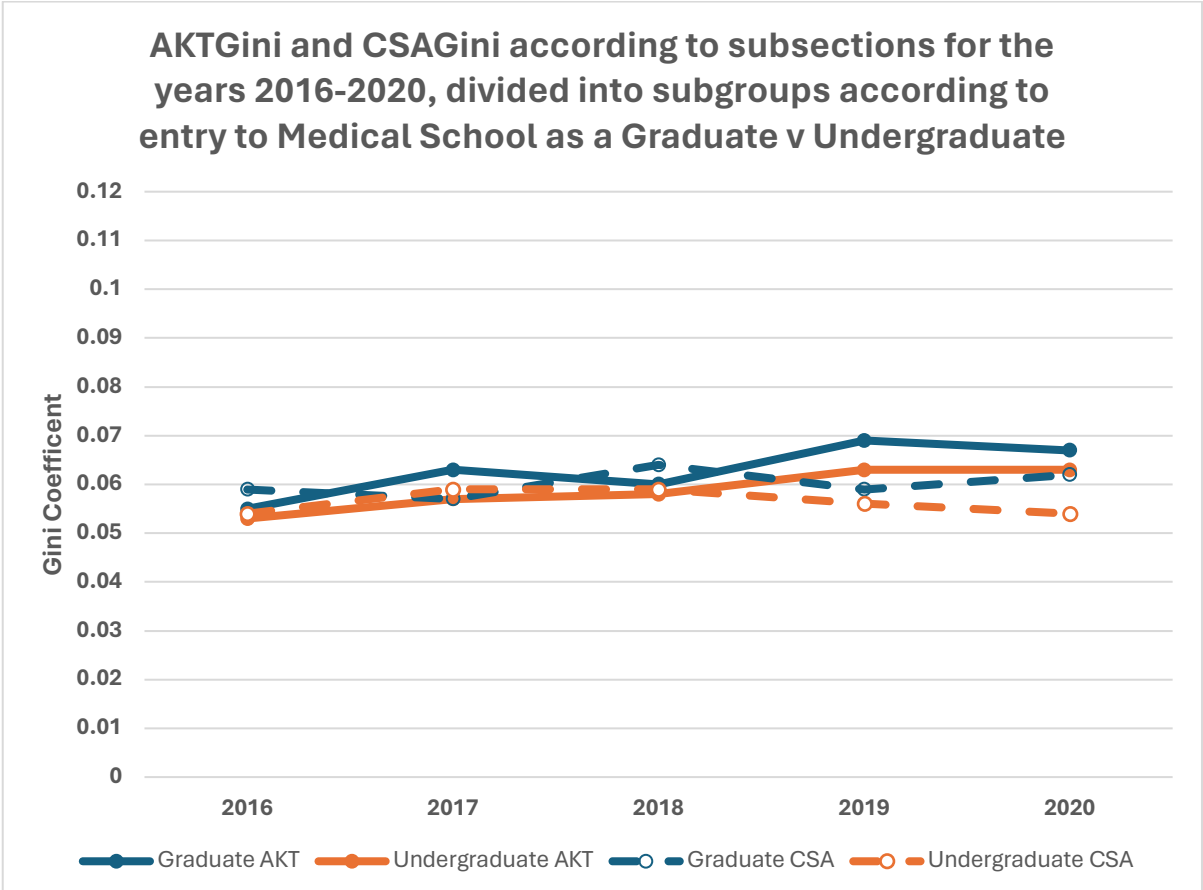
AKT_{GINI}

Generally between 2016 and 2020, inequity in AKT performance, as measured by the AKT_{GINI} coefficient, is higher among candidates who undertook graduate entry medicine courses than undergraduate medicine entry courses with an incremental trend of inequity among both graduate entrants (from 0.055 in 2016 to 0.067 in 2020) and undergraduate entrants (0.053 in 2016 to 0.063 in 2020) participants. More specifically, between 2016 and 2020, the overall inequity in AKT performance, as measured by AKT_{GINI}, increases by 21.8% for graduate entrants to medical school and 18.9% for undergraduate entrants to medical school between 2016 and 2020 respectively.

CSA_{GINI}

Generally between 2016 and 2020, inequity in CSA performance, as measured by the CSA_{GINI} coefficient, is higher among candidates who undertook graduate entry medicine courses than undergraduate medicine entry courses. The gap in inequity in CSA performance, as measured by CSA_{GINI}, has marginally widened between 2016-2020 (0.05 in 2016 and 0.08 in 2020).

Figure 21- Study Two: AKT_{Gini} and CSA_{Gini} according to subsections for the years 2016-2020, divided into subgroups according to entry to Medical School as a Graduate v Undergraduate



Ethnicity

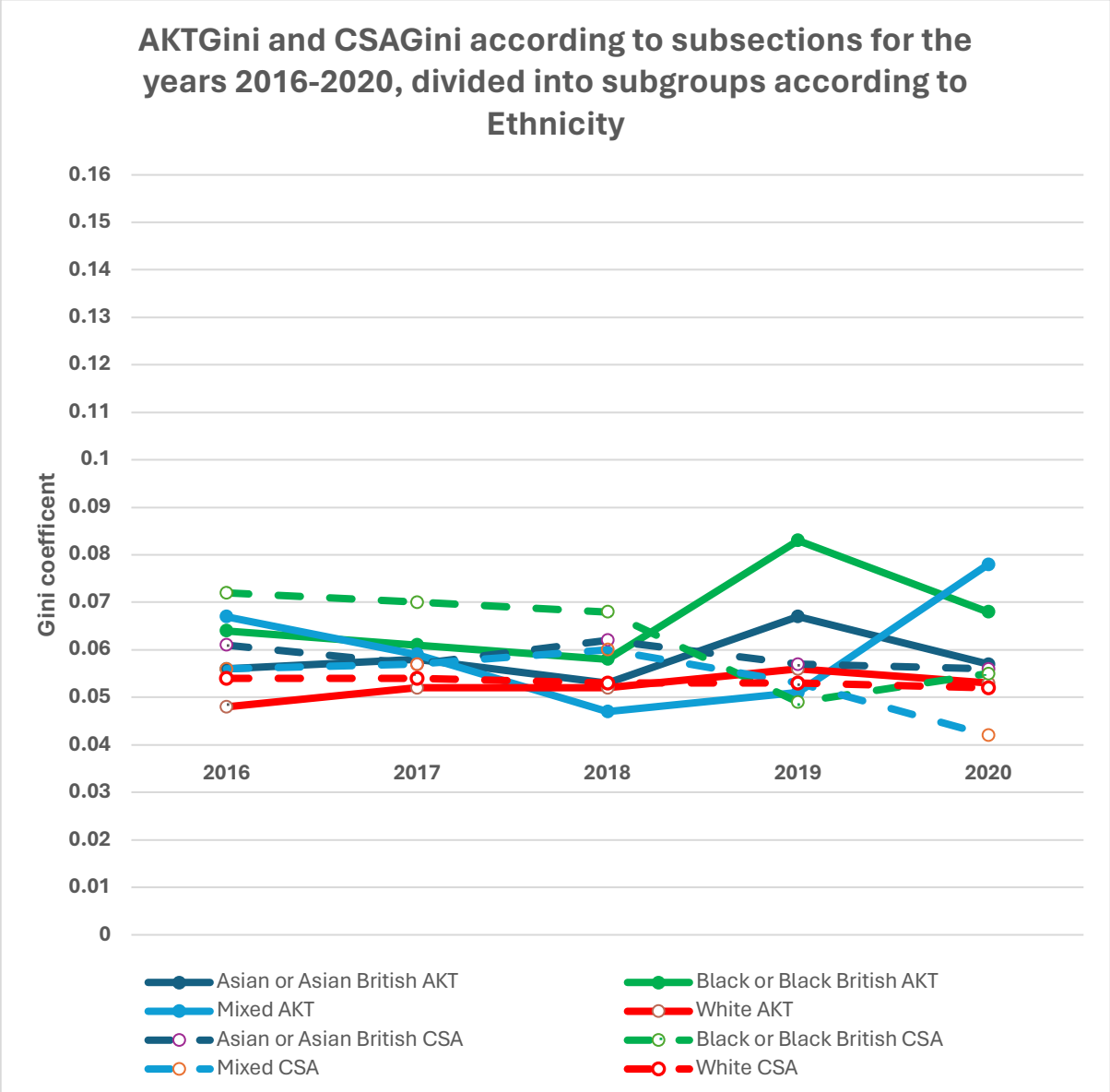
AKT_{GINI}

Between 2016 and 2018, the extent of inequity in AKT performance, as measured by the AKT_{GINI} coefficient, is lowest among candidates declaring their ethnicity as White, higher among candidates declaring their ethnicity as Asian or Asian British and highest among candidates declaring their ethnicity as Black or Black British. Between 2016 and 2018, there is a reducing trend of inequity among candidates declaring their ethnicity as Black or Black British by 9.4% (0.064 in 2016 to 0.058 in 2018) and Asian or Asian British by 5.4% (0.056 in 2016 to 0.053 in 2018) and Mixed by 16.4% (0.067 in 2016 to 0.047 in 2018). Meanwhile, between 2016 and 2018, there was an 8.3% incremental trend in inequity among candidates declaring their ethnicity as White (0.048 in 2016 to 0.052 in 2018). In 2019, there was a spike of increased inequity among candidates declaring their ethnicity as Black or Black British by 43.1% (0.058 in 2018 to 0.083 in 2019), Asian or Asian British by 26.4% (0.053 in 2018 to 0.067 in 2019), White by 7.7% (0.052 in 2018 to 0.056 in 2019) and Mixed by 8.5% (0.047 in 2018 to 0.051 in 2019). In 2020, the extent of inequity reduced back down almost to baseline for Asian or Asian British (0.057 in 2020, 0.056 in 2016) but not quite to baseline for Black or Black British (0.068 in 2020, 0.064 in 2016) and White (0.053 in 2020, 0.048 in 2016). Conversely, in 2020, for candidates declaring their ethnicity as Mixed, the extent of inequity rose further by 52.9% (0.051 in 2019 to 0.078 in 2020).

CSA_{GINI}

Between 2016 and 2020, the extent of inequity in CSA performance, as measured by the CSA_{GINI} coefficient, is lowest among candidates declaring their ethnicity as White, higher among candidates declaring their ethnicity as Asian or Asian British and highest among candidates declaring their ethnicity as Black or Black British (with the exception of 2019) where the extent of inequity among candidates declaring their ethnicity as Black or Black British is lower than those declaring their ethnicity as White, Asian or Asian British or Mixed). The gaps in inequity in CSA performance, as measured by the CSA_{GINI} coefficient, has narrowed between 2016-2020 with convergence across White, Black or Black British and Asian or Asian British (2016: 0.054,0.072,0.061 respectively, 2020: 0.052, 0.055, 0.056 respectively). More specifically, inequity had reduced by 3.7% for candidates declaring White ethnicity, 23.6% for candidates declaring Black or Black British ethnicity and 8.2% for candidates declaring Asian or Asian British ethnicity.

Figure 22- Study Two: AKT_{Gini} and CSA_{Gini} according to subsections for the years 2016-2020, divided into subgroups according to Ethnicity



Sexual orientation

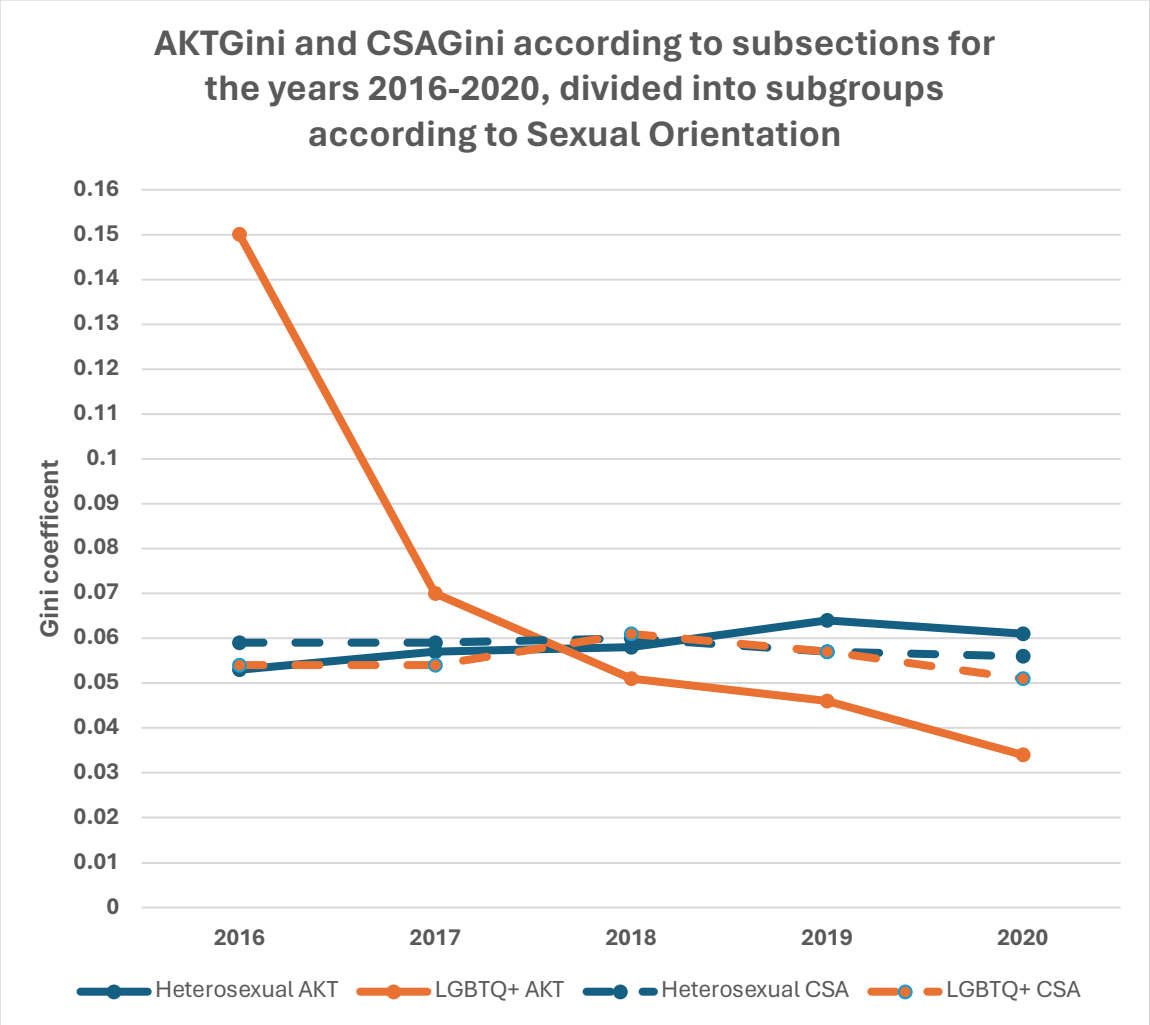
AKT_{GINI}

Generally between 2016 and 2020, inequity in AKT performance, as measured by the AKT_{GINI} coefficient, has sharply reduced by 77.2% among candidates declaring sexual orientation as LGBTQ+ (0.149 in 2016 and 0.034 in 2020).

CSA_{GINI}

Generally between 2016 and 2020, inequity in CSA performance, as measured by the CSA_{GINI} coefficient, is higher among candidates who declared their sexual orientation as Heterosexual. The gap in inequity in CSA performance, as measured by the CSA_{GINI} Index, is static between 2016-2020 (0.05 in 2016 and 0.05 in 2020).

Figure 23- Study Two: AKT_{Gini} and CSA_{Gini} according to subsections for the years 2016-2020, divided into subgroups according to Sexual Orientation



Deprivation

AKT_{GINI}

Inequity, according to AKT_{GINi} was highest among trainees who lived pre-medical school in the most deprived quintiles for Income and Employment deprivation and lowest among trainees who lived pre-medical school in the most deprived quintile for CYP deprivation.

- **IMD-** Generally between 2016 and 2020 (except 2017), inequity in AKT performance, as measured by the AKT_{GINI} coefficient, is higher among candidates who lived pre-medical school in the most deprived IMD quintile than all other quintiles. Inequity, as measured by the AKT_{GINI} coefficient, among those who lived pre-medical school in the most deprived IMD quintile, comparative to all other quintiles in 2016 and 2020 was 4% and 30.0% higher than all other quintiles respectively. Furthermore, there was an incremental trend of inequity, among those who lived pre-medical school in the most deprived IMD quintile (by 44.4% from 0.054 in 2016 to 0.078 in 2020) and those who lived pre-medical school in all other quintiles (by 15.4% from 0.052 in 2016 to 0.06 in 2020) participants.
- **Income deprivation -** Inequality as measured by the AKT_{GINI} coefficient, among those who lived pre-medical school in the most deprived Income deprivation quintile, comparative to all other quintiles, in 2016 and 2020 was 9.2% and 38.6% higher than all other quintiles respectively. Furthermore, there was an incremental trend of inequity, among those who lived pre-medical school in the most deprived Income deprivation quintile (by 36.6% from 0.071 in 2016 to 0.097 in 2020) in comparison to those who lived in all other quintiles for Income deprivation (by 7.7% from 0.065 in 2016 to 0.070 in 2020).
- **Employment deprivation –** Inequality as measured by the AKT_{GINI} coefficient, among those who lived pre-medical school in the most deprived Employment deprivation quintile, comparative to all other quintiles, in 2016 and 2020 was 34% and 44.8% higher than all other quintiles respectively. Furthermore, there was an incremental trend of inequity, among those who lived pre-medical school in the most deprived employment deprivation quintile (by 25.4% from 0.067 in 2016 to 0.084 in 2020) in comparison to those who lived in all other quintiles for Income deprivation (by 16.0% from 0.050 in 2016 to 0.058 in 2020).
- **Adult Skills deprivation -** Inequity in AKT performance, as measured by the AKT_{GINI} coefficient, among those who lived pre-medical school in the most deprived quintile for Adult Skills deprivation, comparative to all other quintiles, in 2016 and 2020 was 28.5% and 31.6% higher than all other quintiles respectively. The decremental trend between 2016 and 2020 among trainees who lived in the most deprived quintile for Adult Skills deprivation was

by 16.7% from 0.09 in 2016 to 0.075 in 2020 and in all other quintiles was by 24% from 0.075 in 2016 to 0.057 in 2020.

- **CYP deprivation –** Inequity in AKT performance, as measured by the AKT_{GINI} coefficient, among those who lived pre-medical school in the most deprived quintile for CYP deprivation, comparative to all other quintiles, in 2016 and 2020 was by 4% and 3.3% respectively. The decremental trend between 2016 and 2020 among trainees who has lived in the most deprived quintile for CYP deprivation was 40.4% from 0.052 in 2016 to 0.031 in 2020 and in all other quintiles was 40% from 0.050 in 2016 to 0.030 in 2020.

CSA_{GINI}

Inequity, according to CSA_{GINi} was highest among trainees who lived pre-medical school in the most deprived quintiles for Income and Employment deprivation and lowest among trainees who lived per-medical school in the most deprived quintile for CYP deprivation.

- **IMD-** Generally between 2016 and 2020, inequity in CSA performance, as measured by the CSA coefficient, is higher among candidates who lived pre-medical school in the most deprived IMD quintile than all other quintiles. Inequity, as measured by the CSA coefficient, among those who lived pre-medical school in the most deprived IMD quintile, comparative to all other quintiles in 2016 and 2020 was 3.4% and 0% higher than all other quintiles respectively. Furthermore, there was a decremental trend of inequity, among those who lived pre-medical school in the most deprived IMD quintile (by 8.3% from 0.060 in 2016 to 0.055 in 2020) and those who lived pre-medical school in all other quintiles (by 5.2% from 0.058 in 2016 to 0.055 in 2020) participants.
- **Income deprivation -** Inequality as measured by the CSA_{GINI} coefficient, among those who lived pre-medical school in the most deprived Income deprivation quintile, comparative to all other quintiles, in 2016 and 2020 was 4.8% and 41.5% higher than all other quintiles respectively. Furthermore, there was an incremental trend of inequity, among those who lived pre-medical school in the most deprived Income deprivation quintile (by 41.5% from 0.065 in 2016 to 0.092 in 2020) in comparison to those who lived in all other quintiles for Income deprivation (by 4.8% from 0.062 in 2016 to 0.065 in 2020).
- **Employment deprivation-** Inequality as measured by the CSA_{GINI} coefficient, among those who lived pre-medical school in the most deprived employment deprivation quintile, comparative to all other quintiles, in 2016 and 2020 was 35% and 46.4% higher than all other quintiles respectively. Furthermore, there was an incremental trend of inequity, among those who lived pre-medical school in the most deprived employment deprivation

quintile (by 30.2% from 0.063 in 2016 to 0.082 in 2020) in comparison to those who lived in all other quintiles for employment deprivation (by 12.0% from 0.050 in 2016 to 0.056 in 2020).

- **Adult Skills deprivation**- Inequality as measured by the CSA_{GINI} coefficient, among those who lived pre-medical school in the most deprived quintile for adult skills deprivation, comparative to all other quintiles, in 2016 and 2020 was 26% and 34.0% higher than all other quintiles respectively. Furthermore, there was an decremental trend of inequity, among those who lived pre-medical school in the most deprived adult skills deprivation quintile (by 12.3% from 0.081 in 2016 to 0.071 in 2020) in comparison to those who lived in all other quintiles for employment deprivation (by 11.7% from 0.060 in 2016 to 0.053 in 2020).
- **CYP deprivation -** Inequity in AKT performance, as measured by the CSA_{GINI} coefficient, among those who lived pre-medical school in the most deprived quintile for CYP deprivation, comparative to all other quintiles, in 2016 and 2020 was by 12.5% and 3.4% respectively. The decremental trend between 2016 and 2020 among trainees who lived in the most deprived quintile for CYP deprivation was 33.3% from 0.045 in 2016 to 0.030 in 2020 and in all other quintiles was 27.5% from 0.040 in 2016 to 0.029 in 2020.

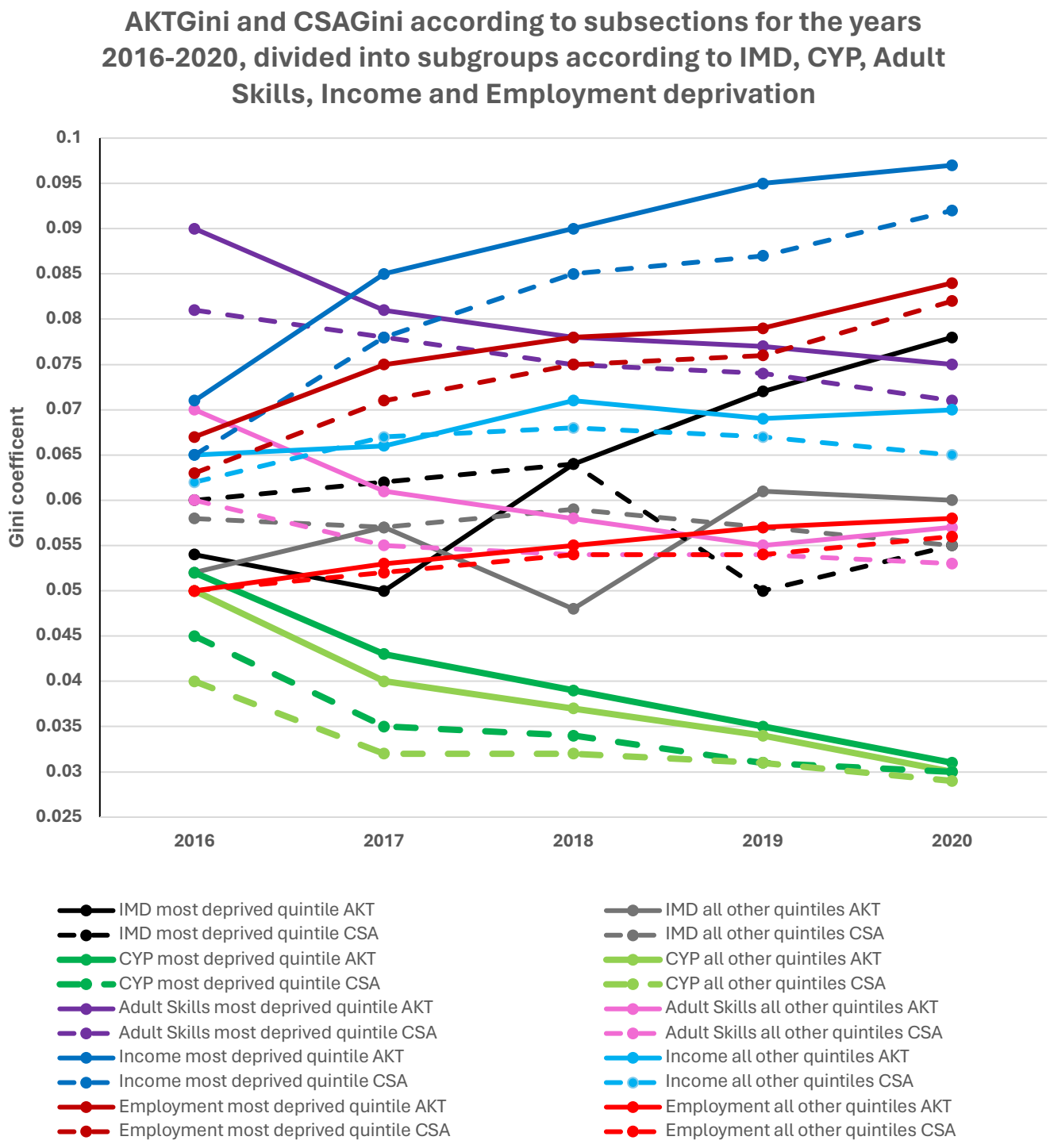


Figure 24- Study Two: AKT_{Gini} and CSA_{Gini} according to subsections for the years 2016-2020, divided into subgroups according to the overall IMD, domains for Income and Employment deprivation and the subdomains of CYP and Adult Skills deprivation

Religion

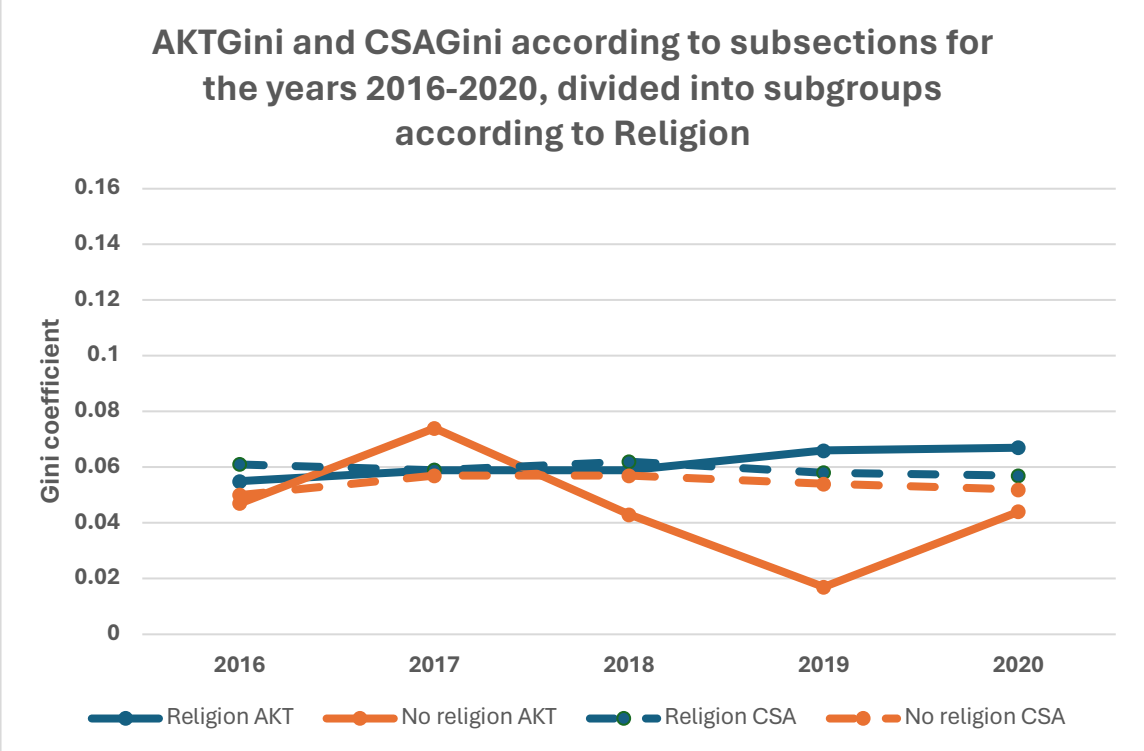
AKT_{GINI}

Generally between 2016 and 2020 (except 2017), inequity in AKT performance, as measured by the AKT_{GINI} coefficient, is higher among candidates who declared following a religious group than candidates who declared that they did not follow any religious group. There was an incremental trend of inequity among both those who declared a religious group (from 0.055 in 2016 to 0.067 in 2020) and a reduction in inequity among those who declared they did not follow a religious group (0.047 in 2016 to 0.044 in 2020) participants although It is to be noted that there is significant variation in the extent of inequity in AKT performance among those who declared no religion annually. More specifically, between 2016 and 2020, the overall inequity in AKT performance as measured by the AKT_{GINI} coefficient increased by 17.9% for candidates who declared following a religious group and reduced by 6.8% for candidates who declared no religion.

CSA_{GINI}

Generally between 2016 and 2018, inequity in CSA performance, as measured by the CSA_{GINI} coefficient, is higher among candidates who declared following a religious group in relation to those who declared no religion. The gap in inequity in CSA performance, as measured by the CSA_{GINI} coefficient, has reduced over the 2016-2020 time period (0.11 in 2016 and 0.05 in 2020).

Figure 25- Study Two: AKT_{Gini} and CSA_{Gini} according to subsections for the years 2016-2020, divided into subgroups according to Religion



Disability

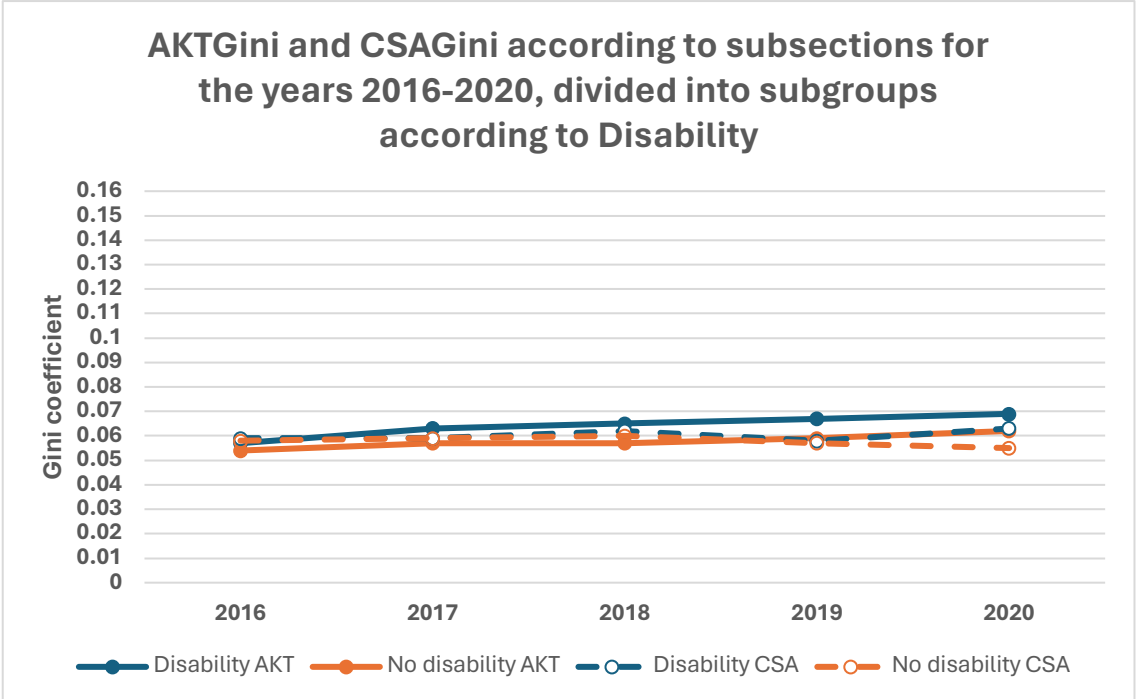
AKT_{GINI}

Generally between 2016 and 2020, inequity in AKT performance, as measured by the AKT_{GINI} coefficient, is higher among candidates who declared a disability in comparison with candidates who declared no disability with an incremental trend of inequity among both those with a declared disability (from 0.057 in 2016 to 0.062 in 2020) and those without a declared disability (0.054 in 2016 to 0.058 in 2020) participants. More specifically, between 2016 and 2020, the overall inequity in AKT performance as measured by the AKT_{GINI} coefficient increased by 8.8% for candidates with a declared disability and 7.4% for candidates without a declared disability.

CSA_{GINI}

Generally between 2016 and 2020, inequity in CSA performance, as measured by the CSA_{GINI} coefficient, is higher among candidates who declared a disability in comparison with candidates who declared no disability with an incremental trend of inequity those with a declared disability (from 0.059 in 2016 to 0.063 in 2020) and a decreasing trend of inequity among those without a declared disability (0.058 in 2016 to 0.055 in 2020) participants. More specifically, between 2016 and 2020, the overall inequity in AKT performance as measured by the CSA_{GINI} coefficient increased by 6.8% for candidates with a declared disability but decreased by 5.2% for candidates without a declared disability.

Figure 26- Study Two: AKT_{Gini} and CSA_{Gini} according to subsections for the years 2016-2020, divided into subgroups according to Disability



5.2.4 Predicting AKT and CSA performance on first attempt: Logistic Regression

Logistic regression modelling was carried out to identify predictors of success in the MRCGP AKT and CSA drawing upon sociodemographic factors including measures of socioeconomic (sex, ethnicity, graduate on entry to medicine, disability, religion, sexual orientation, IMD scores, UCAT bursary, parental degree, free school meals, income support) and educational background (school type, UCAS tariff, UCAT subsection scores, UG course type, EPM score, SJT score, academic trainee, military trainee, LTFT trainee, region of UG training and region of PG training).

Predictors of success in the MRCGP AKT: Binary Logistic Regression

Binary logistic regression modelling identified that when all of the aforementioned variables are taken into account, and ethnicity is modelled as White v Non-White (model 1, table 15), the following are predictors of success in the AKT on first attempt: White ethnicity [OR 2.002 (1.090-3.546), p=0.021], undertaking the primary medical qualification in the Midlands [OR 1.904 (1.039-2.901), P=0.009], undertaking a traditional medicine degree [OR 9.100 (3.702-10.104), p=0.060], undertaking training less than full time [OR 3.510 (0.994-11.967), p=0.053], UCAT Quantitative Reasoning Score [OR 1.002 (1.001-1.006), p<0.001], UCAT Verbal Reasoning Score [OR 1.003 (1.001-1.005), p=0.019], SJT score [OR 1.009 (1.004-1.014), P=0.071], EPM Decile [OR 1.473 (1.319-1.726), p<0.001]. The following were predictors of failure in the AKT on first attempt: undertaking primary medical qualification in the North West [OR 0.421 (0.306-0.875), p=0.039], or North East [OR 0.310 (0.220-0.741), p<0.001], undertaking a medical course with a foundation year [OR 0.293 (0.175-1.640), p=0.052] and being a graduate on entry to medical school [OR 0.293 (0.175-1.640), p=0.052]. Model 2 which adjusted for level 1 ethnicity (table 16) found that the following were predictors of success in the AKT on first sit: performance in the UCAT Quantitative Reasoning sub-section [OR 1.004 (1.002 to 1.007), p<0.001], performance in the UCAT Verbal Reasoning sub-section [OR 1.003 (1.000 to 1.005), p=0.022], SJT score [OR 1.006 (1.000 to 1.012), p=0.065], EPM score [OR 1.598 (1.472 to 1.734), p<0.001], most deprived CYP quintile [OR 2.043 (1.014 to 4.118), p=0.046], LTFT trainee [OR 3.405 (0.976 to 11.875), p=0.055], and having obtained a primary medical qualification from the Midlands [OR 1.668 (1.089 to 2.556), p=0.019]. The following were predictors of failure in the AKT on first sit: undertaking a primary medical qualification in the North West [OR 0.606 (0.381 to 0.962), p=0.034] or North East [OR 0.350 (0.189 to 0.648), p<0.001], living pre-medical school in the most deprived quintile for Income Deprivation [OR 0.293 (0.152 to 0.564), p<0.001], graduate on entry to medical school [OR 0.301 (0.203 to 0.446), p<0.001], undertaking medicine with a foundation year [OR 0.275 (0.075 to 1.005), p=0.051] and living pre-medical school in the most

deprived quintile for Employment deprivation [OR 0.468 (0.335 to 0.654), p<0.001]. Further modelling (model 3) using level 2 ethnicity data (table 17), identified that, in addition to the above, the following was a predictor of being more likely to fail the AKT on first sit: living pre-medical school in the most deprived quintile for Adult Skills deprivation [OR 0.293 (0.165 to 0.522), p<0.001].

Predictors of success in the MRCGP CSA: Binary Logistic Regression

Binary logistic regression modelling (model 4, table 18) identified that when all of the aforementioned variables are taken into account and ethnicity is modelled as White v Non-White, the following are predictors of success in the CSA on first sit: Female [OR 2.451 (1.563-3.398), p<0.001].White [OR 2.354 (1.643-3.501), p<0.001], UCAT Decision Reasoning Score [OR 1.004 (1.002-1.008), p=0.006], SJT Score [OR 1.006 (1.002-1.013), p=0.071], EPM Decile [OR 1.310 (1.195-1.421), p<0.001]. However, being a graduate on entry to medical school was a predictor of failing the CSA on first attempt [OR 0.610 (0.455-0.891), p=0.051]. Model 5 (table 19), which adjusted for level 1 ethnicity, found that the following were predictors of success in the CSA on first sit: Female [OR 2.252 (1.479 to 3.428), p<0.001], attending a state school [OR 2.103 (1.002 to 4.416), p=0.049], UCAT Decision Reasoning score [OR 1.004 (1.001 to 1.007), p=0.005], SJT score [OR 1.007 (1.000 to 1.015), p=0.064] and EPM Decile [OR 1.275 (1.165 to 1.395), p<0.001]. Predictors of failure in the CSA on first sit included: UCAT bursary [OR 0.361 (0.194 to 0.670), p=0.001], graduate on entry to medical school [OR 0.590 (0.355 to 0.981), p=0.042] and living pre-medical school in the most deprived quintile for Adult Skills deprivation [OR 0.510 (0.332 to 0.785), p=0.002]. Further modelling (using level 2 ethnicity data), model 6 (table 20), identified that, in addition to the above, the following were predictors of failure in the CSA: living pre-medical school in the most deprived quintile for Adult Skills deprivation [OR 0.204 (0.082 to 0.511), p<0.001], Employment deprivation [OR 0.181 (0.047 to 0.694), p=0.013], Income deprivation [OR 0.207 (0.084 to 0.507), p<0.001] and Employment deprivation [OR 0.181 (0.047 to 0.694), p=0.013].

5.3 Study Three Results

This section presents the findings of the comprehensive analyses of outcomes in GPHST solely and intersectionally by age, sex, deprivation, ethnicity, disability, sexual orientation and religion. Analyses are presented for ARCP outcomes and CCT completion.

Table 21 summarises the descriptive demographic data of the study population which included trainees with an expected CCT date on or before 26/1/2022 who had accepted a GP Training post via ORIEL since the earliest time of GP Training records (2013). Data is provided for: a) all trainees with an expected CCT date on or before 26/1/22 (n=7481), b) trainees who completed their CCT by that date (n=4583, 61.3%) c) trainees who did not complete their CCT by that date (n=2898, 38.7%). For trainees who completed their CCT by the 26/1/22 (n=4583), table 22 further disaggregates data for trainees who completed their CCT timely within 1856 days of registration (n=1777, 38.8%) and trainees who completed CCT in more than 1856 days of registration (n=2806, 61.2%). Data in both tables are disaggregated by trainees with standard ARCP outcomes at every point and those with one or more non-standard ARCP outcomes and is provided by sex, course type, teaching style, prior degree status, school type, ethnicity (level 1), ethnicity (level 2), sexual orientation, disability, free school meals, parental education, income support, Overall Index of Multiple Deprivation, IMD domains: LE, Income, Health and Disability, Crime, Education, Employment, BHS and IMD subdomains: Indoor LE, Outdoor LE, CYP, Adult Skills, Geographical Barriers and wBHS.

Table 23 outlines the odds ratios of: a) Non-Standard/Developmental ARCP outcomes v Standard ARCP outcomes, b) CCT completion v not completing CCT within the study period and c) timely CCT completion v non-timely CCT completion. Figures 26, 27 and 28 respectively graph the odds ratios by each of the equalities lenses.

5.3.1 Non-standard/ Developmental ARCP Outcomes

Table 23 outlines the odds ratios of non-Standard/Developmental ARCP outcomes v Standard ARCP outcomes and figure 26 graphs the odds ratios through each of the equalities lenses.

Sex: Male trainees were 1.4x more likely than female trainees to be awarded one or more non-standard ARCP outcomes during GPHST [OR 1.389 (1.254-1.539), p<0.0001].

Age: There was no statistically significant difference in ARCP outcomes between trainees in GPHST who had completed Graduate entry Medicine v Standard Entry Medicine.

Level 1 ethnicity: White trainees were less likely than non-White trainees to be awarded non-standard ARCP Outcomes [OR 0.882 (0.793-0.979), p=0.019]. Conversely, ethnic minority trainees were more likely than White trainees to have at least 1 or more non-standard ARCP Outcome [OR 1.135 (1.021 to 1.260), p=0.019]. When ethnic groups are disaggregated, Black or Black British groups were 1.5x more likely than White trainees to have at least one of more non-standard ARCP Outcomes (OR 1.496 (1.129 to 1.981), p=0.005) and Mixed ethnic group trainees were more 1.5x more likely than White trainees to have at least one or more non-standard ARCP Outcomes [OR 1.452 (1.114 to 1.892, p=0.006)]. There was no statistically significant difference between each of the other surveyed ethnic groups in comparison to White: Asian or Asian British (p=0.251) or Any other Ethnic Group (p=0.842).

Level 2 ethnicity: When using disaggregated level 2 ethnicity data, there was no statistically significant difference in ARCP outcomes between White trainees and non-White trainees (p=0.483). Trainees declaring their ethnicity as African were 1.7x more likely than White trainees to have at least one or more non-standard ARCP Outcome [OR 1.679 (1.237 to 2.279), p=0.0009} but Caribbean groups were less likely than White trainees to have at least one or more non-standard ARCP outcome [0.082 (0.04 to 0.173), p<0.0001]. Trainees of White and Asian ethnicity were 1.7x more likely than trainees of White ethnicity to have at least one or more non-standard ARCP Outcome [OR 1.677 (1.16 to 2.42), p=0.006]. There was no statistically significant difference in ARCP outcomes between each of the other surveyed ethnic groups in comparison to White trainees: Bangladeshi (p=0.153), Pakistani (p=0.810), Indian (p=0.328), Chinese (p=0.476), Irish (p=0.767), Any other ethnic group (p=0.632), Any other Asian (p=0.084), Any other Black (p=0.382), Any other mixed (p=0.364), White and Black African (p=0.887), White and Black Caribbean (p=0.176) or Any other White ethnic group (p=0.264).

Deprivation (most deprived quintile v least deprived quintile): There was no statistically significant difference in ARCP outcomes between trainees from the most deprived IMD quintile vs all other quintiles (p=0.070). However, when the IMD is disaggregated into its constituent domains and subdomains, trainees were more likely to have one or more non-standard ARCP outcomes if they had lived pre-medical school in the most deprived quintiles for: Income [OR 1.293 (1.095-1.528), p=0.002], Employment [OR 1.246 (1.038-1.496), p=0.018] and Adult Skills Deprivation [OR 1.637

(1.384-1.935), p<0.0001] in comparison with the least deprived quintiles. There was no statistically significant difference in ARCP outcomes between trainees who lived pre-medical school in the most and least deprived quintiles for: LE (p=0.093), Indoor LE (p=0.116), Outdoor LE (p=0.266), Health and Disability (p=0.280), Crime (p=0.191), Education (p=0.093), CYP (p=0.268), BHS (p=0.813), Geographical Barriers (p=0.231) and wBHS (p=0.461).

Deprivation (most deprived quintile v all other quintiles): There was no statistically significant difference in ARCP outcomes between trainees from the most deprived IMD quintile vs all other quintiles (p=0.092). However, when the IMD is disaggregated into its constituent domains and subdomains, trainees were more likely to have one or more non-standard ARCP outcomes if they had lived pre-medical school in the most deprived quintiles for: Indoor LE [OR 1.166 (1.041-1.305), p=0.008], Income [OR 1.221 (1.051-1.417), p=0.009], Crime [OR 1.156 (1.005-1.330), p=0.043] and Adult Skills deprivation [OR 1.685 (1.441-1.969), p<0.0001]. There was no statistically significant difference in ARCP outcomes between trainees from the most deprived IMD quintile vs all other quintiles: IMD (p=0.092), LE (p=0.071), Outdoor LE (p=0.117), Employment (p=0.080), Health and Disability (p=0.159), Education (p=0.168), CYP (p=0.232), BHS (p=0.968), Geographical Barriers (p=0.394) and wBHS (p=0.066).

Disability: There was no statistically significant difference in non-standard ARCP outcomes between trainees declaring a declared disability and those who did not (p=0.057).

Sexual Orientation: There was also no statistically significant difference in ARCP outcomes during GPHST between Heterosexual trainees and all other declared sexual orientations (p=0.738). However, trainees who declared their sexual orientation as Lesbian/Gay were 1.5x more likely than those who declared their sexual orientation as Heterosexual to get at least one non-standard ARCP outcome [OR 1.483 (1.022 to 2.153], p=0.038] during GPHST. There was no statistically significant difference in non-standard ARCP outcomes during GPHST among those who declared their sexual orientation as Bisexual (p=0.738) in comparison with Heterosexual trainees.

Religion: There was no statistically significant difference in ARCP outcomes during GPHST (p=0.176) between trainees who declared a religious affiliation with one of the 6 main worldwide religions (Buddhism, Christianity, Hindu, Judaism, Islam, Sikh) and those who declared following no religion. When religious groups were disaggregated, there was also no statistically significant difference in ARCP outcomes during GPHST between trainees who declared no religion and those who declared a

religious belief of Christianity (p=0.130), Buddhism (p=0.894), Hinduism (p=0.653), Judaism (p=0.213), Islam (p=0.404) or Sikhism (p=0.777).

5.3.2 CCT completion

Table 23 outlines the odds ratios of: CCT completion v not completing CCT within the study period and figure 27 graphs the odds ratios through each of the equalities lenses.

Sex: Male trainees were more likely to complete GPHST CCT [OR 1.322 (1.199-1.457), p<0.0001]. Female trainees were less likely to complete GPHST CCT [OR 0.757 (0.686 to 0.834), p<0.0001]

Age: Trainees who had entered the Graduate Entry Medicine course were less likely to complete CCT in comparison with those who had entered the Standard Entry Mediicne course [OR 0.887 (0.791-0.995), p=0.041].

Level 1 ethnicity: Trainees declaring their ethnicity as White were less likely than non-White trainees to complete CCT [OR 0.906 (0.824-0.997), p=0.044]. Trainees who declared their ethnicity as Asian or Asian British were 1.3x more likely than White trainees to complete CCT [OR 1.258 (1.127-1.405), p<0.0001]. There was no statistically significant difference in CCT completion between White trainees and trainees of Black or Black British ethnicity (p=0.261), Mixed ethnicity (p=0.970) or Any other ethnic group (p=0.080).

Level 2 ethnicity: Trainees declaring their ethnicity as White were less likely to complete CCT than non-White trainees [OR 0.920 (0.835-1.015), p=0.095]. When ethnic groups are disaggregated, Indian trainees were 1.4x more likely [OR 1.398 (1.199-1.630),P=0.0001] and Pakistani were 1.3x more likely [OR 1.27 (1.050-1.542), p=0.014] than White trainees to complete CCT. Interestingly, trainees declaring their ethnicity as 'Any other White' [OR 0.654 (0.475 to 0.899), p=0.009] were less likely than White counterparts to complete GPHST CCT. There was no statistically significant difference in CCT completion between each of the other surveyed ethnic groups in comparison to White: Any other ethnic group (p=0.231), Any other Asian (0.749), Any other Black (0.568), African (0.181), Caribbean (0.708), Arab (p=0.116), Irish (p=0.379), Chinese (p=0.723) and Bangladeshi (p=0.858).

Deprivation (most deprived quintile v least deprived quintile): There was no statistically significant difference in ARCP outcomes between trainees from the most deprived IMD quintile vs all other quintiles with regards to the IMD (p=0.733), LE (p=0.452), Indoor LE (p=0.239), Outdoor LE (p=0.500), Income (p=0.363), Employment (p=0.307), Health and Disability (p=0.736) and Crime (p=0.169), Education (p=0.880), Adult Skills (p=0.610), BHS (p=0.341), wBHS (p=0.575), Geographical Barriers (p=0.056). Interestingly trainees who had lived in the most deprived quintile for CYP were less likely than those who had lived pre-medical school in the least deprived quintile to complete GP HST CCT [OR 0.836 (0.701-0.996), p=0.045].

Deprivation (most deprived quintile v all other quintiles): There was no statistically significant difference in ARCP outcomes between trainees from the most deprived IMD quintile vs all other quintiles with regards to the IMD (p=0.916), Education (p=0.744), CYP (p=0.101), Adult Skills (p=0.641), BHS (p=0.404), wBHS (p=0.545), LE (p=0.437), Indoor LE (p=0.417), Outdoor LE (p=0.392), Income (p=0.255), Employment (p=0.410), Health and Disability (p=0.857) and Crime (p=0.239). Interestingly trainees who had lived in the most deprived quintile for Geographical Barriers were less likely than all other trainees to complete GP HST CCT [OR 0.894 (0.804 to 0.995), p=0.039].
Disability: Trainees who declared a disability were less likely than those who declared no disability to complete their GPHST CCT [OR 0.796 (0.659 to 0.960), p=0.017].

Sexual Orientation: Trainees declaring their sexual orientation as heterosexual [OR 1.638 (1.204-2.229), p=0.002] were more likely to complete CCT than trainees of other sexual orientations such as lesbian, gay, bisexual or other. Trainees were less likely to complete GPHST CCT if they identified as Bisexual [OR 0.426 (0.218 to 0.835), p=0.013] or Lesbian/Gay [OR 0.692 (0.483 to 0.993), p=0.046]

Religion: Trainees who declared no religious belief were less likely to complete GPHST CCT [OR 0.842 (0.752-0.943), p=0.003]. In fact, trainees who declared a religious affiliation were 1.2x more likely than their counterparts to complete GPHST CCT [OR 1.188 (1.061 to 1.330), p=0.003]. When religious groups are disaggregated, trainees with the following religious beliefs: Hinduism [OR 1.487 (1.186-1.865), p=0.0006], Sikhism [OR 1.722 (1.151-2.576), p=0.008] and Islam [OR 1.329 (1.101-1.592), p=0.002] were more likely to complete CCT than trainees declaring no religion. There was no statistically significant difference in CCT completion between trainees declaring no religious belief and trainees who declared a religious belief of: Christianity (p=0.331), Buddhism (p=0.680), Judaism (p=0.472).

5.3.3 Timely CCT completion

Table 23 outlines the odds ratios of timely CCT completion v non-timely CCT completion and figure 28 graphs the odds ratios through each of the equalities lenses.

Sex: Females more likely to take longer to complete GP HST CCT (>1856 days of registration) [OR 1.513 (1.340 to 1.707), p<0.0001].

Age: There was no statistically significant difference in timely CCT completion between graduates from a graduate entry medicine course and a standard entry medicine course (p=0.721).

Level 1 ethnicity: Trainees declaring their ethnic group as White were less likely to complete CCT timely [OR 0.760 (0.673-0.857), p<0.0001] in comparison with trainees who declared their ethnicity as a non-White ethnic group. Trainees declaring their ethnicity as Asian or Asian British, were 1.4x more likely to complete CCT timely [OR 0R 1.397 (1.221-1.598), p<0.0001] than White ethnic groups. There was no statistically significant difference in timely CCT completion between White ethnic groups and Black or Black British ethnic groups (p=0.688), Mixed ethnic groups (p=0.957) or Any other ethnic group (p=0.177).

Level 2 ethnicity: Trainees declaring their ethnic group as White were less likely to complete CCT timely [OR 0.751 (0.664-0.849), p<0.0001] in comparison with trainees who declared their ethnicity as a non-White ethnic group. When ethnic minority groups are disaggregated according to level 2 ethnicity, Indian trainees 1.5x more likely (OR 1.484 (1.242 to 1.772), p<0.0001], Chinese trainees twice as likely [OR 2.051 (1.286 to 3.271), p=0.003], any other Asian trainees 1.4x more likely (OR 1.414 (1.056 to 1.894), P=0.020) to complete CCT timely in comparison with White trainees. There was no statistically significant difference in timely CCT completion between White trainees and trainees who declared their ethnicity as: Bangladeshi (p=0.075) or Pakistani (p=0.171, African (p=0.875), Caribbean (p=0.391), White and Asian (p=0.538), White and Black African (p=0.892), White and Black Caribbean (p=0.703), Any other ethnic group (p=0.621), Any other black (p=0.472), Any other mixed (p=0.510), Any other White (p=0.126), Arab (p=0.074) and Irish (p=0.508).

Deprivation (most deprived quintile v least deprived quintile): GPHST trainees who had lived pre-medical school in the most deprived quintiles for the following deprivation forms were more likely to complete CCT timely in comparison with applicants from the most deprived quintile: IMD [OR 1.348 (1.091-1.665), p=0.006], Income [OR 1.302 (1.064-1.593), p=0.010], Employment [OR 1.453 (1.171-

1.803),p=0.001], Health and Disability [OR 1.299 (1.050-1.606), p=0.016], Education [OR 1.569 (1.225-2.008), p=0.0004], CYP [OR 1.442 (1.148-1.812), P=0.002], Adult Skills [OR 1.581 (1.69-.1972), p<0.0001]. There were no statistically significant differences in the likelihood of completing CCT timely between trainees who had lived pre-medical school in the most deprived quintile compared with the least deprived quintile for the following deprivation forms: LE (p=0.552), Indoor LE (p=0.466), Outdoor LE (p=0.215), Crime (p=0.189), BHS (p=0.286), Geographical Barriers (p=0.080), wBHS (p=0.192).

Deprivation (most deprived quintile v all other quintiles): GPHST trainees who had lived pre-medical school in the most deprived quintiles for the following deprivation forms were more likely to complete CCT timely in comparison with applicants from all other quintiles: IMD [OR 1.304 (1.075-1.581), p=0.007], Income [OR 1.266 (1.055-1.520),p=0.003], Employment [OR 1.351 (1.111-1.643), p=0.003], Education [OR 1.400 (1.104-1.776), p=0.006], CYP [OR 1.275 (1.027-1.584), p=0.028], Adult Skills [OR 1.375 (1.118-1.691), p=0.003]. There were no statistically significant differences in timely CCT completion between the most deprived quintile and all other quintiles for the following deprivation forms: LE (p=0.414), Indoor LE (p=0.384), Outdoor LE (p=0.376), Health and Disability (p=0.240), Crime (p=0.189), BHS (p=0.568), Geographical Barriers (p=0.081) and wBHS (p=0.784).

Disability: Trainees who declared a disability were half as likely as those who declared no disability to complete GPHST timely within 1856 days of registration [OR 0.544 (0.413 to 0.717), p<0.0001].

Sexual Orientation: Among those who completed GPHST CCT, with regards to timeliness of CCT completion, there was no statistically significant difference between trainees who declared bisexual orientation (p=0.079) and those who declared Lesbian/Gay sexual orientation (p=0.418) when compared with those who declared their orientation as Heterosexual.

Religion: Among those who completed GPHST CCT, with regards to timeliness of CCT completion, there was no statistically significant difference between trainees who declared a religious affiliation with one of the 6 main worldwide religions and those who did not (p=0.814). Trainees reporting their religion as Christianity [OR 0.839 (0.709-0.993), p=0.041] or Hinduism [OR 1.354 (1.047-1.752), p=0.041] were more likely to complete CCT timely than trainees declaring they have no religion. There was no statistically significant difference between trainees declaring they have no religion and trainees declaring the following religious beliefs: Buddhism (p=0.706), Judaism (p=0.393), Sikhism (p=0.062), Islam (p=0.069).

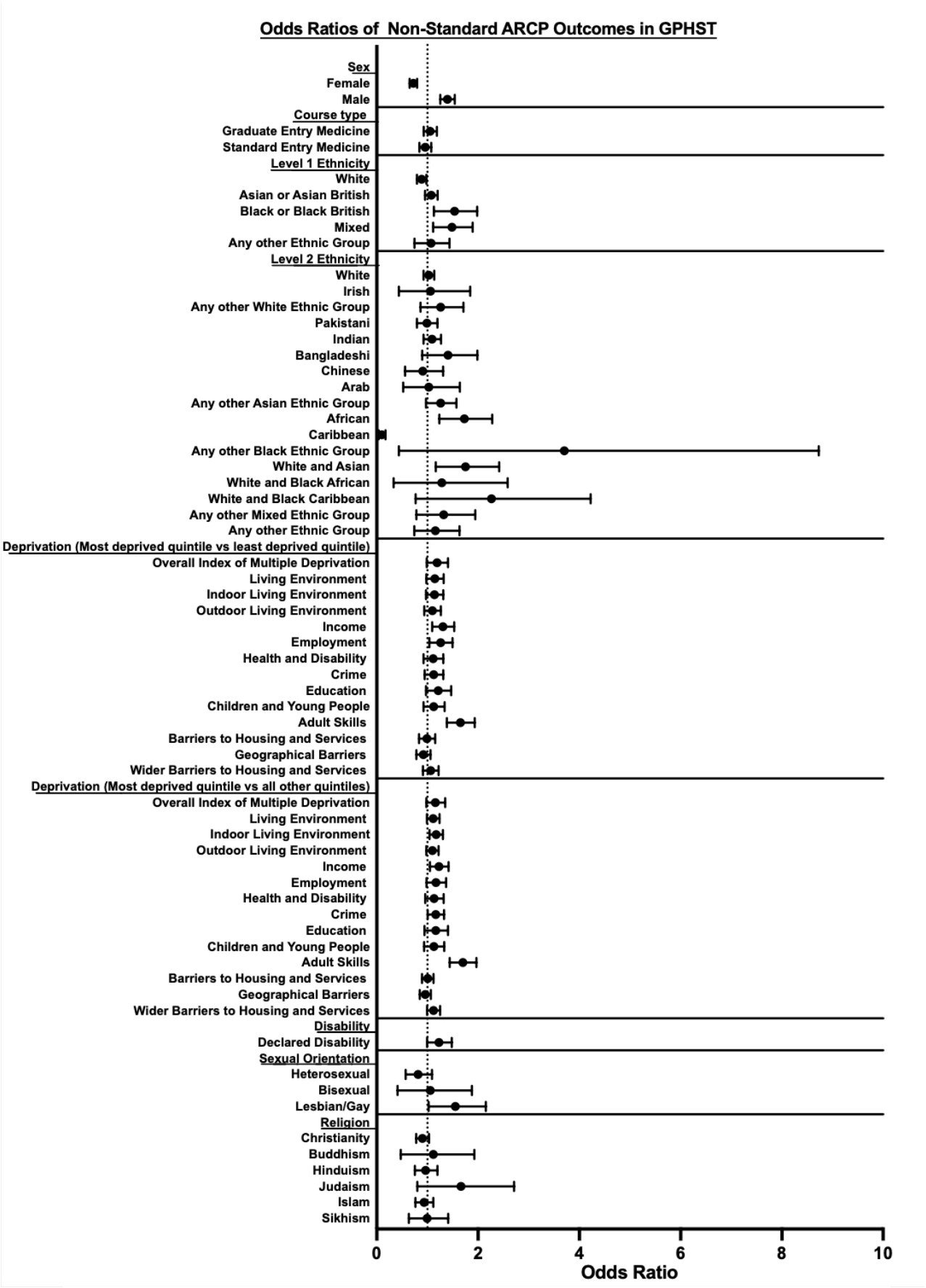


Figure 27- Study Three: Odds Ratios of Non-Standard/Developmental ARCP Outcomes in GPHST v Standard ARCP Outcomes in GPHST

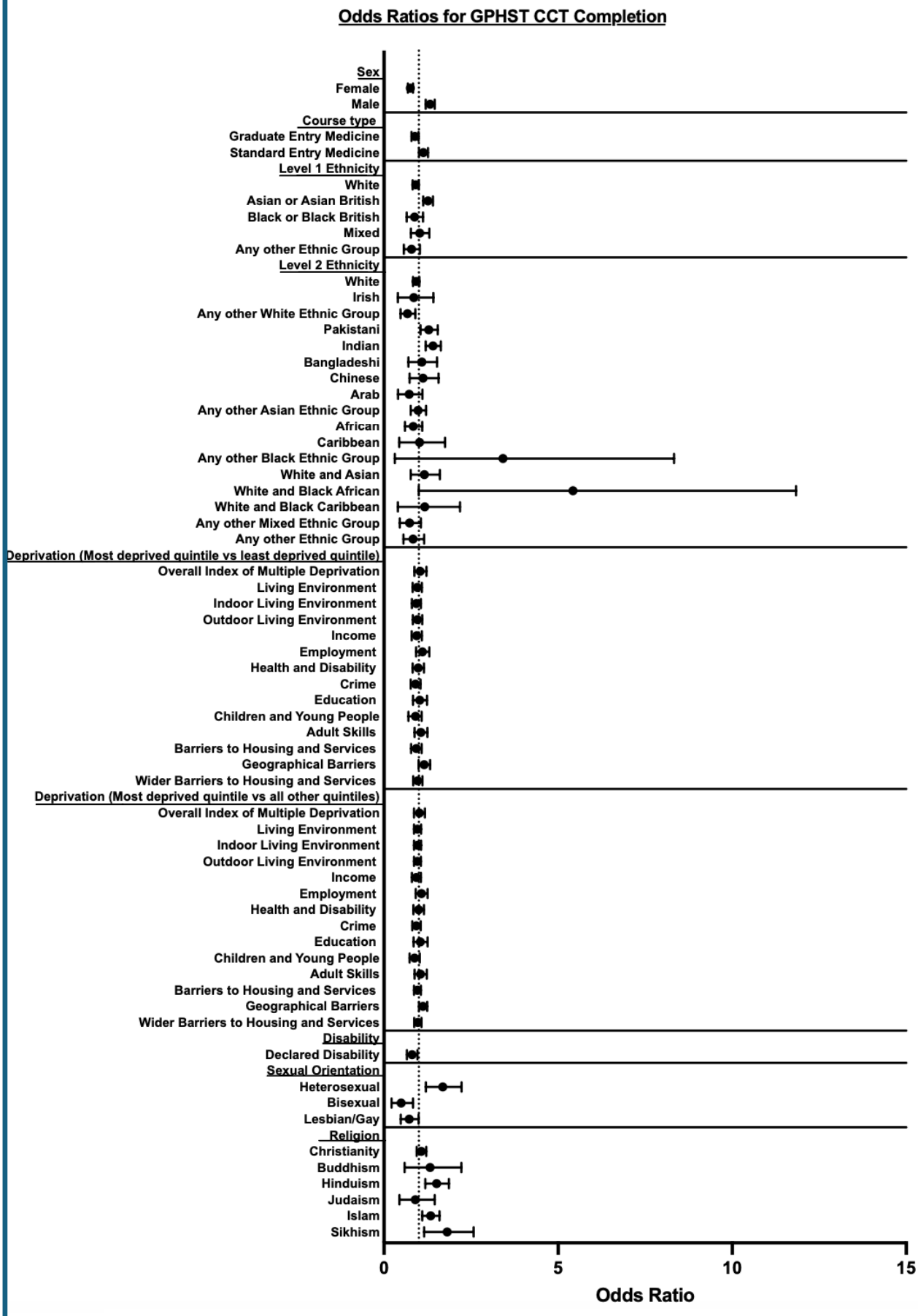


Figure 28 - Study Three: Odds Ratios for GPHST CCT completion v not completing CCT within the study period

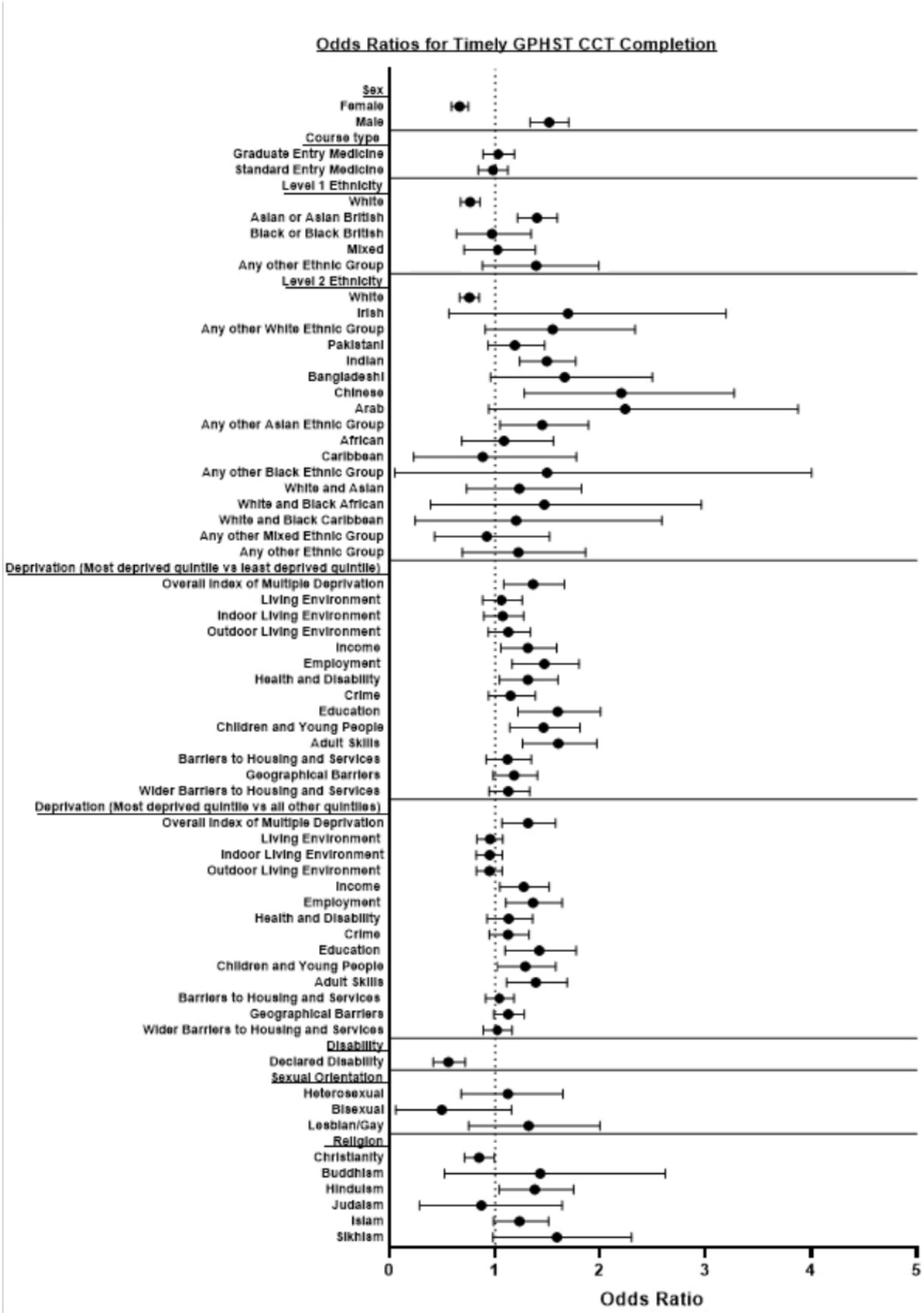


Figure 29- Study Three: Odds Ratios for timely GPHST CCT completion v non-timely CCT completion

5.3.4 Binary logistic regression to predict the characteristics of non-standard ARCP outcomes and timely CCT completion

Binary logistic regression modelling was carried out to identify predictors of non-standard ARCP outcomes and timely CCT completion drawing upon sociodemographic factors including measures of socioeconomic (sex, ethnicity, graduate on entry to medicine, disability, religion, sexual orientation, IMD scores, UCAT bursary, Parental degree, free school meals, income support) and educational background (school type, UCAS tariff, UCAT subsection scores, UG course type, EPM score, SJT score, academic trainee, LTFT trainee, region of UG training and region of PG training).

Predictors of non-standard ARCP Outcomes

Binary logistic regression modelling (model 7, table 24) identified that when all of the aforementioned variables are taken into account, the following are predictors of one or more non-standard ARCP Outcomes during training: less than full time trainee [OR 1.562 (1.061 to 2.301), p=0.024], UG training in Scotland [OR 1.543 (0.962 to 2.474), p=0.072], PG training in Wales [OR 3.231 (1.798 to 5.805), p<0.001], PG training in the Midlands [OR 2.739 (2.176 to 3.449), p<0.001], PG training in the South East [OR 1.722 (1.290 to 2.298), p<0.001], PG training in the South West [OR 1.907 (1.451 to 2.506), p<0.001], trainee who was on free school meals [OR 1.459 (1.115 to 1.909), p=0.006], UCAT Quantitative Reasoning Score [OR 1.001 (1.000 to 1.002), p=0.049]. Modelling identified that, when all of the aforementioned factors are taken into account, trainees were less likely to get non-standard ARCP outcomes if they were: Female [OR 0.782 (0.655 to 0.932, p=0.006], undertook UG training in London [OR 0.720 (0.584 to 0.888), p=0.002], North West [OR 0.579 (0.432 to 0.776), p<0.001] or North East [OR 0.662 (0.455 to 0.964), p=0.031], scored a high UCAS tariff [OR 0.800 (0.650 to 0.910), p=0.002], habitated pre-medical school in the most deprived quintile for CYP deprivation [OR 0.787 (0.650 to 0.952), p=0.014] and scored a high EPM decile [OR 0.877 (0.850 to. 0.905), p<0.001]. Further modelling (model 8, table 25) using level 2 ethnicity identified that, once the modelling is adjusted for all the aforementioned variables including socioeconomic status, Pakistani trainees are less likely to get non-standard ARCP Outcomes during training in comparison to White trainees and there were no other statistically significant findings with regards to ethnicity.

Predictors of timely CCT completion

Binary logistic regression modelling (model 9, table 26) identified that when all of the aforementioned variables are taken into account including level 1 ethnicity, the following are

predictors of timely CCT completion: undertaking PG training in the Midlands [OR 1.457 (1.128 to 1.882), p=0.004], North East [OR 1.295 (0.968 to 1.732), p=0.081] or East of England [OR 1.778 (1.224 to 2.541), p=0.002], UCAT Decision Analysis score [OR 1.002 (1.001 to 1.003), p=0.002], UCAT Verbal Reasoning score [OR 1.004 (1.002 to 1.005), p=0.027], habitating pre-medical school in the most deprived quintiles for Income deprivation [OR 1.467 (1.175 to 1.830), p<0.001] and Employment Deprivation [OR 1.384 (0.974 to 1.965), p=0.070]. The following were predictors of reduced likelihood of timely CCT completion: Female [OR 0.800 (0.655 to 0.977), p=0.029], Academic trainee [OR 0.745 (0.650 to 0.954), p=0.043], less than full time trainee [OR 0.312 (0.151 to 0.642), p=0.002], undergraduate training in the South East [OR 0.618 (0.403 to 0.947), p=0.027] or Scotland [OR 0.532 (0.272 to 1.041), p=0.065], Parental degree [OR 0.778 (0.632 to 0.959), p=0.019], Disability [OR 0.583 (0.382 to 0.891), p=0.013], habitating pre-medical school in the most deprived quintile for CYP deprivation [OR 0.752 (0.587 to 0.963), p=0.024], undertaking medicine with a preliminary year [OR 0.328 (0.092 to 1.163), p=0.084] and being of White ethnicity [OR 0.780 (0.625 to 0.974), p=0.028]. Interestingly, the modelling using level 2 ethnicity (model 10, table 27) is similar.

Chapter 6: Discussion

6. Discussion

This chapter summarises and discusses each of the key findings across the three studies exploring equity of access, experience and outcomes with respect to GPHST solely and intersectionally by age, sex, socioeconomic status, ethnicity, disability, sexual orientation and religion. This chapter discusses the emerging findings in relation to the literature highlighting novel findings and contributions to knowledge.

6.1 Study One

The existing literature exploring access to GPHST is primarily focused on: a) applicant motivation for choosing GPHST as oppose to other specialities (Irish et al., 2011 (17); Watson et al., 2011 (18); Smith et al., 2015 (19)), b) factors which increase the odds of application to GPHST such as being female or non-White, c) factors which reduce the odds of application to GPHST such as having completed a non-graduate entry primary medical qualification, intercalation during their primary medical qualification and above-median academic performance during medical school (Gale 2019 (20)), d) approaches for recruitment to GPHST (Patterson et al. 2000, Patterson et al. 2001, Patterson et al. 2005, Plint & Petterson et al. 2009) and e) the impacts of the public image of a GP on applications to GPHST (Alberti et al. 2017 (21), Barry et al. 2019 (22)). Throughout the literature, studies have not thus far explored access to GPHST solely and intersectionally by age, sex, deprivation, ethnicity, disability, sexual orientation and religion with respect to: a) trends in applications between 2013-2020, b) sole applications to GPHST comparative to those made in combination with other specialties, c) direct and non-direct applications to GPHST, d) Successful offer of a GPHST national training number. The present thesis uses the rich source of UKMED data to address gaps in the literature embodied by the research questions, making several significant novel findings as discussed below:

6.1.1 Trends in applications to GPHST between 2013 and 2020

Study One found that during the study period, which spanned across three quarters of a decade, there was greater diversity in the demographic of applicants opting for GPHST. An increasing proportion of applications was observed from applicants who were: younger, female, domiciled pre-medical school in areas of high CYP and Adult Skills deprivation, with a declared religion other than Christianity (notably Islam and Hinduism), ethnic minority (notably Asian or Asian British, Black or Black British), with declared disability and declared LGBTQ+ sexual orientation. These trends of increasing diversity in applications for GPHST suggest successful strides over the three-quarter decade study period in paving the way for a future workforce which is representative of the population which it serves. This data is the first of its' kind to provide evidence of the progress made on diversity in access to GPHST which is recognised in the NHS Long term Workforce Plan policy stating that the NHS is 'the most diverse it has ever been' (271).

Reviewing the trend of evidence of wider diversity over time with a critical eye, reveals an important consideration that the increased diversity in applications to GPHST is likely to be, in large, helped by decades of 'structure' in the form of stakeholder policy development (Including HEIs, UKFPO, HEE,

NHSE, DHSC) designed to widen participation to medical degrees resulting in a pool of eligible applicants for GPHST who are more diverse and representative of the population which they serve. Widening participation processes have been found by scholars including Narety 2014 (272) to significantly minimise health inequalities, increase young people's life chances, improve health and prosperity (273). However, this occurs within a landscape of 'free will' of applicants who have hundreds of career opportunities including dozens of specialities to choose from. This interplay between "structures" and "freewill" is Bourdieu's description of habitus (274). Irish et al. 2011 noted that key factors for applicant choice for GPHST included: variety of work, continuity of care and work-life balance offered by a career in GP (17). Furthermore, Smith et al. 2015 reported that applicants selected GPHST due to 'working hours and conditions' (odds ratio 11.1) and 'domestic circumstances' (odds ratio 6.0) as more important than intending hospital doctors (19). Moreover, the consistently high proportion of female applicants found in study one is likely to be explained by the work of Watson et al. 2011 (18) who reported that the most important reason for women (76.6%) for choosing a career in GP was its' compatibility with family life (18). Heimans 2012 argues that Bourdieu's concepts of habitus, capital and field together describe power relations within a social space in practice (275). The capitals in this context are the development of a diverse culture within a 'field' of patients, stakeholders and applicants seeking a greater degree of diversity with regular review. Fanghanel 2007 refers to the significant impact which external stakeholders have on intrinsic policy making at HEIs (276). This includes students but also educationalists and patients who are keen to ensure that the health and social care workforce is representative of the population which it serves. The observed increase in applications from a more diverse pool of candidates to GPHST is a positive development, reflecting the impact of national efforts to make the GP workforce more representative of the UK's diverse population.

However, there is also recognition in the NHS Long term Workforce Plan policy and NHS Oversight Framework that further progress on diversifying the workforce is needed (271) (277). Firstly, a diverse workforce is better equipped to understand and address the varied healthcare needs of a multicultural society, enhancing patient satisfaction and outcomes. Secondly, by reflecting the population's diversity, the GP workforce can help address healthcare disparities and promote equity in healthcare access and outcomes. Thirdly, diverse teams bring a range of perspectives that can lead to innovative solutions and improvements in healthcare delivery. Understanding change over time is critical. Through exploration of trends in applications for GPHST over a three-quarter decade period through the equalities lenses, this work builds upon the more static works of Gale et al. 2017 (20), Cleland et al. 2019 (192) and Kumwenda et al. 2019 (108) which reported static predictors of application for GPHST finding that ethnic minority, female, UK graduates, trainees whose parents did

not have a degree were likely to apply for GPHST but drew no conclusions relating to application patterns over time which is critical in the context of the NHS Oversight Framework Delivery Metrics (278) seeking annual progress checks on the enhanced diversity outcomes set out in the aforementioned NHS Long term Workforce Plan policy (271).

Whilst study one found an increasing trend of applications to GPHST from trainees who lived pre-medical school in the most deprived quintiles for CYP and adult skills deprivation, study one also found no significant change in application trends from individuals in other deprivation categories (overall IMD, Education, Income, Health and Disability, Crime, BHS, wBHS) and a reduction of applications to GPHST from trainees who lived pre-medical school in the most deprived quintiles for Geographical barriers, LE deprivation, indoor LE deprivation, outdoor LE deprivation and Employment deprivation. This is likely to reflect the fact that Widening Participation schemes often best mitigate barriers faced within the parameters of Educational Deprivation, which are captured by the CYP and Adult Skills deprivation metrics including through, for example, offering contextual offers (Medical Schools' Council 2018 (279)) consisting of reduced entry requirements to HEI Medical Courses resulting in a pool of eligible applicants for GPHST which is diverse with respect to the inclusion of trainees domiciled in the most deprived areas for CYP and Adult Skills deprivation but not necessarily exposure to other forms of deprivation to the same degree. Of course, it is widely acknowledged by scholars and policy makers, including at the Higher Education Academy, that Widening Participation policies need to go beyond recruitment to supporting the retention and progression of students throughout their undergraduate studies and beyond (273) (280) (281). Disappointingly, when it comes to deprivation, studies in the literature and indeed the criterion for widening participation eligibility rely upon the overall IMD which has the potential to inadvertently mask the effects of specific deprivation factors and may be subject to sway by constituent indicators which are not relevant for the issues at hand (e.g- air quality). Critically, Heimans and Bourdieu do not give significant credence to the 'different assumptive world' between policy makers and epidemiologists which Sabri details. Sabri 2010 discusses the notion of bringing the assumptive worlds closer to alignment by fostering shared values and developing a shared vision (282). Derbyshire et al. 2014 (23) reported that applicants who are domiciled in a deprived area are more likely to choose to work in that area and what study one highlights is an opportunity for Widening Participation policy approaches to go one step further by mitigating barriers faced by exposure to other deprivation forms, including those above, thus increasing the graduate pool of applicants who face those respective barriers and, in turn, the potential workforce to serve those areas. Fostering shared values, as mentioned by Sabri 2010 (282), involves recognising the distinctions between and impacts of different deprivation forms and various socioeconomic challenges which prospective

GPHST applicants face from as early on as childhood when they are in the pre-undergraduate education stage. This, in turn, can inform the development of targeted recruitment and support strategies that not only attract a diverse range of applicants but also ensure that all potential applicants, including those from traditionally underrepresented or disadvantaged backgrounds, have equitable opportunities to enter GPHST.

Additionally, of note, it is positive that in line with findings of the NHS Long term workforce plan, which cites that 25% of the NHS workforce is ethnic minority (271), the findings from this study show that this trend continues to increase in line with the ambitions set out in the plan. Furthermore, the results from study one show an increase in applicants to GPHST declaring LGBTQ+ sexual orientation over the period from 2013-2020 indicating, at best, a positive trend towards inclusivity and accessibility and, at least, greater transparent declaration of sexual orientation suggesting reduced stigma. This signals a positive step forwards from the findings of scholars, including Torjesen et al. 2022 (159) Schlick et al. 2021 (160), Runswik et al. 2022 (161), who reported that very small numbers of lesbian, gay, bi or transexual doctors feel comfortable to report their identity due to perceived prejudice and discrimination. This is acknowledged in the NHS Long term Workforce Plan policy which states that 'staff who are LGBT are still much more likely to face physical violence, bullying and harassment in their workplace than other staff' (271) and as such more efforts are needed to support retention of staff who are LGBT in the NHS; this is discussed further later. Moreover, it is a positive finding that results from study one show an increase in applications to GPHST from staff with declared disability which indicates, at best, an improved trend towards inclusivity and accessibility and, at least, greater declaration of disability, suggesting reduced stigma. It is likely that the implementation of a number of policy measures will ensure diverse workplaces supporting the retention of these doctors within GP as a career beyond GPHST including: a) Care Quality Commission (CQC) regulation mandating from 1st July 2022 that all health and social care providers registered with the CQC must ensure that their staff receive training in learning disabilities and autism including how to interact appropriately with people with a learning disability and autistic people (283) and b) GMC guidance titled 'Welcomed and valued' on supporting disabled learners in medical education and training (284).

Overall, study one, observed increasing diversity among GPHST applicants over three quarters of a decade, with more women, ethnic minorities, individuals from high CYP and Adult Skills deprivation areas, and those identifying as LGBTQ+ and with disabilities. These trends, add value to static data points cited in the NHS Long term Workforce plan, reflecting successful policy efforts to create a GP workforce that is more representative of the UK's population, though further progress is still needed

to ensure that the GP workforce of the future is sustainably truly representative of the society it serves.

6.1.2 Sole applications to GPHST and in combination with other specialties

Study One found that sole applications to GPHST were more common, than applications made in combination with other specialities from trainees who were: younger, female, with a declared disability, with 'no religion' and predominantly more likely to be of White ethnic group. Conversely, ethnic minority trainees (Pakistani, Indian, Chinese, Arab, Any other Asian Ethnic Group, Any other White Ethnic Group, Any other Mixed Ethnic Group, Any other Ethnic Group) were more likely to apply to GPHST in combination with other specialities in comparison with White trainees. Results also found that applicants who lived pre-medical school in the most deprived quintiles for the following deprivation forms were more likely to apply to GPHST in combination with other specialities in comparison with trainees from all other quintiles or in comparison with trainees who had lived pre-medical school in the least deprived quintiles: IMD, LE, Indoor LE, Outdoor LE, Income, Employment, Crime. Trainees who lived in the most deprived quintile for Health and Disability were also more likely to apply to GPHST in combination with other specialities in comparison with trainees who had lived pre-medical school in all other quintiles although there was no difference when comparing with trainees in the least deprived quintile. However, interestingly, results found that trainees who lived pre-medical school in the most deprived quintile for Adult Skills deprivation were more likely to apply solely for GPHST in comparison with trainees who had lived pre-medical school in the least deprived respective quintile although there was no statistically significant difference when comparing with all other trainees. There was no statistically significant difference between applications made solely for GPHST from applicants who lived pre-medical school in the most deprived quintiles and all other quintiles or the least deprived quintiles for the following deprivation forms: wBHS, Geographical, BHS, CYP deprivation. There was no statistically significant difference in sole applications to GPHST v those made in combination with other specialities by sexual orientation.

Consistent with the findings of Gale et al. 2017 (20), results from the present study support findings of a higher propensity for younger applicants and women to apply solely to GPHST, possibly reflecting a commitment to GP as a speciality or, as opined by Irish et al 2011 (17) and Watson et al. 2011 (18), their search for a career offering a better work-life balance. Woolf et al. 2015 found that women were 1.5x more likely to apply for GPHST although Woolf et al. 2015 did not explore disaggregation by applying solely to GPHST in comparison to applying for GPHST with other

specialities (193). Irrespective, the higher proportion of applications to GPHST noted by Gale et al. 2017 (20), underscores the changing priorities among newer generations entering the medical field, who may value flexibility and family compatibility more highly than previous cohorts. This aligns with the findings of Watson et al. 2011 (18) and Smith et al. 2015 (19), suggesting a broader cultural shift towards valuing these aspects in career choices.

The present study's findings that applicants with a declared disability may be more likely to apply solely for GPHST suggests increased accessibility options available in GP settings as opposed to secondary care, which can offer a conducive work environment for those requiring specific adjustments. GMC guidance titled 'Welcomed and valued' on supporting disabled learners in medical education and training (284) is likely facilitate broader accessibility for trainees embarking on GPHST and ultimately practicing as a GP. Baughan 2012 highlights that sound institutional culture where staff feel supported by the institution is as an important consideration for recruitment and retention of staff (285). It has also been opined by scholars, including Ryan et al. 2020 (286) and Taylor et al. 2022 (287), that the lived experience of staff with disabilities, which tend to require long term adjustments, contributes to the decision making of pursuing a career in GP as a preferred option.

Gale et al. 2017 (20), reported that ethnic minority trainees (Asian or Asian British, Pakistani, Indian, Chinese, Arab, Any other Asian, Any other White, Any other Mixed and Any other ethnic groups) were less likely to apply solely to GPHST but rather more likely to apply to GPHST in combination with other specialities in comparison with their White counterparts. There was no statistically significant difference in sole applications to GPHST among trainees of other ethnic minority groups comparative to trainees of White ethnicity including: Irish, Bangladeshi, African, Caribbean, Any other Black Ethnic group, White and Asian ethnic group, White and Black African and White and Black Caribbean. The present study concurs with the work of Gale et al. 2017 that White trainees were more likely to apply solely to GPHST but also expands on this work further by disaggregating ethnic minority groups and recognising differences between groups. This indicates that treating all ethnic minority trainees as a homogeneous group is not appropriate because there are distinct differences among these groups. Each ethnic group has unique characteristics and behaviours that need to be considered separately rather than being lumped together into one category. This nuanced approach helps in understanding and addressing the specific needs and challenges of each ethnic group more effectively. Historical migration patterns and settlement areas can influence the degree of community cohesion and the likelihood of individuals making applications for higher specialist training in a way which would enable them to stay within their communities and local

support structures. The Postgraduate Medical Education and Training Board which was established on 22nd October 2023 under powers conferred by the General and Specialist Medical Practice Order 2003 and ran from 2004- 2010 at which point it merged with the GMC, issued CCTs in GP including for IMGs (288). It is well documented that the scheme was opened to make it much easier for ethnic minority IMG doctors to attain a CCT in GP and join the specialist GP register which had been extremely challenging to join up to that point (289). It Is recognised that when the scheme opened, approximately 35% of those who were awarded a CCT in GP through the scheme were Asian, Pakistani, Indian etc.. and approximately 5% were Black, African or Caribbean etc... (288). One hypothesis could be that it is likely that different cultures and communities have differing beliefs about how to apply for specialist training in a way which will secure the golden training number whilst keeping ties with their community based upon historical familial experiences. Given the significantly larger proportion of Asian groups who experienced historical challenges with obtaining a national training number in GP until the inception of PMETB, it follows that younger generations within the same community might consider that applying for GPHST in combination with multiple other specialities would increase the probability of being offered that golden national training number within a desirable geographic location. The same behaviour may be less evident within other ethnic communities where migration patterns are different such as the Black, African and Caribbean communities which were historically underrepresented in medicine and largely did not have the same experience. This may explain why application behaviours within these groups is more akin to the White British group where there is a view that by applying for GPHST where there is highest number of training posts available out of all specialities, it is likely that one would have an optimum choice on geographical location and be able to maintain community ties and a good work-life balance if that is their preference. However, as noted by Scanlan et al. 2019, little is known about how personal characteristics and intention interact with career decision making (290). Furthermore, the finding in study one, that trainees declaring no religious belief were 1.2x more likely than trainees with religious beliefs to apply to GPHST solely rather than in combination with other specialities is intriguing. One hypothesis is that those with religious ties in the community might be applying for multiple specialities to increase their perceived chance of staying within their community, close to local support systems and networks including spiritual networks. Further qualitative research is needed to explore this further. The implications could be highly significant, for example accepting religious beliefs given the spiritual support structures accessed therein as a special circumstance to remain within a geographical region when applying for higher specialist training which could reduce the burden of haphazard strategic applications to higher specialist training which tend to result in vacancies. Whilst scholars have explored the prevalence of religious

faith among doctors and its relationship with decision making such as in end-of-life care (Seale 2010 (291)), there is extremely limited literature relating to the religious beliefs of GP trainees or GPs and how this might impact the workforce and staff application behaviours including speciality choice and geographical patterns of application.

Furthermore, the present work extends the findings of Gale et al. 2017 (20) by seeking to clarify further what is meant by 'coming from this highest social classes' given that different forms of deprivation exist in different regions. Although the present study concurs with Gale et al. 2017 that trainees who applied to GPHST from the most deprived quintile for overall IMD, would be less likely to apply solely for GPHST v in combination with other specialties, the present study disaggregates deprivation forms further finding no statistically significant difference between trainees who applied to GPHST having lived pre-medical school in the most deprived quintile for CYP in comparison with trainees who had lived pre-medical school in the least deprived quintile for CYP deprivation and all other deprivation quintiles; CYP deprivation is a measure of childhood education deprivation. These findings suggest that early years Widening Participation initiatives including those outlined in the Medical Schools Council guidance of good practice in contextual admissions (279) which guides use of the following indicators for provision of a reduced offer to medical school: *individual and household level measures including care leaver, free school meals, first generation in higher education, receipt of UCAT bursary, attendance of state school, school performance and overall IMD quintile*, have resulted in progress for widened access to career opportunities in medicine and subsequently GPHST. Specifically, for example, contextual offers offered by HEIs tend to account for students who attended a state school for GCSE where the Attainment 8 score is below the national average and being the first in the family to go to university thus making strides to mitigate against educational CYP deprivation. It is foreseeable that these mitigations have given applicants real confidence of a prospect of success in GPHST application which is evident through the non-existent differences in applicant behaviour between those who lived pre-medical school in the most deprived quintile for CYP deprivation and those who did not. Likewise, the present study finds no statistically significant difference between trainees who applied to GPHST having lived pre-medical school in the most deprived quintile for wBHS deprivation in comparison with trainees who had lived pre-medical school in the least deprived quintile for wBHS deprivation or all other quintiles for wBHS deprivation; wBHS deprivation is a measure of household overcrowding, housing affordability and homelessness. This is also likely to suggest that widening participation policies including individual HEI policies on contextual offers which often account for students who live away from home, often due to household overcrowding, have successfully narrowed gaps in the effects of wBHS deprivation evident through similar applicant behaviour (in terms of sole applications to GPHST) between those

who lived pre-medical school in the most deprived quintile for wBHS deprivation and those who did not. However, this does not necessarily negate existing disparities in applicant behaviour observed among trainees who had applied to GPHST having lived pre-medical school in the most deprived quintiles for Income, Employment and LE deprivation which is a measure of indoor and outdoor housing quality whereby applicants were less likely to apply solely for GPHST and more likely to apply to GPHST in combination with other specialities. This is perhaps not surprising given that widening participation processes do not specifically mitigate sufficiently against barriers experience on account of Income, Employment or LE deprivation. In fact, HEIs tend to set a threshold of £35,0000 to qualify for a contextual offer, e.g-University of Leicester (292), which arguably is still relatively significantly lower than and disparate relative to other peers whose parents have a medical background whereby the household income can be in excess of £250,000/ annum as a minimum. Additionally, the lower proportion of sole applications to GPHST found in the present study with respect to applicants from the most deprived quintiles from Crime and Health and Disability quintiles comparative to the least deprived respective quintiles and all other quintiles are again explained by the lack of mitigations in place within current processes and system to account for the disparities arising from exposure to these deprivation forms. It is evident that this manifests itself in greater applicant insecurity to 'risk all eggs in one basket' through sole application to GPHST thus driving applicant behaviour to apply for GPHST in combination with other specialities. In a time where policy efforts are designed to ensure that the workforce is representative of the population it serves including within communities, this 'fear of commitment' poses challenge. There is no doubt that applicant aspiration, of course, does play a role for all applicants although where a clear aspired commitment to a speciality is evident, applicants are encouraged to apply solely for that speciality as opposed to applying for GPHST in addition 'as a backdrop' option. This study contributes relevant knowledge that deprivation is not a phenomenon solely captured by the IMD and policies should mitigate against individual deprivation forms more holistically. Scholars have opined that individuals within HEIs need to take more accountability for HEI policymaking and its effects socially (293) which includes ensuring that HEI Widening Participation policies account for exposure to all deprivation forms to ensure a diverse pool of graduates for GPHST and a workforce representative of the population which it serves .

The exploration of factors influencing sole applications to GPHST through an intersectional lens offers a nuanced understanding of medical trainees' career decision-making processes. This analysis reveals the interplay of demographic characteristics, academic achievements, and personal beliefs and values in shaping the pathways toward general practice. Previous studies, such as those by Gale

et al. 2017 and Cleland et al. 2019, have called for such further nuanced analyses that consider multiple factors simultaneously. This study answers this call by examining combined effects on GPHST applications. Furthermore, Bauer et al. 2021 argued that intersectionality asserts that multiple social positions cannot be adequately understood by considering social positions independently (178) (179) (180). Bauer et al. 2021 (190) and Willig 2023 (191) have postulated that with large data sets containing non-linear relationships and where one is seeking to understand intersectional factors in the context of subjects' decision making (e.g- in the context of applications for GPHST), decision tree analyses provide the most promising analytical approach for exploring intersectionality in the context of predicting application patterns to GPHST in comparison than the logistic regression approach adopted by Gale et al. 2017. The intersectional three-level decision tree analysis presented meticulously unravels the complexities inherent in the decision-making process of medical trainees opting for GPHST. By delving into the interplay between various critical factors—demographic data, longitudinal academic achievements from UCAS tariff to EPM and SJT, and the nuances of socioeconomic status including through deprivation domains and subdomains—the analysis offers a profound understanding of what drives medical trainees towards sole applications to GPHST. At the first level, age emerges as a pivotal factor, revealing distinct patterns across different cohorts. Younger cohorts are more likely to apply solely for GPHST in comparison with older cohorts whereby greater proportions are more likely to apply for GPHST in combination with other specialities. Diving deeper, the analysis shows that younger trainees, particularly those under 30 from less socio-environmental deprivation demonstrate a stronger inclination (79.2%) toward GPHST in comparison with those from higher socio-environmental deprivation (67.2%). This high propensity suggests that the stability afforded by less deprivation may facilitate a clearer or more confident pursuit of preferred specialties early in one's career. Moreover, it might reflect an alignment of personal values with the community-centric ethos of general practice. For ethnic minority applicants under 30 with low or mid-range UCAS scores, there's a significant draw towards GPHST, with a 65.4% and 74.0% likelihood of applying solely to this field comparative to those with high UCAS tarrifs where only 48.6% apply solely to GPHST. This study demonstrates that policy makers should consider incentivising high performers to pursue a career within General Practice.. Furthermore, British or Irish applicants aged 30-31 with lower academic performance in the UCAS tarriff, again, showed a remarkable determination (79.5%) to pursue GPHST in comparison with their counterparts with higher UCAS tariffs (58.5%). Interestingly, the analysis also identifies specific ethnic groups aged 30-31, including Chinese, Arab, African, or Caribbean, showing a varied level of interest (39.5%) in GPHST. This lower percentage might reflect diverse career aspirations within

these communities or the differential impact of various factors on their career planning. Further qualitative work is needed to explore these associations further.

For South Asian applicants (Indian, Pakistani, or Bangladeshi) in their early 30s and without declared disabilities, there's a notable 64.9% inclination towards GPHST which is higher than the 47.3% seen among the same group without declared disabilities. This suggests that more work may be needed to understand how best to support ethnic minority trainees with a disability in GP training. Further qualitative work, through targeted interviews and focus groups, is needed to explore current practices, perceptions, barriers and opportunities. Older applicants, particularly those over 35 from traditional medical or foundational pathways, exhibit a 60.5% interest in GPHST. This might reflect an accumulated appreciation for the diversity and patient-centred nature of general practice, perhaps influenced by extensive life and professional experiences. Lastly, older trainees from graduate entry programs or gateway years who come from less income-deprived backgrounds show a significant, though comparatively higher, interest (52.6%) in GPHST than the most deprived quintile (38.7%). This group's motivations may be influenced by a combination of prior career experiences, financial considerations, or a mature realisation of the unique benefits that a career in general practice offers.

The study highlights significant factors influencing sole applications to GPHST, revealing a complex interplay of demographic, socioeconomic, and personal factors. Younger applicants, women, and those with disabilities are more inclined towards GPHST, likely due to its favourable work-life balance and accessibility. Ethnic minority applicants show diverse application behaviours, reflecting unique community and cultural influences. Socioeconomic factors, particularly varying forms of deprivation, play a crucial role, with differing effects on applications to GPHST. Additionally, the intersectional analysis offers a nuanced understanding of how multiple factors combined—such as age, ethnicity, socioeconomic status, disability and educational factors —impact application behaviours. This intersectional approach underscores the importance of considering the multifaceted nature of trainees' backgrounds and experiences. These findings underscore the need for targeted policies and support systems to address the specific needs of different trainee groups, ensuring equitable access and representation within the medical profession. By recognising and addressing the multifaceted influences on medical trainees' career decisions, medical education stakeholders can foster a more diverse and representative GP workforce. This, in turn, can contribute to the delivery of more culturally competent and empathetic care to the diverse populations served by general practitioners.

6.1.3 Direct and non-direct applications to GPHST

The present study found that there were no statistically significant differences in the proportion of direct applications to GPHST immediately after foundation training v later down the line by sex and disability. Results showed that ethnic minority trainees were more likely to apply directly to GPHST directly after foundation training in comparison with White trainees especially trainees from the following ethnic minority groups: Asian or Asian British (1.9x), Pakistani (1.9x), Indian (1.9x), Bangladeshi (1.8x), Chinese (2x), Arab (1.9x) and Any other Asian Ethnic Group (1.8x) and Any other ethnic group (1.7x). There was no statistically significant differences in the proportion of direct applications to GPHST immediately after foundation training v further down the line for trainees by the following ethnic groups: Black, Mixed, Irish, African, Caribbean Irish, Any other White ethnic group, Any other Black ethnic group, White and Asian, White and Black African, White and Black Caribbean and Any other mixed group. As discussed in the previous section, it is hypothesised that applicant behaviours may be influenced by aforementioned historical migration patterns including the experiences of more senior generations and their struggles with obtaining a national training number although further qualitative work is needed to explore this further and what current experiences might mean for future generations. It is hypothesised from PMETB data that, Asian or Asian British groups including Indian, Pakistani and Bangladeshi groups were more likely to apply directly into GPHST following on from foundation training given historical struggles obtaining CCT which resolved once the PMETB scheme opened (288).

Trainees with a religion were more likely to apply for GPHST directly after foundation training. Scholars including Horden 2017 have noted that religions tend to emphasise community service, compassion, and care for others, which are core values in GP (294). Ethnicity is also likely to play a role as a confounding factor; trainees from ethnic minority backgrounds were more likely than White trainees to be affiliated with a religious belief and it should be noted that the demographic of applicants for GPHST are predominantly younger females. As indicated by ethnographic scholars (295), young, female, ethnic minority trainees are likely to choose a career pathway which prioritises the demands of starting a family (295); this is the very factor which scholars including Irish et al., 2011 (17), Watson et al., 2011 (18) and Smith et al., 2015 (19) have reported as a key reason for choosing GPHST.

Furthermore, results showed that heterosexual trainees were more likely than LGBTQ+ trainees to apply to GPHST directly after foundation training. One hypothesis might be that, again, sexual

orientation is confounded by ethnicity. LGBTQ+ trainees in this study were predominantly of White ethnicity. Trainees of White ethnicity were more likely than ethnic minority trainees to apply for GPHST later down the line. However, it is not possible to exclude other explanations such as stigma or barriers in equitable access to GPHST which are acknowledged in the NHS Long term Workforce Plan (271). Scholars including Sorini et al. 2023 and Danckers et al. 2024 have called for further research into the topic, given the paucity of existing information. Sorini et al. 2013 has cited adverse impact on career trajectories among LGBTQ+ trainees as well as challenges experienced by LGBTQ+ trainees exemplified by disparities in placement rates (157). Danckers et al. 2024 has referred to discriminatory experiences based on sexual orientation and gender identity within hostile environments in certain specialties and the lack of LGBTQ + mentorship support which can hinder academic pursuits (158). This study is one of the first to contribute knowledge to the field through data analysis relating to access, experience and outcomes of GPHST for all trainees including by sexual orientation. The data presented will undoubtedly be valuable for further qualitative work.

Moreover, study one found that GPHST applicants who had lived pre-medical school in the most deprived quintiles for the following deprivation forms were less likely to apply for GPHST directly after foundation training in comparison with trainees from the least deprived quintile but more likely to apply directly for GPHST in comparison with trainees from all other quintiles: IMD, LE, Indoor LE, Outdoor LE, Income, Employment, Health and Disability, Crime, Education. This suggests that trainees who lived in the most deprived quintiles for the aforementioned deprivation forms pre-medical school were less likely to apply directly for GPHST than those in the least deprived quintiles but relatively more likely to apply directly for GPHST than all other trainees as a whole group. One hypothesis to explain the stark fewer direct applications among trainees living in the most deprived in comparison to the least deprived quintiles for the aforementioned deprivation forms is the need for those trainees with limited access to familial financial resource to take time out for the purpose of locum shifts to pay off debts acquired as an undergraduate or to support the cost of living which is undoubtedly disproportionately felt in the absence of parental means for support. Further qualitative analyses are needed to explore the observed data trends further and to inform policy (e.g- whether widening participation measures need to extend into PG training, for example through a PG training grant) and educational strategies to ensure equitable access and support for all trainees considering a career as a GP. The findings from this study give credence to the work of scholars and policy makers, including at the Higher Education Academy, that Widening Participation policies need to go beyond recruitment to supporting the retention and progression of students throughout their undergraduate studies and beyond (273) (280) (281). This has important

implications for the delivery of culturally competent care and addressing health disparities. There was no statistically significant difference between trainees applying to GPHST directly after foundation training from the most deprived quintiles of the following deprivation forms in comparison with all other respective quintiles: 1) CYP and Adult skills and 2) BHS and Geographical Barriers suggesting, for the former, that widening participation processes earlier in UG medical education have narrowed gaps in access to GPHST and, for the latter, that greater access to local amenities would provide opportunities for increased cultural and social awareness of interaction within communities and the operational workings of a GP practice such that there was no statistically significant difference in direct applications to GPHST.

The intersectional three-level decision tree analysis presented offers an in-depth and nuanced understanding of the factors influencing direct applications to GPHST. This analytical approach which considers the interplay of intersectional factors in predicting direct applications to GPHST is supported by Bauer et al. 2021 (190) and Willig 2023 (191). Age emerged as the most critical factor, with different age brackets showing varying likelihoods of applying directly to GPHST. Notably, applicants over the age of 35 had a high likelihood (77.4%) of direct application, possibly reflecting a more definitive career choice at this stage in their professional journey. The analysis identified specific combinations of age, ethnicity, and religion that significantly influence the likelihood of direct GPHST applications. For example, younger applicants (≤29 years) from Indian, Pakistani, Bangladeshi, Chinese, Caribbean, African, or Arab backgrounds had an 80.7% likelihood of applying directly, suggesting that younger individuals from these ethnic groups are particularly drawn to General Practice. The EPM decile and UCAS tariff scores were also found to be important predictors. Interestingly, higher academic achievers (e.g-EPM decile < 4) were less inclined to apply directly. This concurs with and builds upon the work of Gale et al. 2017 which found that there was greater probability of application to GPHST among trainees in the bottom two quartiles for the EPM decile (20). The tree analyses in this study adds that, of all educational and demographic intersectional factors, low EPM score continues to emerge as a significant predictor of direct application to GPHST without time out of training. This suggests that more needs to be done to inspire motivation among candidates with high academic performance to pursue a career in general practice among these groups. This has significant implications for developing policy interventions to incentivise GPHST among higher performing trainees as well to ensure there is a diversity of skills within the GP workforce and opportunities to cultivate skills and talent. Interestingly, as of 2024, the UKFPO no longer uses the EPM in allocating trainees for foundation training placements having shifted to a system of random allocation designed to equalise experience across the NHS and narrow inequities

in care (296). This thesis provides data to support and justify the policy shift although ultimately future research will need to evaluate whether this policy shift is sufficiently effective in diversifying the capability of applicants for GPHST. The analysis also sheds light on the influence of BHS deprivation, particularly among applicants aged 33-35 from a number of ethnic minority backgrounds. The high likelihood of direct application from the most deprived quintile for wBHS (81.0%) among this group is a notable finding, possibly indicating a strong motivation to enter GPHST directly to support career stability necessary to support familial housing and getting onto the property ladder; this is a struggle among locum doctors or doctors undertaking a period of self-funded out of programme development who are not privy to the same stability of income as a colleague within a training programme (GPHST). Whilst HEI policies on Widening Participation often account for students who live away from home, often due to household overcrowding and thus this is accounted for at the stage of application to medical school, it is evident that a policy shift is needed to ensure that Widening Participation policies go beyond recruitment to supporting the retention and progression of trainees throughout their undergraduate studies and beyond to enable more equitable opportunity for trainees who were domicilled pre-medical school in the most deprived areas for BHS deprivation to ensure equitable career opportunities which are not necessarily driven solely by financial need but rather developmental need (273) (280) (281). This may require a period of time undertaking leadership, teaching or research skills for example to gain other non-front line skills necessary to flourish as a GP. The decision tree analysis presented within this thesis provides a robust evidence base for policy change whilst underscoring the complexity of factors influencing medical career choices. It demonstrates that career decisions in medicine are not solely based on singular demographic or academic factors but are instead the result of a complex interplay of multiple dimensions. The findings highlight that there are diverse pathways and motivations leading to a career in General Practice. This diversity is crucial for building a GP workforce that is reflective of and responsive to the needs of a diverse population. Understanding these intersectional predictors can aid in developing more targeted recruitment and support strategies for GP training, ensuring that the profession attracts and nurtures talent from a broad spectrum of society. For policymakers and educators, these insights are invaluable for shaping policies and programs that not only aim to diversify the medical workforce but also address the specific needs and barriers experienced by various groups within the medical community. These insights are crucial for informing strategies and policies aimed at fostering a diverse, equitable, and representative GP workforce.

6.1.4 Successful offer of a GPHST national training number

The process for being offered a GPHST national training number is firstly completing foundation training, secondly sitting the MSRA (multi-speciality recruitment assessment) which includes a clinical problem-solving test (CPST) and a situational judgement/professional dilemma test (SJT). Where candidates score highly on these tests, they are offered a GPHST national training number automatically and where this is not the case, applicants are offered an interview and, if successful, a GPHST national training number (297). Previous studies have relied upon GPNRO data, which includes IMG and UK graduates, relating to the MSRA including the CPST and SJT finding that MSRA performance is predictive in the MRCGP AKT and CSA (Siriwardena et al. 2023 (30), Botan et al. 2022 (254) and the CSA (Tiffin et al 2024 (210)). However, studies have not thus far explored the offer of GPHST national training numbers through the equalities lenses of sex, age, ethnicity, disability, deprivation, sexual orientation and religion.

The present study found that male trainees were less likely to secure an offer for GPHST which supports the findings of Woolf et al. 2016 (28) and adds a finding that trainees who secured an offer to GPHST were more likely to be older. This study found that trainees who declared their sexual orientation as heterosexual were 1.5x more likely than trainees of other sexual orientations (LGBTQ+) to successfully get a national training number in GPHST. Although there was no statistically significant difference between getting a national training number in GPHST among Bisexual and Heterosexual trainees, trainees declaring their sexual orientation as lesbian or gay were less likely to get a national training number in GP; the NHS Longterm Workforce Plan policy highlights that LGBT groups are at increased risk of being marginalised in the workplace (271). This study contributes quantitative data insights further to the calls of scholars including Sorini et al. 2023 and Danckers et al. 2024 who have highlighted a paucity of existing data which can be used to inform policy making interventions to ensure a more inclusive education system. It should be noted, however, that the sample size of LGBTQ+ groups is relatively small which may influence the odds ratios and as such, further qualitative analyses are recommended. Nevertheless, at face value, the findings suggest that formal national policy to mitigate the barriers cited in the NHS Longterm Workforce Plan by scholars, including Sorini et al. 2023 and Danckers et al. 2024, is needed and greater efforts to ensure diversity in recruitment strategies as well as broader support networks.

Furthermore, this study found that there were no statistically significant differences in being offered a GPHST national training number by disability, religion or ethnicity according to level 1 and level 2

ethnicity for every ethnic group except African trainees who were less likely to be successfully awarded a national training number in GP in comparison with White trainees. This suggests that efforts to ensure equality, diversity and inclusion in recruitment to shape a workforce representative of the population which it serves have largely succeeded. NHS England have highlighted that generally 'White trainees perform better than non-White trainees on assessments and on the whole are more successful in selection' for GPHST (298) although the present study would suggest that this is not the case. However, there would appear to be further qualitative work to understand any potential disparities in the odds of African trainees being offered a national training number and whether there have been improvements over time. It will also be essential for the profession to continue its commitment to equality, diversity and inclusion without complacency to ensure the workforce is representative of the population which it serves.

Interestingly, the present study found that there was no statistically significant difference in being offered a national training number in GP between trainees who lived pre-medical school in the most deprived quintile for overall IMD compared with the least deprived quintile for overall IMD. However, in comparison with all other quintiles, trainees who lived in the most deprived quintile for overall IMD were less likely to be offered a GPHST national training number. NHS England have highlighted that 'socioeconomic background is considered to be a factor of growing importance in contributing to our understanding of the causes of group differences in selection' (298). This research suggests that current recruitment policies are to a large degree successful in ensuring equity between the most deprived and least deprived, but more is needed to level the playing field across the board. When deprivation forms were disaggregated, there was no statistically significant difference in the offer of GPHST national training numbers among those who lived pre-medical school in the most deprived quintiles in comparison with the respective least deprived quintiles and all other quintiles for: Employment, Health and Disability, Education, CYP, BHS, Geographical Barriers, wBHS. Of note, this would suggest that a combination of existing careers advice infrastructures and training delivered throughout medical school and foundation training are likely to provide employment skills which support trainees from all backgrounds such that there is no difference in the offer of GPHST national training numbers by the point of application for GPHST between trainees who had lived pre-medical school in the most deprived quintile for Employment deprivation and the least deprived quintile for Employment deprivation. Furthermore, the aforementioned mitigations with respect to Widening Participation which include the widespread offer of courses by HEIs are likely to have contributed to an eliminated difference in the offer of GPHST national training numbers by the point of application for GPHST between trainees who had

lived pre-medical school in the most deprived quintiles for Education and CYP. As discussed above, existing Widening Participation policies account for care leavers and those living away from home on account of, for example, housing issues such as household overcrowding, housing affordability and homelessness which is measured by the wBHS subdomain and in turn the BHS domain which aggregates the wBHS subdomain and Geographical Barriers, a measure of access to local amenities such as GP surgeries. It follows that greater access to local amenities would provide opportunities for increased cultural and social awareness of interaction within communities and the operational workings of a GP practice such that there was no statistically significant difference in GPHST national training numbers offered between trainees who lived pre-medical school in the most deprived quintile for Geographical barriers and the least deprived quintile and all other quintiles. Interestingly, trainees who lived pre-medical school in the most deprived quintile for Adult Skills deprivation were more likely to be offered a GPHST national training number in comparison with the least deprived quintile but not all other quintiles. This is interesting because in the most deprived quintile for Adult Skills deprivation, adults have low or no qualifications and limited English language proficiency (the two indicators measured within Adult Skills deprivation). Kumwenda et al. 2018 found that trainees who came from families where no parent was educated to degree level were more likely to apply for GP rather than other specialities and more likely to apply closer to home (299). This study adds that these trainees are also more likely to be successful in securing a GPHST national training number. Further qualitative work could explore further reasons for this. Trainees who lived in the most deprived quintile for Crime pre-medical school were less likely to be offered a GPHST national training number in comparison with the least deprived quintile but not in comparison with all other quintiles suggesting that the impacts of childhood exposure to violence, burglary, theft and criminal damage (the four indicators which feed into the Crime domain of the IMD) could influence responses to the situational judgement test component of the recruitment process and ultimately the offer of a GPHST national training number. Further qualitative analyses are required to explore the extent to which prolonged exposure to Crime during childhood has an impact upon situational judgement. Interestingly, trainees who were domicilled pre-medical school in the most deprived quintiles for Income deprivation were less likely to be offered a GPHST national training number in comparison to the least deprived quintile and all other quintiles. This is likely to suggest that the effects of being a child in a family which is in receipt of Universal Credit, Pension credit, Child tax credit and jobseekers' allowance (which are indicators feeding into the Income domain) are longer term beyond childhood and include likely deficiencies in opportunities to gain professional skill sets. These findings provide a crucial evidence base to support the policy ambitions of the Higher Education Academy that Widening Participation policies need to go beyond

recruitment to supporting the retention and progression of students throughout their undergraduate studies and beyond (273) (280) (281). It should be noted that the Employment deprivation domain contains indicators for claimants of the aforementioned benefits whereas the Income deprivation domain contains indicators of children in families receiving those aforementioned benefits. This is an important distinction especially given that this study finds no statistically significant difference in the offer of GPHST national training numbers between trainees who lived pre-medical school in the most deprived quintile for Employment deprivation but that trainees who lived in the most deprived quintile for Income deprivation were less likely to get a GPHST national training number in comparison with the least deprived quintile and all other quintiles which is indicative of the impact of financial hardship on trainees themselves well beyond the childhood phase and into undergraduate and postgraduate education. Finally, trainees who lived pre-medical school in the most deprived quintiles for indoor LE and outdoor LE (the two subdomains of the LE domain of the IMD) were less likely to be offered a GPHST national training number in comparison to trainees from all other quintiles but not in comparison to trainees who had lived pre-medical school in the respective least deprived quintiles. Given that those living in the most deprived areas for indoor quality and outdoor quality including houses with no central heating are likely to be in receipt of housing benefit which is considered as part of widening participation processes, it is hypothesised that widening participation policies have equalised the gap between the most and least deprived but that more is needed to level the playing field across the board. This work adds significantly to the medical education literature which has not thus far explored access to GPHST by each of the deprivation forms, disaggregating the overall IMD. As discussed by Trow 1984, it is not uncommon for policy makers to refrain from questioning accustomed approaches which are adopted by policy makers such as using the overall IMD but that more granular exploration of quantitative data, for example through disaggregation of the overall IMD and into the constituent deprivation forms, can reveal more nuanced understanding of specific forms of disparity and equity which provide a more informed evidence for influencing policy (300).

The findings underscore the importance of a nuanced understanding of how socioeconomic factors influence medical training pathways. This research finds that caution should be adopted when interpreting the overall IMD in isolation. Further qualitative research is needed to understand definitive factors which underly the findings of the quantitative data. The findings highlight the need for medical education policymakers to recognise the various domains of socioeconomic deprivation as a first step to considering what further mitigations may be required to ensure a workforce representative of the population which it serves. By doing so, not only can the medical profession

promote equity and diversity, but it can also benefit from the unique perspectives and skills that individuals from diverse socioeconomic backgrounds bring to the field. In line with the data driven epistemological approach for this study, The findings from data driven studies, such as the present studies, provide a basis for further qualitative research, as opined by McGraw Hill 2004 (260), designed to dive deeper into testing the explanatory hypotheses presented and provide further insights and understanding to underpin the statistical findings.

6.2 Study Two

Studies indicate that despite the extensive training provided by the RCGP training, its short duration and community-focused nature presents unique challenges (Park et al. 2015 (26); MacVicar et al. 2015 (27)). Research reveals that ethnic minority trainees and international medical graduates (IMGs) face additional barriers, including biases and lack of support, impacting their training experiences and performance in associated high stakes examinations including MRCGP AKT and CSA (Woolf et al. 2016 (28); Warwick et al. 2014 (29)). Existing literature emphasises the need for non-stigmatising interventions and improved trainee-trainer relationships (Woolf et al. 2016 (28)).

Published studies have relied heavily on data from the GP National Recruitment Office (GPNRO) to predict performance in key assessments during GPHST, such as the MRCGP AKT and CSA, using metrics like the Multi-Speciality Recruitment Assessment (MSRA) and Situational Judgement Test (SJT) (Siriwardena et al. 2013 (30); Patterson et al. 2018 (1)). However, compared to the UKMED database, the GPNRO data is limited in demographic metrics and lacks longitudinal data such as deprivation metrics from the Office for National Statistics, UCAS tariff scores, and EPM rankings, restricting the conclusions that can be drawn about performance predictions. Recognising that over one-third of doctors in the UK are internationally trained, previous studies have explored how ethnicity affects MRCGP AKT and CSA performance, adjusting for the place of primary medical qualification. However, these analyses are limited by insufficient longitudinal data on IMGs from their countries of qualification.

The present study leverages UKMED data, providing extensive longitudinal data across the training pathway, from pre-undergraduate to postgraduate stages, to address critical gaps in understanding equitable experiences during GPHST. This issue gained prominence in 2014 when BAPIO brought an unsuccessful judicial review against the RCGP, alleging discrimination against South Asian and ethnic minority doctors in the MRCGP CSA assessment, highlighting significant disparities in pass rates (White: 93.5%, South Asian: 76.4%, Black: 72.7%) (32). The challenge focused on observed

unexplained variations in performance between groups with protected characteristics and those without termed differential attainment (33). Pass rates alone articulate observed performance differences but do not measure the equity of academic achievement. The High Court noted that pass rates only demonstrate outcome differences and do not establish direct discrimination. To address these limitations, this study introduces novel metrics, such as Gini coefficients, to measure equity in educational attainment. Gini coefficients, widely used to characterise inequity in economics and education, provide a reproducible measure of statistical dispersion, applicable to assessing equity in the MRCGP AKT and CSA. The study expands the focus beyond ethnicity to include other characteristics like age, sex, deprivation, disability, sexual orientation, and religion, both solely and intersectionally.

Results from study two address gaps in the literature relating to: performance in the MRCGP AKT and CSA through each of the equalities lenses, longitudinal performance across key high stakes assessments from pre-undergraduate to postgraduate medical education (UCAS tariff to EPM and EPM to AKT) and predictors of performance in the MRCGP AKT and CSA based upon longitudinal metrics outside of the application process. Study two also addresses the absence of a metric for measuring the extent to which performance in the AKT and CSA are equitable.

6.2.1 The extent to which there is equity longitudinally across key high stakes assessments from pre-undergraduate education to GPHST

Study two explores longitudinal: i) academic performance between the pre-undergraduate (UCAS tariff) and undergraduate (EPM) phases and ii) academic performance between the undergraduate (EPM) and postgraduate (MRCGP AKT) phases through each of the equalities lenses including age, sex, disability, socioeconomic status, ethnicity, religion and sexual orientation. By examining the data longitudinally, it becomes possible to answer the question of whether differential attainment (an observed variation in performance) exists and, if so, whether its' magnitude increases or decreases over time. We are not primarily interested in the attainment gap at either the start or end point but whether the magnitude of the gap changes over time. If differential attainment is present from the earliest part of education, this suggests different mechanisms than if differential attainment is minimally present at the beginning but then grows over time. The present work is novel in assessing the existence of differential attainment as well as the magnitude of gap changes over time across different educational phases through the equalities lenses of age, sex, disability, socioeconomic status, ethnicity, religion, sexual orientation and pre-medical school deprivation with

respect to the overall IMD, Income, Employment, CYP and Adult Skills deprivation in the context of academic assessments. This work represents a novel attempt to understand differential attainment not as a fixed factor, but as a changing influence on student performance and behaviour.

6.2.2 Academic performance between the phases of pre-undergraduate (UCAS tariff) and undergraduate (EPM)

Study two found that the magnitude of the attainment gap between pre-undergraduate education (UCAS tariff) and undergraduate education (EPM) narrowed significantly, with a large effect size, among students who lived pre-medical school in the most deprived quintile for CYP deprivation. This suggests that HEI widening participation schemes have not only widened access to undergraduate medical education but also supported students' experiences and progression during their studies, thus narrowing the magnitude of the academic attainment gap during medical school. The tendency for attainment gaps to narrow during medical school for students from areas of highest childhood academic (CYP) deprivation indicates that educational factors at medical school contribute significantly to levelling the playing field concerning childhood academic deprivation. As described by Becher et al. 2001, the academic ethos in this context can be seen as a dynamic between “tribes” (staff and pupils actively engaged in clinical training) and “territories” (the HEI’s education “landscape”) where efforts are made to widen participation (301). It is pivotal that clinical training is “educationally equitable” (302) with a high degree of “social heterogeneity” (302) to safeguard accessibility to pupils from varying social backgrounds and ensure a workforce which is representative of the population which it serves. Study two contributes the novel finding that undergraduate medical education effectively levels the playing field for students who have embarked upon a medical career from backgrounds of high childhood academic deprivation, demonstrating the positive impact of these educational interventions.

Conversely, study two identified that the magnitude of the attainment gap between UCAS tariff and EPM widened significantly for the following student groups: male vs female (small effect size), undergraduate entrants to SEM medical courses v graduate entrants to SEM medical school courses (moderate effect size) , ethnic minority vs white (moderate effect size) including disaggregated level 1 ethnic groups v white, students declaring a religious belief vs those who declared no religious belief (moderate effect size) and students who lived pre-medical school in the most deprived quintiles of the: overall Index of Multiple Deprivation (small effect size), Adult Skills Deprivation domain (small effect size), Income Deprivation domain (small effect size) and Employment

Deprivation domain (small effect size) compared to the respective least deprived quintiles. The tendency for attainment gaps to grow during undergraduate medical education suggests that educational factors at medical schools may, however inadvertently, act as contributors of observed increase in attainment gaps during medical school. Studies have not thus far undertaken a longitudinal analysis of this nature to explore changes in attainment gaps across different stages of training; these findings add value to the work of other scholars as outlined below.

The present findings concur with those of Mandal et al 2012 (303) which reported that the performance of male students during undergraduate medical education was lower than that of their female counterparts and the findings of Hope et al. 2021 which reported widened attainment gaps among male students between performance in their first year examinations and final year examinations in four Scottish medical schools (304). Study two makes the same observations nationally in England and adds that, in comparison to pre-undergraduate performance (as measured by the UCAS tariff), the attainment gap by the end of medical school widens for male students during undergraduate medical education which signifies that there are factors during undergraduate medical education which, however inadvertently, contribute to observed variations in performance for male trainees, differential attainment, and must be researched in more detail through future qualitative works.

Puddey et al. 2019 reported that graduate entry medical students perform better academically during a SEM programme than their undergraduate entry counterparts, especially in the earlier levels of the course (305). Puddey et al 2019 opined that better performance throughout the programme was seen particularly for those graduates with a health or allied health background and that graduate entry students were less likely to have impeded progress during a medical programme (305). Study two concurs and builds upon these findings further by demonstrating that, despite higher UCAS tariff scores among undergraduate students, the attainment gap gets wider for undergraduate students in comparison to graduate entry students likely due to more limited experience in study techniques involved within higher education.

With respect to the attainment gap during undergraduate education by ethnicity, Hope at al. 2021 reported that the attainment gap grew among ethnic minority students vs white students between performance in their first year examinations and final year examinations in four Scottish medical schools (304). Study two makes the same observations nationally in England and adds in comparison to pre-undergraduate performance (as measured by the UCAS tariff), the attainment gap by the end

of medical school widens for ethnic minority students, including for disaggregated level 1 ethnic groups (Asian or Asian British, Black or Black British and Mixed ethnicity) signifying the presence of contributory factors during undergraduate medical education which contribute to the observed variation in performance or differential attainment. These findings in study two provide quantitative evidence supporting the work of Gupta et al 2021 which carried out a systematic review on the experiences of ethnic minority students at medical school finding five key explanatory contributory themes from the analysis of 13 qualitative research works: a) being divergent: not feeling part of the current organizational learning, b) lack of social capital: difficulty in being absorbed into existing 'networks' of relationships in a manner that is 'approachable' and not 'intimidating', c) continuum of discrimination: 'indirect' impact of subtle communication processes in the learning environment undermining individual 'belief' in own performance, d) institutional discriminatory factors: culture, rules, norms, behavioural routines of educators that lead to differential outcomes for learners and e) lack of external support (306). Furthermore, an international review, Orom 2013, found that minority medical students "experience less supportive social and less positive learning environments [and] are subject to discrimination and racial harassment which often adversely affects their performance" (307). Woolf et al. 2020 has also acknowledged the problem describing it as a systemic problem requiring openness and strong leadership (308) but sadly pointed to a lack of evidence to support specific interventions to reduce differential attainment (7). The analyses presented in this study contributes strong evidence to support the call for a review of educational teaching, learning and assessment in undergraduate medical education with a view to addressing the issues identified and exploring potential interventions to narrow the gap.

Study two contributes new knowledge, based on national data across England over half a decade, that attainment gaps widen between pre-undergraduate performance (UCAS tariff) and undergraduate performance (EPM) among students who hold a religious belief in comparison to those who do not. There is no preceding literature which might shed light on potential explanations for the trend. However, scholars including Harrison et al. 2009 have described the phenomenon of 'religious coping' which underpins the notion that religious beliefs and practices are important resources for coping with stress and adversity (309). It is hypothesised that when students move away from home and lose their religious community, they may lose important coping mechanisms, potentially leading to increased stress and negatively impacting their learning and overall well-being. Schlossberg 1981 postulated a model for analysing human adaptation to transition which focuses on how individuals cope with life transitions including moving to a new environment; a key implication of her work is that the loss of familiar religious support systems during the transition to university

can be a significant challenge affecting students' ability to find new sources of support thus affecting their adjustment and academic performance (310). Furthermore, Maslow's hierarchy of needs hypothesises that five basic needs must be fulfilled for the learner to learn best; these needs are physiological, safety, belonging, self esteem and self actualisation (311). However, critics including Wahba and Bridwell have pointed to the minimal evidence about the hierarchical order of Maslow's five needs citing that self-actualization may not equate to competence and for the incompetent practitioner, "being all that one can be" may not be an adequate threshold for the provision of optimum care (312). Studies have not thus far explored the impact of the religious transition to medical school on psychological safety and academic performance; further qualitative analyses are recommended for that purpose.

Although study two found that the magnitude of the attainment gap between UCAS tariff (pre-undergraduate) and EPM (undergraduate) narrowed significantly among students who lived pre-medical school in the most deprived quintile for CYP deprivation, which suggests that factors at medical school successfully narrow the gap in pre-existing academic attainment deprivation from childhood, study two also found that the attainment gap widened over the same period for students who lived pre-medical school in the most deprived quintiles for: IMD, Adult Skills, Income and Employment deprivation in comparison to the least deprived quintiles. This is likely to signify that while certain aspects of educational support at medical school (possibly on account of Widening Participation policy implementation) are effective in addressing childhood educational deprivation, they may not be sufficient to overcome the broader socioeconomic challenges faced by students from the most deprived backgrounds. These findings indicate the necessity for additional targeted interventions to support students facing multi-faceted deprivation beyond academic factors. Addressing these broader socio-economic issues could involve expanding their inclusion within Widening Participation policies and implementing comprehensive support systems, such as financial aid, mentoring, and career guidance. These measures would help ensure that all students have equitable opportunities to succeed throughout their medical education and beyond. Furthermore, these findings highlight the importance of not solely relying on the overall IMD when evaluating deprivation. Instead, there is a need to disaggregate deprivation metrics into deprivation forms, as this approach reveals the nuanced and varying impacts of different types of deprivation on academic attainment. Such detailed analysis allows for more targeted and effective interventions to address these disparities.

The fact that no statistically significant differences were observed between UCAS tariff (pre-undergraduate) and EPM (undergraduate) by sexual orientation, declared disability, income support or free school meals at the time of application to medical school suggests that educational factors, policies and systems at medical school appear to effectively mitigate disparities in academic performance among these groups.

6.2.3 Academic performance between the phases of undergraduate (EPM) and postgraduate (MRCGP AKT)

Study two found that the magnitude of the attainment gap between the EPM (undergraduate) and the MRCGP AKT (postgraduate) widened significantly for: female vs male, students whose families were on income support at the time of applying to medical school vs those whose families were not on income support, students who were on free school meals vs those who were not, participants who lived pre-medical school in the most deprived quintiles for: IMD, Income Deprivation Domain, Employment Deprivation Domain and CYP Deprivation subdomain compared to the respective least deprived quintiles. The tendency for attainment gaps to grow during the postgraduate phase by socioeconomic status and deprivation suggests that there are educational factors during postgraduate education, however inadvertently, which contribute to the described differential attainment in these groups.

Study two contributes findings that certain groups may be disproportionately affected by a greater need to support their families which may create resource and time constraints that are likely to affect postgraduate training experience and performance in the MRCGP AKT. Firstly, with respect to women, it is intriguing that study two observes a wider attainment gap for female trainees at MRCGP AKT in comparison to male trainees; key contributing factors are likely to be maternity leave and the increased burden brought about by holding family commitments and caring commitments which often results in undertaking less than full time training. Irish et al. 2011 (17) and Smith et al. 2015 (19) have cited ‘work-life balance’, ‘domestic circumstances’ and ‘time for own family’ as a key influencing contributor to the choice of training as a GP. Study two suggests that current policies are perhaps not sufficient in mitigating the impact of family life on GPHST training. On a point of critique of the literature relating to adult learning theory, study two has shone a spotlight on the absence of any consideration of work-life balance within the theoretical constructs and frameworks despite this being cited by adult learners as a critical dimension and backdrop to their learning. Knowles’ assumptions about adult learners include: self-concept, adult learner experience, readiness to learn,

orientation to learning and motivation to learn but neither considers the perspective of adult learners citing the importance of the consideration of 'work-life balance', 'domestic circumstances' and 'time for own family', nor the interaction with adult learning and attainment (313). Nevertheless, although aspects of Knowles' adult learning theory encourage independent learners who are intrinsically motivated to learn, it does not appear to adequately consider personal circumstances, work-life balance or the learner's prior knowledge, the relevance of the knowledge to the learner's daily life or wider social determinants of learning as set out by Sanderson et al. 2021 (314). Rogers postulated that "significant learning takes place when the subject matter is perceived by the student as having relevance for his own purposes" (315) and Di Carlo 2006 stated that "real world problems motivate deep conceptual learning" (316); again neither scholar gave significance to personal circumstances and work-life balance as a key consideration in adult learning . On the contrary, Maslow's hierarchy of needs hypothesizes that five basic needs must be fulfilled for the learner to learn best; these needs are physiological, safety, belonging, self esteem and self actualization (311). Although Maslow did not specifically hypothesize that a training structure which respects work-life balance and takes account of personal domestic circumstances would facilitate adult learning, his theoretical construct around psychological safety is the closest published adult learning theoretical construct which might go some way towards encompassing these factors. However, critics including Wahba and Bridwell have pointed to the minimal evidence about the hierarchical order of Maslow's five needs citing that self-actualization may not equate to competence and for the incompetent practitioner, "being all that one can be" may not be an adequate threshold for the provision of optimum care (312). Again, contrary to Rogers and Di Carlo, Maslow's theory fails to take into consideration real life applications or the differences in perceptions around 'self actualization', which for many might require sound work-life balance. Study two contributes to the literature that adult learning theories need to account for the learners' domestic circumstances and consider the necessary work-life balance to enable effective learning and equitable attainment. Further qualitative research is needed to explore what is needed to enable equitable attainment for all whilst ensuring that work-life balance is maintained and that the fundamental human right of a right to family life is not compromised during postgraduate training. Understanding the reasons behind the observed trends alongside the present data will provide the basis for policy making to mitigate against the identified barriers and provide support for all trainees to thrive equitably during GPHST postgraduate training irrespective of socioeconomic status or sex hence contributing to the development of a sustainable workforce which is representative of the population which it serves.

Likewise, the findings from study two demonstrate a widened attainment gap among postgraduate trainees who were domiciled pre-medical school in socioeconomic deprivation (free school meals, Income Deprivation, Employment deprivation). O'Donnell et al. 2009 argued that the imperatives that the widening participation agenda generates are as compatible with postgraduate as with undergraduate study, and that this may have been overlooked previously owing to assumptions of the homogeneity of postgraduates (317). Budd 2016 noted that such trainees are disadvantaged beyond higher education and into the postgraduate phase (318), for example, by being more vulnerable to poor work life balance during postgraduate training for a variety of reasons including working enhanced hours to support their families in a context of more limited financial parental support, greater caring responsibilities and an increased likelihood of mental health illness. This study is the first of its kind to provide quantitative analysis highlighting that childhood socioeconomic deprivation widens the attainment gap postgraduate education with little policy mitigation unlike in the earlier undergraduate phase where there are mitigations in place on account of widening participation policies and several student grants, scholarship and bursary schemes available (319). It is widely acknowledged by scholars and policy makers, including at the Higher Education Academy, that Widening Participation policies need to go beyond recruitment to supporting the retention and progression of students throughout their undergraduate studies and beyond (273) (280) (281). These findings have implications for policy making in postgraduate training which mitigates against childhood economic disadvantage.

Similarly, the findings from study two suggest that there is a widened attainment gap among postgraduate trainees who come from a background of childhood academic deprivation. This is unsurprising given the concurrent finding of a widened attainment gap among postgraduate trainees who experienced financial and economic hardship in childhood such that their families required income support and they were eligible for free school meals. What is interesting is that the previous study presented in this thesis demonstrated no difference in attainment gap during undergraduate medical education for trainees who had experienced such financial and economic hardship in childhood such that their families required income support and they were eligible for free school meals suggesting that educational and system factors in the undergraduate phase (e.g- widening participation schemes, grants, scholarship and bursary schemes)mitigate such effects on academic performance but that in the postgraduate phase where such style of mitigations are not in force, the widening of the attainment gap is observed. Again, it is widely acknowledged by scholars and policy makers, including at the Higher Education Academy, that Widening Participation policies need to go beyond recruitment to supporting the retention and progression of students throughout their

undergraduate studies and beyond (273) (280) (281). The findings in this thesis are the first to provide quantitative data to support the business case for action.

No statistically significant differences in the magnitude of the attainment gap during postgraduate training were observed among ethnic minority vs white participants, students entering medical school as a gradate vs an undergraduate, participants declaring heterosexual orientation vs LGBTQ+, participants with a declared disability vs those without and participants declaring no affiliation to a religion in comparison to those who declared an affiliation. Perhaps the findings that attainment gaps do not grow within postgraduate training by ethnicity, age, sexual orientation, disability or religion is unsurprising given that trainees have more choice about where they can train unlike undergraduate training whereby geographical choices are largely restricted by entry criteria and a much greater degree of competition. As such, trainees can choose to undertake postgraduate training in regions where they have established support structures, often close to home and possibly close to religious communities in-keeping with their faith beliefs.

It is an especially intriguing finding that no statistically significant differences were observed in attainment from undergraduate to postgraduate training among white participants v non-white participants in total and as disaggregated by level 1 ethnic groups. Scholars have highlighted that even for those ethnic minority trainees who succeed in securing a place within UK higher speciality training programmes, they appear to be at greater odds of poorer experience during higher speciality training including lower pass rates in postgraduate examinations (differential attainment) necessary for progression. Scholars have noted that the performance of ethnic minority students is lower than that of White students in: 1) GCSE and Alevel (McManus et al. 2008 (67)) , 2) Higher education, i.e-medical school (Shah et al. 2019 (142), Richardson et al. 2018 (144), Bhopal 2019 (145)) and 3) Postgraduate specialist training with the GMC having found that once in specialty training, UK-qualified white candidates have an average 75% pass rate in postgraduate exams (143) compared with 62.7% for UK-qualified ethnic minority candidates and 42.7% for non-European international medical graduates (142). Study two contributes novel knowledge that the attainment gap for ethnic minority students widens between pre-undergraduate and undergraduate education but then does not widen further between undergraduate and postgraduate education. Based upon the quantitative analyses presented in this thesis, it is possible to conclude that policy efforts to tackle variations in performance by ethnicity should focus on narrowing the widened attainment gap during UG training and that given that there don't appear to be additional factors widening the attainment gap during postgraduate training in GP, it is likely that tackling the widening of the

attainment gap during UG training through policy aiming to improve the performance of ethnic minority trainees would reduce observed variations in performance. These findings broaden those of Hope et al. 2021 who also reported growing differential attainment gaps during undergraduate medical education, including by ethnicity, based upon data from four Scottish medical schools, based upon performance in the first year and the final year of the undergraduate medical course suggesting that there are educational factors at medical school which however inadvertently, contribute to differential attainment (320). The present study reports a widening of attainment among ethnic minority trainees from the end of pre-undergraduate education (UCAS tariff) to the end of undergraduate education (EPM). An international review, Orom 2013 (307), has found that minority medical students "experience less supportive social and less positive learning environments [and] are subject to discrimination and racial harassment which often adversely affects their performance". Tackling these issues would be a huge step forward in narrow the widening attainment gap seen during undergraduate training.

It is also intriguing that the attainment gap for students who had lived pre-medical school in the most deprived quintile for Adult Skills deprivation pre-medical school widened during undergraduate training but did not widen further during postgraduate training. These quantitative findings support the hypothesis reported by Green 2014 that trainees whose families live in areas of low or no adult qualifications and low English language proficiency do not perform as well academically during university (medical school) in comparison with their counterparts on account of: a) requiring more time and effort to comprehend learning materials which can hinder their academic progress, b) language barriers impacting on performance in assessments and c) reduced parental experience of study at higher education level (321) but that over time, by postgraduate education, students adapt to the medical education environment, improving their English proficiency, clinical competencies and gain skills in leveraging institutional support and utilising their resilience and determination. This adaptation reduces the initial disadvantage faced during the early years of medical school (321).

6.2.4 Odds of failing the MRCGP on first attempt

Generally, the present thesis noted widespread observed variations in performance in the MRCGP AKT and CSA through the equalities lenses. The extent to which these observed variations signify equitable attainment is addressed in the following section.

Odds ratio analyses in study two found that trainees were more likely to fail the AKT on first attempt if they were: male (1.2x) compared to female, declaring a disability (1.6x) compared to those with no declared disability, declaring sexual orientation of Bisexual (3.3x) compared to those who declared a Heterosexual orientation, ethnic minority (2.9x) compared with their White counterparts including Asian or Asian British (3x), Indian (2.8x), Pakistani (2.9x), Bangladeshi (2.5x), Any other Asian (4.7x), Chinese (3.3x), Black or Black British (5x), Caribbean (5.2x), African (5.5x), Mixed ethnic groups (1.8x), White and Black African (4.4x), Any other Mixed Group (2.5x) or Any other ethnic group (2.7x) and trainees declaring a religious belief (2.5x) compared to those who declared no religious belief including Buddhist (4.4x), Christian (1.8x), Hindu (3.3x), Muslim (3.8x), Sikh (3.6x). There was no statistically significant difference in pass rate between trainees with no religious affiliation and trainees with affiliation to Judaism. Moreover, odds ratios indicated that trainees were at greater odds of failing the AKT on first attempt if they lived pre-medical school, in comparison to all other deprivation quintiles and the least deprived quintiles, in the most deprived quintiles for: IMD, Education, wBHS, Living Environment, Indoor Deprivation, Outdoor Deprivation, Income Deprivation, Employment Deprivation, Health and disability Deprivation and Crime Deprivation. However, trainees were at greater odds of passing the AKT on first attempt if they lived pre-medical school in the most deprived quintile for Geographical barriers Deprivation. There was no statistically significant difference in passing the AKT on first attempt among trainees who lived pre-medical school in the most deprived quintiles for CYP deprivation, Adult Skills Deprivation and BHS deprivation.

Odds ratio analyses also found that trainees were at greater odds of failing the CSA on first attempt if they were: male (2.2x) compared to female, ethnic minority (3.1x) compared with their White counterparts including Asian or Asian British (3.2x), Indian (2.9x), Pakistani (3.4x), Bangladeshi (6.9x), Any other Asian (3.2x), Chinese (5.5x), Arab (6.1x) Black or Black British (4x), Caribbean (8.3x), African (3.8x), Any other White (3.1x) or Any other Mixed group 3.2x and trainees who declared a religious belief (2.1x) compared to trainees who declared no religious belief including Buddhist (5.1x), Hindu (2.7x), Muslim (3.6x).There was no statistically significant difference in pass rate between trainees declaring no religious belief and trainees with the following religious beliefs: Christian, Sikh and Judaism or among trainees with a declared disability v no declared disability. Moreover, trainees were more at greater odds of failing the AKT on first attempt if they lived pre-medical school, in comparison to all other deprivation quintiles, in the most deprived quintiles for: IMD, wBHS, Living Environment, Indoor Deprivation, Outdoor Deprivation, Income deprivation, Employment deprivation, Health and disability deprivation and Crime deprivation. Trainees were at

greater odds of passing the AKT on first attempt if they lived pre-medical school in the most deprived quintile for Geographical barriers Deprivation. There was no statistically significant difference in passing the AKT on first attempt among trainees who lived pre-medical school in the most deprived quintiles for: Education, CYP, Adult Skills Deprivation and BHS deprivation.

The findings with respect to sex are consistent with those of Pope et al. 2015 who also reported sex differences in both the MRCGP AKT and CSA whereby females outperform males (213); the present study makes the same finding over a longer and later time period confirming that this is a challenge. The present study is the first of its kind to explore unadjusted odds of success in the MRCGP AKT and CSA, for half a decade between 2016-2020, among disaggregated level 1 and level 2 ethnic groups. This significantly expands the work of Siriwardena et al. 2023 (30), Patterson et al. 2015 (322), Patterson et al. 2018 (1) who found that performance was lower in the MRCGP AKT and CSA among ethnic minority trainees noting that the effect is significantly more apparent for those who have trained outside the UK and concluding that identifying specific causes is problematic given that candidates' ethnicity is strongly confounded with place of medical qualification and a significant proportion of IMGs are of ethnic minority background (1). This work also builds upon that published in an Independent Review of the Membership of the Royal College of General Practitioners (MRCGP) examination led by Esmail et al. 2013, covering the period between 2010 and 2012 where it was reported that UK graduate ethnic minority trainees were 4.8x more likely to fail the MRCGP CSA in comparison with White trainees (212). Furthermore, Interestingly, the present study found that UK graduate trainees with a disability performed significantly worse in the AKT but not the CSA which is at odds with the findings of Siriwardena et al. 2023 who noted the opposite findings in a cohort of both UK and IMG graduates (30) suggesting that differences in performance may be influenced by specific challenges unique to UK graduate trainees and IMG trainees and that there may be differing factors influencing exam performance for disabled trainees within different contexts or groups, potentially highlighting the need for tailored support and interventions to address these disparities. Studies thus far have not disaggregated observed performance (pass rates and odds ratios) for UK graduates by sexual orientation, religion, deprivation, graduate v non graduate entry to medical school and disability. As such, the present study contributes novel analyses about observed variations in performance through each of the equalities lenses. However, these analyses do not account for intersectionality and do not enable the drawing of conclusions about the degree to which any observed variations in performance are equitable or inequitable, particularly given differences in sample sizes between ethnic groups. These points will be discussed later in this section.

6.2.5 Understanding the extent to which attainment is equitable in Postgraduate GPHST

Having explored the change in attainment gaps from pre-undergraduate medical education to postgraduate medical education by equalities lenses, study two proceeded to explore observed variations in successful performance in the MRCGP AKT and CSA through each of the equalities lenses through the use of pass rates and odds ratios. Pass rates provide a percentage proportion of the respective population who have passed or failed within a group whilst odds ratios compare the likelihood of the event occurring between two groups, providing a direct ratio of probabilities and focusing on specific binary outcomes. This makes it suitable for examining the relationship between two distinct categories. However, it should be noted that these methods have the potential to be skewed by small numbers, they are not capable of taking into account the whole distribution of scores and they are not a measure of equity.

As discussed previously, scholars including Siriwardena et al. 2023 (30), Patterson et al. 2015 (322), Patterson et al. 2018 (1), Esmail et al. 2013 (212) have used odds ratios to compare the odds of success v failure in all aggregated ethnic minority trainees compared with White trainees. However, the assumption that all ethnic minority candidates would perform in the same way is not sound and even, when disaggregated, the overall sample size of ethnic minority candidates is often considerably lower than the White sample. BAPIO have pointed to MRCGP AKT and CSA pass rate data demonstrating observed variations in academic performance between different groups of doctors—93.5% for White candidates, 76.4% for South Asian, and 72.7% for Black (32). On this basis, BAPIO brought an unsuccessful judicial review that the RCGP had breached its' public sector equality duties. However, the High Court ruled that "the statistical differences which exist do not of themselves establish direct discrimination" but rather "all that they do, is to demonstrate that there is a difference of outcome" (32). In other words, the use of pass rates are only able to articulate observed variations in performance but not the extent to which academic achievement is equitable. The real question is to what extent any variations seen are equitable.

Within medical education, scholars have not thus far adopted a robust approach to measure the degree of equity in academic performance, unlike in other sectors. As outlined earlier in thesis, in both the background and methodology chapters, the present thesis contributes a novel approach for calculating the extent to which any observed variation in MRCGP AKT and CSA academic attainment constitutes equity or inequity by adopting the internationally renowned Gini index methodology. GINI co-efficients are nationally and internationally used, reproducible measures of statistical

dispersion to characterise equality and calculate the extent of inequity in attainment over time by measuring the overall distribution of educational attainment across an entire population, highlighting the inequality or disparity in the distribution. Although Gini coefficients have not yet been used to calculate the extent of educational equity in medical education or the MRCGP AKT and CSA, Gini coefficients have been used by scholars to characterise inequity within economics, opportunity and school education in terms of inequity in the average number of years of schooling (Barro and Lee 1991 (34), Thomas et al. 2002 (35), Mesa 2007 (36), Tomul et al. 2011 (37)) and inequity in academic attainment at secondary school (Zehorit Dadon Golan (38)). Thus far, scholars within medical education have focused on differential attainment by ethnicity which leaves another key gap in the literature relating to differential attainment caused by other characteristics such as age, sex, deprivation (overall IMD, IMD domains and IMD subdomains), disability, sexual orientation, or religion solely and intersectionally; these are gaps which the present thesis will address through novel contributions to knowledge and practice made by the novel developments of AKT_{Gini} and CSA_{Gini} and other insights which serve as crucial evidence basis for policy making and evidence based intervention.

AKT_{GINI}

Gini coefficents calculated across each of the equalities lenses of age, sex, ethnicity, disability, religion, sexual orientation, deprivation quintile for: overall IMD, CYP, Adult Skills, Income and Employment for each year over the study period of over half a decade (2016-2020), found that overall there was relative equity in AKT performance, through each lens, as measured by the AKT_{GINI} Index. Nevertheless, there is value in exploring changes in the AKT_{GINI} over time drawing comparisons between groups within each equalities lens and assessing trends over time.

The AKT_{GINI} Index from 2016 to 2020 revealed relative overall equity, yet notable disparities existed across various equality dimensions. Inequity was generally higher among male candidates, graduate entrants, and those from more deprived backgrounds (particularly Income and Employment). Specifically, male inequity rose from 5.4 to 6.3, and female inequity increased from 4.6 to 7.0. Graduate entrants saw inequity rise from 5.5 to 6.7, while undergraduate entrants experienced an increase from 5.3 to 6.3. %. Candidates from the most deprived quintiles, particularly regarding Income and Employment, faced steep rises in inequity compared to others. Conversely candidates from the least deprived quintiles for CYP and Adult Skills saw a steep decline in inequity over the study period compared to others. Ethnic disparities in AKT performance were notable, with inequity

being lowest among White candidates, higher among Asian or Asian British candidates, and highest among Black or Black British candidates. Between 2016 and 2018, inequity decreased for Black or Black British candidates by 9.4%, Asian or Asian British candidates by 5.4%, but increased for Mixed ethnicity candidates by 16.4%. In 2019, there was a spike in inequity across all ethnic groups, followed by a reduction in 2020 for Asian or Asian British candidates to near-baseline levels, while inequity remained elevated for Black or Black British and Mixed ethnicity candidates. Sexual orientation saw a significant reduction in inequity for LGBTQ+ candidates, dropping by 77.2%. Additionally, inequity was higher among those with declared disabilities and candidates who followed a religious group, with trends indicating an overall increase for these groups over time.

CSA_{GINI}

Gini co-efficient calculated across each of the equalities lenses of age, sex, ethnicity, disability, religion, sexual orientation, deprivation quintile for: overall IMD, CYP, Adult Skills, Income and Employment for each year over the study period of over half a decade (2016-2020), found that overall there was relative equity in CSA performance, through each lens, as measured by the CSA_{GINI} Index. Nevertheless, there is value in exploring changes in the $CSA_{GINI\ I}$ over time drawing comparisons between groups within each equalities lens and assessing trends over time.

Between 2016 and 2019, inequity in CSA performance was higher among female candidates than male candidates, but this gap narrowed significantly by 2020 (from 0.7 in 2016 to 0.1 in 2020). Similarly, inequity was generally higher among graduate entrants compared to undergraduate entrants, with the gap slightly widening over the period (from 0.5 in 2016 to 0.8 in 2020). Ethnic disparities in CSA performance were notable, with inequity lowest among White candidates, higher among Asian or Asian British candidates, and highest among Black or Black British candidates, except in 2019. The gaps in inequity narrowed from 2016 to 2020, with reductions of 3.7% for White candidates, 23.6% for Black or Black British candidates, and 8.2% for Asian or Asian British candidates. Additionally, inequity was higher among candidates who declared themselves as Heterosexual, but the gap remained static from 2016 to 2020. Deprivation also played a significant role, with higher inequity among those from the most deprived quintiles for Income and Employment. Inequity trends showed an increase for those in the most deprived quintiles for Income (41.5% increase) and Employment (30.2% increase) but a decrease for Adult Skills and CYP deprivation. Inequity was higher for candidates with disabilities and those following a religious group, though the gap for religious candidates decreased from 1.1 in 2016 to 0.5 in 2020. Inequity

for candidates with disabilities increased by 6.8%, while it decreased by 5.2% for those without disabilities over the same period.

These findings contribute significantly to a body of literature which, as mentioned previously, has pronounced the AKT and CSA to be biased examinations (towards White trainees) with allegations of discrimination levelled against examining bodies on the basis of observed variations in performance according to pass rates and odds ratios termed differential attainment. This thesis contributes that these are not measures of equity. To measure whether observed variations in academic achievement are equitable, Education Gini needs to be calculated. Upon doing so, this thesis has found that equity in academic achievement among ethnic minority groups has improved over time although the analyses reveal that policy making needs to go further when it comes to improving the experience of trainees of Black or Black British ethnicity. It is positive to see the huge progress made with respect to remarkably reducing inequity in performance in the CSA suggesting potentially increased diversity among examiners and that mandating equality, diversity and inclusion training among examiners and patients has been effective. It is intriguing to see that the greatest inequities noted are with respect to being domiciled pre-medical school in the most deprived quintiles for Income and Employment deprivation and that these trends have increased over time suggesting that policy needs to focus on ensuring that widening participation processes account for these factors and do so beyond recruitment at undergraduate level; O'Donnell et al. 2009 (317), Budd 2016 (318) and the Higher Education Academy (273) (280) (281) have recommended that Widening Participation policies need to go beyond recruitment to supporting the retention and progression of students throughout their undergraduate studies and beyond. The data presented in this thesis concurs. Furthermore, the incremental rise in AKT_{GINI} among candidates with a declared disability raises queries about whether candidates are accessing reasonable adjustments and whether these are effective; further monitoring of the AKT_{GINI} trend will be necessary.

Studies have not thus far applied the Gini method to calculate the extent to which there is equity in academic achievement. This work contributes a novel approach for calculating the extent to which there is equity in academic achievement within the MRCGP AKT and MRCGP CSA for each of the equalities lenses enabling trends to be tracked over time and opportunities for intervention. This is a significant step forwards given that, in the literature, beyond calculating observed variations in performance, there is no validated approach for calculating the extent to which there is equity in performance. Observed variations in educational attainment, termed differential attainment, have thus far been calculated and presented through percentages, odds ratios and averages. The use of

the Gini index (224) adds a measure of the extent to which observed variation is equitable and scholars including Thomas et al. 2002 (35) have opined that one of the most apt approaches for determining the extent of equity in education is by using output measures which appropriately measure the level and the quality of achievement. The approach has not been widely adopted in the literature due to reported difficulties obtaining the required national or international data which would be needed.

The present work builds upon the work of David-Hadar 2008 (237) and Dadon-Golan 2019 (38), who with access to national matriculation examination data in Israel for 2001-2002 and 2001-2011 respectively, were able to calculate inequality in student levels of academic achievement, using EGINI, for the entire population and for various subgroups, e.g- by ethnicity and residence (urban v rural) (237). Both studies found the Gini index to be a useful indicator of inequity in academic attainment also providing insights into trends over time including by equalities lenses, thus informing practical policy interventions to reduce inequality in educational achievement.

Checchi et al. 2017 reported an association between the calculated Gini index measuring inequality in academic achievement in various OECD international examinations (PISA, PIAAC) with income equity (242). Future studies can explore the association between income GINI and the calculated AKT_{GINI} index and CSA_{GINI} index. The cost of inequitable education surpasses its financial outlay. Functioning as critical national infrastructure, education is vital for offering equal opportunities, bridging socio-economic divides, and ensuring societal unity, as noted by scholars like Piketty, 2014 (323); Stiglitz, 2013 (324). Furthermore, the discourse around educational equity, central to both public and scholarly debate, posits education as described by Mann, 1957 as 'the great equalizer' that prioritizes merit over circumstance (325). Educational equity and economic growth are interconnected with scholars like Garibaldi, 2006 highlighting how knowledge acquisition enhances individual productivity (326) and Lucas, 2002 emphasises its role in fostering national development (327). This underscores the extent of educational (in)equity through each equalities lens is essential.

This work contributes that differential attainment is not necessarily inequitable. Rather this is a term to describe an observed variation in performance. To evaluate the extent to which such observed variation is equitable would require calculation of the Gini index; this can be calculated periodically enabling the monitoring of trends over time.

6.2.6 Multivariate analyses: Predictors of success in the MRCGP AKT and CSA

Studies have thus far found that performance in the MRCGP AKT and MRCGP CSA can be predicted by performance in assessments included within the application process for GPHST: namely the Multi-Specialty Recruitment Assessment (MSRA) (Siriwardena et al. 2023 (30)) and GPHST Situational Judgement Test (GPHST SJT) (Patterson et al. 2018 (1)) and Clinical-problem solving test CPHST (Patterson et al. 2018 (1)) using GPNRO data. However, in comparison with the UKMED database which is used in the present thesis, the GPNRO database is limited in metrics relating to demographic data as well as key longitudinal data such as Office for National Statistics household deprivation metrics including the overall IMD, IMD domains, subdomains and previous academic performance, for example, UCAS tariff and EPM which limits the conclusions which can be drawn from existing predictive analyses of MRCGP AKT and CSA performance.

Logistic regression modelling was carried out to identify predictors of success in the AKT and CSA drawing upon sociodemographic factors including measures of socioeconomic (sex, ethnicity, graduate on entry to medicine, disability, religion, sexual orientation, IMD scores, UCAT bursary, Parental degree, free school meals, income support) and educational background (school type, UCAS tariff, UCAT subsection scores, UG course type, EPM score, SJT score, academic trainee, LTFT trainee, region of UG training and region of PG training).

With respect to predictors of success in the AKT, modelling which adjusted for White and Non-White ethnicity, found that predictors of success included: White ethnicity, undertaking the primary medical qualification in the Midlands, undertaking a traditional medicine degree, undertaking training less than full time, UCAT Quantitative Reasoning Score, UCAT Verbal Reasoning Score, SJT Score and EPM Decile and undertaking training less than full time. This modelling also found that predictors of failure in the AKT included: undertaking primary medical qualification in the North West or North East, entering medical school as a graduate and undertaking medicine with a foundation year.

Modelling which adjusted for level 1 ethnicity data identified that predictors of success in the AKT on first sit also included living pre-medical school in the most deprived quintile for CYP deprivation whilst predictors of failure in the AKT on first sit also included living pre-medical school in the most deprived quintile for Income Deprivation and Employment deprivation, with ethnicity no longer being a predictor. Further modelling (adjusting for level 2 ethnicity data) identified that in addition

to all of the above, living pre-medical school in the most deprived quintile for Adult Skills deprivation was also a predictor of failure in the AKT, again with ethnicity no longer being a predictor.

With respect to predictors of success in the CSA, modelling adjusting for the aforementioned variables in the first paragraph of this section and adjusting for ethnicity as White and non-White, found that predictors of success on the CSA on first sit included: female, White, UCAT Decision Reasoning score, SJT score and EPM Decile. This modelling also found that predictors of failure in the CSA included entering medical school as a graduate. Further modelling, adjusting for level 1 ethnicity, also found that attending state school was a predictor of success in the CSA on first attempt whilst living pre-medical school in the most deprived quintile for Adult Skills deprivation was a predictor of failure in the CSA on first attempt with ethnicity no longer being a predictor. Further modelling, adjusting for level 2 ethnicity, also found that living pre-medical school in the most deprived quintile for Income deprivation and Employment deprivation were predictors of failure in the CSA, again with ethnicity no longer being a predictor.

This work advances the literature in medical education which has predominantly explored ethnicity through the 'white' and 'non-white' lenses in quantitative research. The analyses find that when modelling adjusts for more granular level 1 and level 2 ethnicity data, it is evident that ethnicity is not a predictor of success or failure in the AKT or CSA and socioeconomic factors emerge as predictors of performance in both the AKT and CSA.

Regarding modelling predictors of performance in the AKT, it is intriguing that when level 1 ethnicity data is adjusted for, being domiciled pre-medical school in the most deprived quintiles for Income deprivation and Employment deprivation emerge as predictors of failure in the AKT whilst being domiciled pre-medical school in the most deprived quintile for CYP deprivation emerges as a predictor of success in the AKT. This contributes huge knowledge to a body of literature which has neither disaggregated ethnicity data nor deprivation data to such granularity. The findings suggest that the effects of socioeconomic deprivation in childhood can adversely affect performance in postgraduate training, decades later. Given that this can be predicted, this study provides an opportunity for policy makers to consider how these adverse effects can be mitigated, for example by way of financial bursary for those who have taken up a career in GP from a deprived socioeconomic background. This study clearly shows that policy makers should consider support during the postgraduate phase in the same way that mitigations and support may have been applied previously, e.g- through means tested student finance. The finding related to CYP deprivation

demonstrates the success of widening participation policies beyond widening access to undergraduate training but also predicting success in postgraduate training. Evidently this suggests that undergraduate and postgraduate curricula and teaching and learning methods have evolved accessibly to students from a wide variety of educational backgrounds. These long-term impacts have not been previously reported in the literature. When level 2 ethnicity data is adjusted for, being domiciled in the most deprived quintile for Adult Skills deprivation is a predictor of failure in the AKT and ethnicity is not a predictor. This suggests that, English language proficiency imposes significant barriers to success in postgraduate academic attainment in the MRCGP AKT, thus building upon the work of Patterson et al. 2018 (1) which found the same with respect to the MRCGP CSA. Crenshaw 1989 (162) (163) and Collins 1990 (164) argued that social identities combine in complex ways, influencing how individuals navigate societal structures. The holisitic consideration of social identity through the present work makes it well situated to consider intersectionality and inform policy making.

With respect to modelling predictors of performance in the CSA, it is intriguing that when level 1 ethnicity data is adjusted for, level 1 ethnicity data is adjusted for, being domiciled pre-medical school in the most deprived quintiles for Adult Skills deprivation emerges as a predictors of failure in the AKT. This suggests that, English language proficiency imposes significant barriers to success in postgraduate academic attainment in the MRCGP CSA. This is generally consistent with the findings of Patterson et al. 2018 who noted that English language proficiency was a predictor of performance in the MRCGP CSA exam (1). Adjustment for level 1 ethnicity data also found that those with a UCAT bursary were less likely to pass the CSA but those who attended state school were twice as likely to pass the CSA. This is, again, likely to suggest that childhood socioeconomic deprivation has lasting effects, impacting on postgraduate performance, e.g- through continued financial support or bursary to continue means tested student finance given at university. Moreover, the finding related to attendance of state school being a predictor of performance in the CSA demonstrates the success of widening participation policies beyond widening access to undergraduate training but also predicting success in postgraduate training. Evidently this suggests that undergraduate and postgraduate curricula and teaching and learning methods have evolved accessibly to students from a wide variety of educational backgrounds. When level 2 ethnicity data is adjusted for, being domiciled in the most deprived quintiles for Income and Employment Deprivation emerge as predictors of failure in the CSA suggesting that childhood socioeconomic deprivation has profound long term impacts decades on. This study provides an opportunity for policy makers to consider how these adverse effects can be mitigated, for example by way of financial bursary for those who have

taken up a career in GP from a deprived socioeconomic background. Policy researchers like Angelique Harris have used intersectionality to critique policy development, showing how policies can perpetuate or exacerbate inequalities if they ignore intersectional identities (174). The present work highlights the critical importance of using granular ethnic categories in modelling as broad ethnic categories may initially appear significant because they encompass multiple confounding factors related to socioeconomic status, educational background, and other demographic variables.

These analyses add significantly to the body of literature given that studies have not thus far used rich UKMED data to explore the extent to which longitudinal demographic, socioeconomic, academic and geographical factors in the pre-undergraduate and undergraduate phases are predictive of performance in the postgraduate MRCGP AKT and CSA although such work has been carried out in the contexts of postgraduate higher speciality training in medicine (MRCPUK) by Paton et al. 2021 (68) and postgraduate higher speciality training in surgery (MRCS) by Ellis et al. 2021 (216) and Ellis et al 2022 (217).

6.3 Study Three

Despite persistent recruitment and retention challenges in the GP workforce over the past two decades which have been highlighted by reports and scholars (Young et al. 1999 (39), Goldacre et al. 2002 (40), Lambert et al. 2016 (41), Owen et al. 2019 (42), Hall et al. 2019 (43), Hanratty et al. 2022 (44), Martin et al. 2022 (45), Rashid et al. 2016 (46), Tavabie et al. 2013 (47), Sharma et al. 2020 (48)), few studies have comprehensively explored predictors of non-standard ARCP outcomes and timely CCT completion including longitudinal data from across the whole GP training pathway from as early as pre-undergraduate education with metrics for each of the equalities lenses. Study three investigates outcomes from GPHST solely and intersectionally by age, sex, deprivation, ethnicity, disability, sexual orientation and religion over the half a decade period from 2016-2020 with respect to: i) ARCP Outcomes, ii) CCT completion as well as the predictors of non-standard ARCP outcomes and timely CCT completion.

6.3.1 ARCP Outcomes

Developmental ARCP outcomes in GPHST were statistically more likely among trainees who were: 1) male in comparison with female, 3) ethnic minority comparative to White, specifically, Black or Black British (1.5x), African (1.7x), Mixed (1.5x) and White and Asian (1.7x), 4) Lesbian/Gay (1.4x) in comparison with Heterosexual and 5) living pre-medical school in the most deprived quintiles in comparison to the least deprived quintiles and all other quintiles for Income and Adult Skills deprivation. Additionally, trainees who had lived pre-medical school in the most deprived quintile for Employment deprivation were more likely to receive a developmental outcome in comparison with those who had lived in the least deprived quintile although not in comparison with trainees from all other quintiles. Results also show that trainees who lived in the most deprived quintiles for indoor LE and Crime were more likely to receive one or more developmental ARCP outcome in comparison with trainees from all other quintiles although not in comparison to trainees from the least deprived respective quintiles. There were no statistically significant differences in developmental ARCP outcomes by age, disability or religious beliefs or among trainees who lived in the most deprived quintiles for other deprivation domains and subdomains in comparison with the least deprived respective quintiles or all other trainees.

Binary logistic regression modelling was carried out to identify predictors of developmental ARCP outcomes accounting for intersectionality arising from measures of socioeconomic status (sex, ethnicity, graduate on entry to medicine, disability, religion, sexual orientation, IMD scores, UCAT bursary, Parental degree, free school meals, income support) and educational background (school type, UCAS tariff, UCAT subsection scores, UG course type, EPM score, SJT score, academic trainee, LTFT trainee, region of UG training and region of PG training). Predictors of one or more developmental ARCP Outcomes during GPHST training included: male, less than full time trainees, completing UG training in Scotland, PG training in Wales, PG training in the Midlands, PG training in the South East, PG South West, trainees who were on free school meals, UCAT Quantitative Reasoning Score. Trainees were less likely to get developmental ARCP outcomes if they were: female, undertook UG training in London, North West or North East, had a high UCAS tariff, had a high EPM decile and lived pre-medical school in the most deprived quintile for BHS deprivation. Further binary logistic regression modelling using level 2 ethnicity identified that, after accounting for all the aforementioned variables including socioeconomic status, Pakistani trainees are less likely to get developmental ARCP Outcomes during training in comparison to White trainees and there were no other statistically significant findings with regards to ethnicity. In other words, once the aformentioned intersectional demographic and educational variables are considered within the modelling, there is no association between age, ethnicity, sexual orientation or living pre-medical school in the most deprived quintiles for CYP, Adult Skills, LE, Indoor LE, Income and Crime on developmental ARCP GPHST outcomes.

The present study builds upon the work of Siriwardena et al. 2023 (30) which, applying logistic regression to data from the GPNRO including variables of sex, ethnicity, qualification country, declared disability and MSRA score, found that the following groups were more likely to get developmental ARCP outcomes: males in comparison with females, ethnic minorities combined compared to White trainees, IMGs compared with UK-trained graduates, candidates declaring a disability in comparison to those who did not and candidates with lower MSRA scores (30). Siriwardena et al. 2023 (30) focused on a mixture of IMG and UK graduates but the present work focuses on a UK graduates enabling more consistent comparison groups and minimising confounding factors related to differences in medical education and training systems thus making the present work better placed for exploring equity in outcomes for UK trained GP trainees. Nevertheless, the present study concurs with Siriwardena et al. 2023 that male trainees are more likely to attain developmental ARCP outcomes. However, as well as comparing IMG trainees with UK graduate trainees, Siriwardena categorised ethnicity as ‘white’ and ‘non-white’ thereby grouping all ethnic

minority trainees together despite distinctions between ethnic minority groups. Critically appraising this, a 'one size fits all approach' is not appropriate and could result in unsubstantiated generalisations and misclassifications (328) (329). Whittaker et al. 2022 attributed failures in improvement in access, experience and outcomes in education and training to not disaggregating data through equalities lenses when undertaking research and presenting findings (328). The present study undertakes modelling variations which disaggregate ethnic minority data by both Level 1 and Level 2 groups for UK graduates enabling more detailed and nuanced modelling. Univariate analyses in study three found that ethnic minority trainees comparative to White, specifically, Black or Black British, African, Mixed and White and Asian were more likely to be awarded developmental ARCP outcomes. However, once modelling accounted for the intersectionality of factors including measures of socioeconomic status (sex, ethnicity, graduate on entry to medicine, disability, religion, sexual orientation, IMD scores, UCAT bursary, Parental degree, free school meals, income support) and educational background (school type, UCAS tariff, UCAT subsection scores, UG course type, EPM score, SJT score, academic trainee, LTFT trainee, region of UG training and region of PG training), ethnicity (according to level 1 groupings) did not emerge as an independent predictor of developmental ARCP outcomes. Furthermore, when modelling accounted for the aforementioned demographic and educational factors and ethnicity (according to level 2 ethnic groupings), Pakistani trainees were less likely to be awarded developmental outcomes in comparison to White trainees. By drawing upon rich UKMED longitudinal data metrics, including granular metrics such as level 1 and level 2 ethnicity, which span across the training pathway from pre-undergraduate to postgraduate training, it is possible to ascertain that the playing field with respect to progression in GPHST is more level than might be expected among different ethnic groups who graduated from UK medical schools.

Unlike Siriwardena et al. 2023 (30), the present study found that disability had no effect on developmental outcomes during GPHST neither in univariate analyses nor as a predictor once other longitudinal demographic, social and educational variables had been adjusted for. This is likely to suggest improved awareness, inclusivity, effective reasonable adjustment measures and support structures for trainees with disabilities which have levelled the playing resulting in more equitable progression for trainees with a disability throughout the present study period from 2016-2020 thus levelling the playing field for trainees. The present study also found that the greater odds of receiving developmental ARCP outcomes found among Lesbian and Gay trainees were not significant once longitudinal socioeconomic, demographic and educational factors were accounted for.

Interestingly, study 3, found that trainees undertaking less than full time training were at increased odds of developmental ARCP outcomes. Whilst this could be due to less private study time afforded to less than full time trainees and significant variabilities in the working week which less than full time GPHST trainees are confronted with as reported by Rickard et al. 2012 (330), there is conflicting opinion amongst scholars with Hope et al. 2022 reporting no significant effects of less than full time training on progression in Trauma and Orthopaedic speciality training (331) and Hope et al. 2021 reporting no significant effects of less than full time training on progression in General Surgery Training (320). Further qualitative work is needed to understand the potential challenges faced by less than full time trainees in terms of working patterns and opportunities for acquiring competencies for GPHST CCT.

Furthermore, study 3 identified that trainees who had lived premedical school in the most deprived quintile for CYP deprivation were less likely to be awarded developmental ARCP outcomes in comparison to all other trainees. However, results also showed that trainees who had been on free school meals were at increased odds of developmental ARCP outcomes. This may suggest that childhood disparities in education do not appear to have an impact on progression during GPHST but childhood economic deprivation can continue to have an impact on progression decades later during GPHST. This finding indicates that while policy making efforts to widen participation in GPHST have resulted in progress, they may not fully address or mitigate the long-term impacts of socioeconomic deprivation. These findings suggest the need for more comprehensive support systems and interventions targeted at addressing the issue of deprivation more holistically to ensure equitable progression opportunities for all and mitigation against the effects of certain types of childhood deprivation such as financial and economic deprivation. Future research should explore whether the award of a bursary in postgraduate GP training to trainees from a background of childhood financial deprivation could support more equitable progression during GPHST.

Moreover, the findings in study 3 that higher UCAS tariff points and EPM decile scores are linked to lower odds of receiving developmental ARCP outcomes during GPHST are critical for understanding the dynamics of pre-undergraduate, undergraduate and postgraduate training and ultimately indicating that academic achievement from as early as pre-undergraduate education is indicative of a candidate's ability to cope with the future intellectual demands of medical training and practice. In light of these findings, arguably, policies relating to widening participation should strive to ensure that initiatives aimed at increasing diversity to ensure a workforce representative of the population it serves does not inadvertently lower academic standards. Several scholars have grappled with the

dilemma. Haggis 2016 discussed pedagogies for diversity: retaining critical challenge amidst fears of 'dumbing down' suggesting a need to move away from the individualised focus on needs, deficits and 'support' and move more towards a consideration of 'activities, patterns of interaction and communication failures' (332). Haggis 2016 reconceptualises the idea of 'barriers to learning' and attempting to understand how more subtle aspects of pedagogical cultures may themselves be creating conditions which make it difficult, or even impossible, for some students to learn and moving more towards 'older' values which may prevent students from running into difficulties in the adult world and the workplace (332). Thiele 2015 talks about the importance of needing to maintain academic integrity in the widening participation landscape (333). However, national policy makers led by Rt Hon Alan Milburn MP have opined that *'Increasing fair access to professional careers is not about 'dumbing down', any more than it is about allowing young people who otherwise would not be bright enough to become doctors or lawyers. It is about making current access routes fairer and ensuring that those young people who succeed in gaining a top job do so on the basis of talent and merit alone'* (334). The tension between policymakers seeking a bureaucratic framework that emphasises rules, regulations, standardization, and accountability to ensure consistency, equity, and efficiency across the educational system and educators rely on professional authority based upon experience is described by Weber 1947 (335). Tensions becomes challenging when bureaucratic demands for standardisation clash with professional contextual adaptability and feasibility for implementation (335). The latter may include resourcing to support students/trainees from non-traditional backgrounds to achieve their full academic and professional potential so they can meet the same high standards expected rather than a sole focus on reduced or contextual offers.

Interestingly, the results from study 3 highlight regional disparities in developmental outcomes awarded within GPHST in the UK with trainees in the North of England and London less likely to be awarded developmental outcomes but trainees in Scotland, Wales, Midlands, South East and South West more likely to be awarded developmental ARCP outcomes in GP training. With respect to England, life expectancy is widely recorded to be up to 10 years lower in the North of England with record multimorbidity. Yet, findings from this study suggests fewer developmental outcomes awarded during GPHST for those who had undertaken their UG training in the North of England, despite local population health challenges. This could be explained by the work of Derbyshire et al. 2014 (23) that shorter distances to GP practices potentially enhance access to a wider variety of training placements, offering trainees a richer, more diverse clinical learning environment, in turn supporting their training experience and progression (noted through standard ARCP outcomes). It has been noted by Bauer et al. 2018 (336) that, on the whole part, GP practices in London and the

North West are the most accessible (due to shorter distances) in England particularly in the city areas of London, Manchester and Liverpool, Southport and Mersyside (336). Lower odds of developmental ARCP outcomes in these areas might be attributed to the logistical advantages brought about by shorter distances to GP practices for training placements coupled with a potentially increased exposure to a population of higher multimorbidity and shorter life expectancy which together are likely to enhance clinical skills, decision-making abilities, and adaptability, all of which are vital for navigating the complexities of GPHST and achieving standard ARCP outcomes.

6.3.2 CCT completion

The results from study 3 identify disparities in GPHST CCT completion by: 1) sex, with female trainees less likely to complete GPHST CCT than male trainees; 2) sexual orientation, with LGBTQ+ trainees less likely to complete GPHST CCT than Heterosexual trainees; 3) religious belief, with trainees who hold a religious belief more likely to complete GPHST CCT than non-religious believers; 4) ethnicity, with White trainees less likely than non-White trainees to complete GPHST CCT and notably Indian and Pakistani trainees more likely to complete GPHST CCT than White trainees; 5) disability, with trainees who declared a disability being less likely to complete GPHST in comparison with trainees without a disability. There were no statistically significant differences in GPHST CCT completion by age or between trainees who lived pre-medical school in the most deprived quintiles of the IMD or each of its constituent domains and subdomains, save CYP, in comparison with the least deprived quintiles.

With respect to those who completed GPHST CCT, study 3 identified disparities in timely GPHST CCT completion by: 1) sex, with female trainees less likely to complete GPHST CCT timely than male trainees; 2) disability, with trainees who declared a disability being less likely to complete GPHST CCT timely than trainees who declared they had no disability, 3) ethnicity, with White trainees being less likely to complete CCT timely comparative to ethnic minority trainees and trainees who were Asian or Asian British, Indian, Pakistani, Chinese and Any other Asian being more likely to complete CCT timely comparative to White trainees, 4) deprivation with trainees who lived pre-medical school in the most deprived quintiles for IMD, Income, Employment, Education, CYP, Adult Skills deprivation more likely to complete CCT timely in comparison with trainees who lived pre-medical school in the least deprived quintiles respectively and in comparison to trainees from all other quintiles. There were also no statistically significant differences in timely CCT completion by: 1) age, 2) sexual orientation, 3) religion, 4) other deprivation forms including trainees who entered GPHST from the

most deprived quintiles for LE, Indoor LE, Outdoor LE, BHS, Geographical Barriers, wBHS and Crime deprivation in comparison with the respective least deprived quintiles and all other quintiles.

These findings emphasise some of the themes which have been discussed throughout this thesis. Firstly, that certain groups may be disproportionately affected by a greater need to support their families which may create resource and time constraints that affect trainee ability to complete postgraduate training. With respect to women, it is notable that further to study two which observed a wider attainment gap for female trainees at MRCGP AKT in comparison to male trainees, study three finds that women are less likely to complete their CCT. Key contributing factors are likely to be maternity leave and the increased burden brought about by holding family commitments and caring commitments which often results in undertaking less than full time training. Irish et al. 2011 (17) and Smith et al. 2015 (19) have cited 'work-life balance', 'domestic circumstances' and 'time for own family' as a key influencing contributor to the choice of training as a GP. However, as discussed previously, a key critique of the literature relating to adult learning theory is its failure to consider the work-life balance of postgraduate trainees and how learning can be optimised in this landscape.

It is saddening to see quantitative evidence that some marginalised groups including those with declared disabilities and declaring LGBTQ+ sexual orientation are less likely to complete their CCT suggests exposure to barriers in the workplace which is acknowledged by scholars including Sorini et al. 2023 (157) and Danckers et al. 2024 (158) and the NHS Long term Workforce plan (271) which also acknowledges that NHS staff who are LGBT are still much more likely to face physical violence, bullying and harassment in their workplace than other staff thus calling for urgent action (271).

It is intriguing that non-White trainees, and in particular, Indian and Pakistani trainees were more likely to complete CCT. Historical migration patterns and settlement areas can influence the degree of community cohesion and the likelihood of individuals engaging with higher specialist training. As discussed previously, the Postgraduate Medical Education and Training Board which was established on 22nd October 2023 under powers conferred by the General and Specialist Medical Practice Order 2003 and ran from 2004- 2010 at which point it merged with the GMC, issued CCTs in GP including for IMGs (288). It is well documented that the scheme was opened to make it much easier for ethnic minority IMG doctors to attain a CCT in GP and join the specialist GP register which had been extremely challenging to join up to that point (289). It Is recognised that when the scheme opened, approximately 35% of those who were awarded a CCT in GP through the scheme were Asian, Pakistani, Indian etc... (288). One hypothesis could be that a legacy of these historical barriers

appears to put a high emphasis on the value of completing CCT thus influencing resilience and resolve to complete CCT in GPHST.

Generally, there were no statistically significant differences in CCT completion by pre-medical school deprivation. However, among those who completed CCT, those who were domiciled in the most deprived quintiles for IMD, Income, Employment, Education, CYP and Adult Skills were statistically more likely to complete CCT in a timely fashion in comparison to the least deprived quintiles and all other quintiles. This suggests that trainees who have experienced income, employment and educational deprivation might develop stronger coping mechanisms and perseverance, which could contribute to their ability to complete GPHST CCT in a timely manner. The concept of "grit" described by Duckworth et al. 2007 as perseverance and passion for long-term goals, could explain why these trainees are more likely to finish their training promptly once they have navigated through the initial phases of their education and training (337).

It is interesting that despite being at greater odds of receiving at least one non-standard ARCP outcome, trainees who were domiciled in the most deprived quintiles for Income, Employment, CYP and Adult Skills Deprivation, were more likely to complete CCT timely than their counterparts suggesting that non-developmental outcomes had likely provided appropriate remedial support. An intriguing finding is that those who were domiciled in the most deprived quintile for CYP deprivation were less likely to complete GPHST CCT in comparison to those who were domiciled in the least deprived quintile for CYP deprivation but, of those who completed CCT, trainees who were domiciled in the most deprived quintile for CYP deprivation were more likely to complete CCT timely than the least deprived quintile for CYP deprivation. This challenges the perspective of Luthar et al. 2000 with regard to resilience; Luthar et al. 2000 defined this as the process of, capacity for, or outcome of successful adaptation despite challenging or threatening circumstances (338). The present findings suggest that challenging circumstances can help adaptation to some degree, as evident through the successes reported throughout this thesis but that full adaptation requires the implementation of resilience through policy and system levers additional to individual resilience.

Binary logistic regression modelling was carried out to examine predictors of timely CCT completion drawing upon sociodemographic metrics (sex, ethnicity, graduate on entry to medicine, disability, religion, sexual orientation, IMD scores, UCAT bursary, Parental degree, free school meals, income support) and educational metrics (school type, UCAS tariff, UCAT subsection scores, UG course type, EPM score, SJT score, academic trainee, LTFT trainee, region of UG training and region of PG

training). Predictors of timely CCT completion included: undertaking PG training in the Midlands, North East or East of England, UCAT Decision Analysis score, UCAT Verbal Reasoning score and living pre-medical school in the most deprived quintiles for Income and Employment Deprivation. The following were predictors of reduced likelihood of timely CCT completion: Female, Academic trainee, less than full time trainee, undergraduate training in the South East or Scotland, Parental degree, Disability, living pre-medical school in the most deprived quintile for CYP deprivation, undertaking medicine with a pre-liminary year and being of White ethnicity. Interestingly, the modelling using level 2 ethnicity was also similar. Much of the published work to date with respect to predicting CCT outcomes, including by Siriwardena et al. 2023 (30), Tiffin et al. 2024 (210) and Botan et al. 2022 (254), focuses on the role of the MSRA as a predictor, finding that it is. This does not warrant further investigation and scholars have called for research exploring whether timely CCT completion can be predicted from metrics earlier than the GPHST selection process.

Study three found that female sex was an independent predictor of reduced likelihood of timely CCT completion even after socioeconomic metrics, educational metrics, level 1 ethnicity, and level 2 ethnicity had been adjusted for. This is likely to reflect significant gender-based disparities reported by scholars including Maiorova et al. 2008 (339). Maiorova et al. 2008 (339) cited that in their study 'a high proportion of women did not complete their training because of difficulties of combining work and child care'. In England, trainees can request less than full time training for a number of reasons including to support caring responsibilities which essentially enables trainees to undertake reduced hours/week over a longer time period to complete their CCT in GP. On a point of critique, scholars, through the works of: Tiffin et al. 2014 (121), James et al. 2006 (122). Lambe et al. 2012 (123), Lambe et al. 2016 (124) and Lievens et al. 2016 (125), have shown that females perform better on academic assessments such as the MRCGP AKT and CSA indicating that academic performance is not the explanatory factor for reduced likelihood of timely CCT completion among female trainees but more likely compatibility with family life which scholars, including Irish et al., 2011 (17); Watson et al., 2011 (18) and Smith et al., 2015 (19), have highlighted is a key rationale for choosing GPHST.

Understandably, undertaking an academic GPHST training programme also resulted in reduced likelihood for timely CCT completion likely to be due to the additional time taken out of training for the purpose of research and pursuit of a higher research degree (PhD/MD) which is part of the training pathway (340). As highlighted by Lambe et al . 2019, there are few academic GPs relative to other specialties, with only 6.5% of clinical academics being GPs in the UK (341). It is essential that

GP trainees who aspire to pursue academia are supported in doing so to ensure a workforce capable of advancing scientific research for patients in local communities.

It is perhaps unsurprising that UCAT Decision Analysis predicts decision making capabilities necessary for satisfactory progression and timely CCT completion after adjustment of longitudinal demographic and educational factors. Furthermore, it is also unsurprising that UCAT Verbal Reasoning predicts satisfactory progression and timely completion of CCT on account of the essential English language comprehension skills required. Scholars have researched the extent to which the UCAT predicts future performance in postgraduate clinical assessments (such as the MRCGP) although Paton et al. 2021 explored the extent to which the UCAT predicts future performance in postgraduate clinical assessments in the MRCP (a sister exam to MRCGP for those pursuing a career in Medicine as opposed to GP) finding that that the abilities assessed by aptitude and skills and verbal reasoning may be the most important cognitive attributes, of those routinely assessed at selection, for predicting future clinical performance (342). Bala et al. 2022, having undertaken a systematic review of the predictive validity of the UCAT, found that the cognitive total and verbal reasoning subtests had the largest evidence base as weakly positive predictors of academic performance thus supporting the use of cognitive total and verbal reasoning subtests as part of medical school selection processes (343). The present work reaffirms the predictive validity findings of Paton et al. 2021 and Bala et al. 2022 and extends these beyond just postgraduate examination performance but also to timely CCT completion which requires successful examination performance in the MRCGP but also evidence of other competencies.

The consistent findings that trainees with a declared disability are less likely to complete GPHST CCT (vs not complete GPHST CCT) and less likely to complete GPHST CCT timely (vs taking longer to complete GPHST (>1856 days)), is supported by published qualitative analyses exploring the lived experience of GP trainees failing to progress in training (Winter et al. 2020) (344) finding that associated professional factors, personal factors, and social factors can result in difficulties with managing work-load, poor motivation, lack of family time and psychological ill-health ultimately resulting in difficulties for GP trainees completing training. However, despite criticism of a system failure to fully understand trainees' journeys and challenges which would ordinarily provide opportunities for bespoke packages of care and remediation, there was little recommendation about potential interventions which might help to shift the dial. Paulo Freire 2005 in his seminal work 'Pedagogy of the oppressed' discusses how oppressive educational systems can lead to a sense of fatalism and apathy among marginalised students (345). John Dewey, writing in the 20th century

critiques traditional education systems and advocates for more democratic and engaging forms of education citing that conventional systems can fail to inspire and engage (346). Perhaps greater alignment of GPHST with experiential learning or “learning by doing” as proposed by Dewey (346) could mitigate some of the challenges in terms of professional factors, personal factors, and social factors experienced thus helping to boost motivation and techniques for managing workload which were found by Winter at al. 2020 to be causative of difficulties with progression in GPHST.

Irrespective of whether level 1 or level 2 ethnicity is accounted for in the modelling, White trainees were less likely to complete CCT timely. Given that they were not more likely to achieve developmental outcomes as per previous analyses presented in study 3, it is reasonable to conclude that White trainees were less likely to complete CCT timely on account of taking time out of training to pursue extracurricular activities. Interestingly, living pre-medical school in the most deprived quintiles for Income deprivation and Employment deprivation were predictors of timely CCT completion which may signify a keenness to secure permanent employment as a GP having attained a GPHST national training number in pursuit of financial stability. It is also foreseeable that trainees who lived pre-medical school in the most deprived quintiles for Income and Employment deprivation have reduced access to familial funding to support funding for out of programme experiences and the risk of unemployment during that time period. Conversely, trainees whose parents have a parental degree were less likely to complete CCT timely which could be due to increased funding and resource opportunities to pursue out of programme extra-curricular experiences. Interestingly, trainees who lived pre-medical school in the most deprived quintile for CYP deprivation were less likely to complete CCT timely suggesting that a culture of widening participation may have provided more opportunities for funding out of programme experiences. This hypothesis is supported by the findings of the previous analyses presented in study which demonstrated that after adjusting for various longitudinal demographic and educational factors, trainees were less likely than their counterparts to achieve developmental ARCP outcomes indicating satisfactory progression with GPHST competencies. This study presents novel trends and in the absence of any existing published data in this space including out of programme experiences, it is only possible to draw hypotheses and recommend further qualitative work to explore these further. Intriguingly, undertaking UG training in the South East and Scotland were predictors of reduced likelihood of CCT completion whereas undertaking PG training in Midlands, North East or East of England were predictors of increased likelihood of timely CCT completion. Given that there are likely to be a number of contributory complex factors at play, further qualitative research is also needed to explore the effects of spatial training on CCT completion.

Chapter 7: Significant Contributions to Knowledge, Practice and Recommendations

7. Significant Contributions to Knowledge, Practice and Recommendations

The current studies made several contributions to knowledge which have implications for practice and recommendations; some of these are outlined below:

7.1 Study One

Firstly, study one contributes evidence of increasing diversity among GPHST applicants over three quarters of a decade with greater applications from trainees who are: women, ethnic minority, domiciled pre-medical school in areas of high CYP and Adult Skills deprivation, identifying as LGBTQ+ and with declared disability. These trends indicate, at best, a positive trend towards inclusivity and accessibility and, at least, greater self-declaration of minority protected characteristics suggesting a potentially reduced stigma although it is acknowledged by scholars including Sorini et al. 2023 (157) and Danckers et al. 2024 (158)) and the NHS Long term Workforce plan that more action is needed (271). These contributions to knowledge signify that long-term policy efforts to widen access in medical education at multiple levels including at undergraduate and postgraduate stages through Widening Participation guidance issued by the Medical Schools' Council 2018 (279) and the NHS Long term Workforce Plan (271) (277) respectively have made progress in widening diversity goals on the ground. Studies had neither thus far explored trends in applications for GPHST in general, nor through the equalities lenses and in fact there is very little published data which explores access, experience and outcomes from GPHST disaggregated through the equalities lenses. The contributed trends from the present work are novel and provide valuable implications for evaluating and monitoring changes over time including in response to policy interventions.

Secondly, this is the first study to contribute critical knowledge that pre-medical school exposure to deprivation is not appropriately captured by the overall IMD which is the aggregate measure of deprivation currently recommended in Widening Participation policy for evaluating pre-medical school socioeconomic deprivation via the POLAR deprivation score (279). The present study finds that those who were domiciled pre-medical school in the most deprived IMD quintile were less likely to apply solely for GPHST or directly after foundation training either comparative to those who were domiciled in the least deprived IMD quintile or all other IMD quintiles. Furthermore, the present study found no statistically significant difference in being offered a GPHST national training number among trainees who were domiciled pre-medical school in the most deprived IMD quintile in comparison with the least deprived IMD quintile and all other IMD quintiles. However, the same analyses with the domains and subdomains of the IMD revealed different results, thus contributing

knowledge to support further policy development of Widening Participation policies with a view to: a) greater consideration of specific granular deprivation forms which includes going beyond the current position of relying upon the overall IMD quintile but rather a broader range of domain and subdomain data, b) ensuring that widening Participation policies go beyond HEI recruitment to supporting the retention and progression of students throughout their undergraduate studies and beyond. Scholars have opined that individuals within HEIs need to take more accountability for HEI policymaking and its effects socially (293) which includes ensuring that HEI widening participation policies account for exposure to all deprivation forms to ensure a diverse pool of graduates for GPHST and a workforce representative of the population which it serves.

Thirdly, study one contributes a nuanced understanding of the intersectional factors influencing application patterns to GPHST through the deployment of novel decision tree analyses on the advice of Bauer et al. 2021 (190) and Willig 2023 (191) who reported that with large data set (over a longer time period for example) with non-linear relationships and where one is seeking to understand intersectional factors in the context of subjects' decision making (e.g- in the context of applications for GPHST), decision trees offered the most promising analytical approach for exploring intersectionality where choice is involved comparative to logistic regression which has been adopted by Gale et al. 2017. Examining the combined effects of age, sex, deprivation, ethnicity, disability, sexual orientation, and religion, through decision tree analyses, has contributed a detailed picture of how these factors interplay to shape career decision-making in GP trainees in keeping with the perspective of Crenshaw 1989 (162) (163) who argued that the concept of intersectionality highlights how various forms of oppression intersect and overlap in complex ways and the perspective of Collins 1990 (164) who described how social identities combine in complex ways, influencing how individuals navigate societal structures. The holisitic consideration of social identity through the present work has contributed a detailed approach for and consideration of intersectionality which provides valuable contributions of knowledge about specific groups who are more likely to apply solely to GPHST and directly to GPHST directly after foundation training enabling the development and implementation of more targeted recruitment strategies. For example:

A) The present studies found that younger, female, disabled, and ethnic minority applicants are more likely to apply solely for GPHST, while trainees from more deprived backgrounds are less likely to make sole applications. Furthermore, the present studies found that younger applicants (≤29 years) from Indian, Pakistani, Bangladeshi, Chinese, Caribbean, African, or Arab backgrounds, and those experiencing fewer socioeconomic barriers, were more likely to apply directly to GPHST after foundation training. In contrast, higher academic achievers

and trainees from the most deprived backgrounds were less likely to apply directly to GPHST after foundation training. This is the first study of its kind to identify demographic group predictors of sole application and direct application to GPHST accounting for a wide range of intersectional factors including longitudinal socioeconomic, demographic, geographic and academic factors spanning from pre-undergraduate medical education through to undergraduate medical education and postgraduate medical education. These insights challenge the traditional view of treating demographic groups as homogeneous entities and highlight the need for more tailored approaches in medical education and recruitment policies. By understanding that younger, female, disabled, and ethnic minority applicants are more likely to apply solely for GPHST, medical schools and recruitment bodies can develop targeted outreach programs and support mechanisms. These strategies could include mentorship programs, flexible training pathways, and initiatives that specifically address the needs and preferences of these demographic groups, ultimately enhancing the diversity and inclusivity of the GP workforce.

B) The present studies also found that younger applicants (≤29 years) from Indian, Pakistani, Bangladeshi, Chinese, Caribbean, African, or Arab backgrounds, and those experiencing fewer socioeconomic barriers, were more likely to apply directly to GPHST after foundation training whilst in contrast, higher academic achievers and trainees from the most deprived backgrounds were less likely to apply directly to GPHST after foundation training, recruitment strategies can be well informed accordingly and designed to keep a balance between encouraging sustained recruitment from the identified groups as well as looking to reach out more broadly to ensure a diverse workforce which is representative of the population which It serves. For example, one policy recommendation would be to incentivise applications to GPHST among prospective applicants who are academically gifted and talented through the provision of a scholarship or increased likelihood of the applicant's preferred geographical work location whilst another policy recommendation would be the provision of financial assistance to help mitigate barriers faced by trainees from deprived backgrounds and promote direct entry into GPHST.

Fourthly, study one contributes new insights into how historical migration patterns influence application behaviours to GPHST. It reveals that ethnic minority groups, particularly those from Asian or Asian British backgrounds, are more likely to apply directly to GPHST immediately after foundation training. This trend can be linked to the historical challenges these communities faced in obtaining a CCT before the establishment of the PMETB scheme, which made it easier for ethnic minority international medical graduates to attain a CCT in GP. Consequently, the legacy of these

historical barriers appears to drive a strategic approach among current applicants from these communities, aiming to secure a GPHST national training number by applying directly after foundation training. This finding underscores the lasting impact of historical migration and educational policy changes on contemporary medical career choices, thus highlighting the importance of understanding these historical contexts in shaping current recruitment strategies and policies. Interestingly, the present study contributes knowledge that there are no statistically significant differences in the odds of being offered a GPHST national training number among each ethnic minority group as disaggregated by level 1 ethnicity. This suggests that efforts to ensure equality, diversity and inclusion in recruitment to shape a workforce representative of the population which it serves have largely succeeded. NHS England have highlighted that generally 'White trainees perform better than non-White trainees on assessments and on the whole are more successful in selection' for GPHST (298) although the present study provides evidence that this is not the case.

Fifthly, study one contributes novel insights into the allocation of GPHST national training numbers through the equalities lenses on a number of fronts including:

A) The finding of no statistically significant differences in the success rates of being offered a GPHST national training number among disabled applicants indicates that initiatives like the GMC's 'Welcomed and Valued' policy have been successful. These policies appear to have created a more inclusive environment, ensuring that applicants with disabilities have equal opportunities to pursue a career in GPHST, thus promoting diversity and inclusivity within the medical workforce.
B) The contribution to knowledge that trainees declaring their sexual orientation as LGBTQ+ are less likely to be offered a GPHST national training number in comparison to trainees declaring their sexual orientation as Heterosexual. These findings lead to recommendations for implementing anti-discrimination policies, creating inclusive training environments, and establishing peer support networks. This study recommends that HEIs and employers seek to address barriers faced by LGBTQ+ trainees can help medical education providers foster a more inclusive and supportive atmosphere, ultimately enhancing the well-being and career prospects of all trainees.

7.2 Study Two

Firstly, Study two offers numerous significant contributions to knowledge by examining the change in attainment gaps from pre-undergraduate to postgraduate medical education through various equality lenses. To note a few:

A) Study two contributed knowledge of a statistically significant narrowing of the attainment gap during undergraduate medical education between trainees who had been domiciled pre-medical school in the most deprived quintile for CYP deprivation in comparison with the least deprived quintile thus providing the first quantitative evidence that Widening Participation schemes have successfully gone beyond widening access to medical school but also to levelling the academic playing field in terms of academic performance during medical school. Study two also contributed a statistically significant widening of the attainment gap during postgraduate medical education between trainees who had been domiciled pre-medical school in the most deprived quintile for CYP deprivation in comparison with the least deprived quintile thus providing evidence to support the work of O'Donnell et al. 2009 (317), Budd 2016 (318) and the Higher Education Academy (273) (280) (281), that Widening Participation policies need to go beyond recruitment to supporting the retention and progression of students throughout their undergraduate studies and beyond.

B) Study two also contributed knowledge that while attainment gaps widen during undergraduate education by disaggregated ethnic groups, these gaps do not widen further during postgraduate training. This finding highlights that the critical period for intervention is during undergraduate education, thus providing the first quantitative evidence of its kind and giving credence to the calls to action by several scholars, including Orom 2013 (307), Woolf 2020 (308) and Gupta 2021 (306), who through qualitative works, noted the adverse impacts of less supportive HEI environments and discrimination on minority students' performance. Study two therefore recommends that policy efforts should focus on improving undergraduate experience for ethnic minority trainees to reduce disparities, as this stage significantly influences their overall academic and professional outcomes.

C) Study two contributed insights that attainment gaps between students with and without religious beliefs widen during undergraduate education but do not widen further during postgraduate education. This may be explained by the loss of religious support systems when students transition to university, which can affect their coping mechanisms, stress levels, and overall well-being, as suggested by scholars like Harrison et al. 2009 (309) and Schlossberg 1981 performance (310). Further qualitative research is recommended to

explore the impact of religious transitions on psychological safety and academic performance in medical school.

Secondly, study two contributes to knowledge that current educational theory do not sufficient account for the impact of family life and the importance of work-life balance on postgraduate training. Adult learning theories postulated by several scholars including Knowles (313), Rogers (315), Maslow (312) do not address how family commitments and work-life balance intersect with learning and attainment. This oversight is significant, as adult learners frequently cite these factors as crucial to their learning experience.

Thirdly, study two contributes a novel approach for the calculation of the extent to which observed variations in educational attainment are equitable through the introduction of AKT_{GINI} and CSA_{Gini} over time through each of the equalities lenses thus enabling trends to be tracked over time and opportunities for policy and intervention. This is a significant step forwards given that, in the literature, beyond calculating observed variations in performance, there is no validated approach for calculating the extent to which there is equity in performance. Using the Gini index to measure inequality in examination performance by inequalities lenses offers a more comprehensive and nuanced perspective on disparities in performance outcomes compared to simply examining standard deviation, raw percentages, odds ratios or averages, as postulated by Atkinson et al. 1970 (243) and Sen et al. 1973 (244). The use of the Gini index adds a measure of the extent to which observed variation is equitable and scholars, including Thomas et al. 2002 (35), have opined that one of the most apt approaches for determining the extent of equity in education is by using output measures which appropriately measure the level and the quality of achievement as is the case with AKT_{GINI} and CSA_{Gini}. By adopting the Gini index, the study addresses a significant gap in the literature, providing a reproducible and robust measure of equity in medical education outcomes. This approach offers new insights into differential attainment, adding a quantitative measure of the extent to which differential attainment is equitable thus providing a crucial evidence base paving the way for policy-making and targeted interventions aimed at promoting equity in medical training. The development of AKT_{Gini} and CSA_{Gini} represents a ground-breaking step in understanding and addressing inequities in medical education, contributing both to academic knowledge and practical applications in educational policy and practice. Future work should consider developing intersectional Gini analyses which account for different factors (e.g- deprivation and ethnicity) evolving the work of Munir et al. 2022.

Fourthly, study two contributes knowledge demonstrating that after adjustment for granular level 1 and level 2 ethnicity data, ethnicity itself is not a predictor of success or failure in the Applied Knowledge Test (AKT) or Clinical Skills Assessment (CSA). Instead, socioeconomic factors emerged as significant predictors of performance in these postgraduate medical exams. The study advances the existing literature by moving beyond the simplistic 'white' and 'non-white' ethnic categorisations and 'IMD most deprived quintile' v 'IMD least deprived quintile categorisations, highlighting that individual deprivation forms including: living in deprived quintiles for childhood and adult skills deprivation, income, and employment are critical determinants of exam outcomes. The findings emphasise the importance of using detailed ethnic classifications in research, as broad categories may obscure the real predictors of performance, which are largely socioeconomic.

7.3 Study Three

Firstly, study three contributed knowledge study three's findings on the predictive validity of academic achievements (UCAS tariff and EPM scores) for ARCP outcomes which underscore the ensuring that Widening Participation initiatives prioritise excellence in academic standards and this might require specialist academic support, extra tuition and enhanced academic courses for trainees. This finding contributes to practice that policymakers should ensure that initiatives aimed at increasing diversity do not inadvertently lower academic standards but rather provide the necessary support for all trainees to meet high standards. This includes reconceptualising barriers to learning in line with the theoretical work of Haggis 2016 (332) and focusing on pedagogical approaches that promote equity and inclusivity without compromising academic integrity as postulated by Thiele 2015 (333).

Secondly, study three contributed new knowledge by revealing significant regional disparities in developmental outcomes within General Practice Higher Specialty Training (GPHST) in the UK. Study three found that trainees in the North of England and London are less likely to be awarded developmental outcomes compared to those in Scotland, Wales, the Midlands, South East, and South West which is likely to be explained by the observations of Bauer et al. 2018 (336) that, on the whole part, GP practices in London and the North West are the most accessible (due to shorter distances) in England particularly in the city areas of London, Manchester and Liverpool, Southport and Mersyside. This study contributes to practice that accessibility to GP practices is a key component in successful progression in GPHST and a key recommendation from this work is a need for the more equitable distribution of GP Teaching practices in areas where accessibility to GP

teaching practices is sparse and travel times are longer. Future funding of GP training practices should take this into account.

Thirdly, study three contributed novel insights that trainees who had lived premedical school in the most deprived quintile for CYP deprivation were less likely to be awarded developmental ARCP outcomes in comparison to all other trainees meanwhile trainees who had been on free school meals were at increased odds of developmental ARCP outcomes suggestive of the fact that childhood disparities in education do not appear to have an impact on progression during GPHST but childhood economic deprivation can continue to have an impact on progression decades later during GPHST. These findings suggest the need for more comprehensive support systems and interventions targeted at addressing the issue of deprivation more holistically to ensure equitable progression opportunities for all and mitigation against the effects of certain types of childhood deprivation such as financial and economic deprivation. This study recommends that Widening Participation policies, give more consideration to economic hardship without compromising academic standards and that in line with anecodotal recommendation from other scholars including O'Donnell et al. 2009 (317) and Budd 2016 (318), Widening Participation policies, take heed of the quantitative evidence provided within this thesis, to go beyond recruitment and focus efforts on supporting the retention and progression of trainees throughout their undergraduate studies and beyond. Future research should explore whether the award of a bursary in postgraduate GP training to trainees from a background of childhood financial deprivation could support more equitable progression during GPHST.

Fourthly, study three contributed that less than full time trainees are at increased odds of developmental ARCP outcomes. This has implications in practice for tailored support to address the specific challenges faced by LTFT trainees, such as variable working patterns and reduced private study time. It is recommended by this study that these issues are addressed to help improve training outcomes and retention of LTFT trainees, who are often balancing training with other responsibilities.

Fifth, study three makes significant contributions to knowledge by revealing that shows that female, LGBTQ+, and disabled trainees face challenges in completing GPHST CCT, while Asian trainees and deprived background trainees exhibit higher timely completion rates. Luthar et al. 2000 (338) and Duckworth et al. 2007 (337) describe how trainees from disadvantaged backgrounds either on account of legacy systems which marginalised capability for their parental generation to obtain a timely CCT in GPHST (until PMETB opened in 2003) or on account of childhood deprivation according

for CYP, Adult Skills, Income or Employment result in successful adaptation despite challenging circumstances with a resultant greater degree of resilience and the stronger coping strategies prompting completion of training not despite challenges, but in spite of them. Future studies should explore the support on offer for these trainees to ensure sustained productivity and minimise the risk of burnout.

Sixth, this study contributes two binary logistic regression models (exploring predictors of timely CCT completion adjusting for level 1 and level 2 ethnicity respectively) as well as longitudinal socioeconomic, demographic, geographic and academic factors intersectionally. Positive predictors of timely CCT included: undertaking postgraduate training in the Midlands, North East, or East of England, higher UCAT Decision Analysis and Verbal Reasoning scores, and living pre-medical school in the most deprived quintiles for Income and Employment deprivation. Predictors of reduced likelihood of timely CCT included: being female, an academic trainee, a part-time trainee, having undergraduate training in the South East or Scotland, parental degree, disability, pre-medical school residence in the most deprived CYP quintile, undertaking undergraduate medicine with a preliminary year, and being White. These findings enhance our understanding of the complex interplay of various factors influencing training outcomes and underscore the need for tailored interventions to support marginalised groups and improve the efficiency and equity of GPHST. These findings highlight that Geographical location of postgraduate training emerges as a predictor of timely CCT completion suggesting variations in training across deaneries that warrant further qualitative analysis.

Chapter 8: Limitations

8. Limitations

The challenges of organising and undertaking a longitudinal study using data from a range of institutions with varying outcome measures should not be understated. A significant limitation of using big data is the potential for data incompleteness and inconsistency. Big data often involves collecting large volumes of information from various sources over extended periods. In the context of tracking medical education progression, data might be gathered from diverse institutions and systems, ranging from university admission processes (UCAS) to professional GP training programs. A significant amount of work was undertaken, in line with UKMED database quality assurance processes, within the data processing stages to ensure that data was correctly aligned from across providers. Nevertheless, as is the case with all studies, there are some limitations which are summarised below:

Demographic data from the UKMED database is largely self-reported. Self-reported demographic data, while useful, is subject to several limitations that can affect its validity and reliability. One of the primary concerns is the accuracy and honesty of the information provided, as respondents may intentionally or unintentionally misreport due to various reasons such as memory errors or a desire to conform to social norms. Sampling bias is another significant issue, arising from the tendency of certain groups to be overrepresented or underrepresented in survey responses. The complexity of demographic identities often goes beyond the limited categories available in surveys, leading to oversimplification or misrepresentation, particularly in areas like race, ethnicity, sex, and sexual orientation. Non-response and response fatigue can result in incomplete data sets, while cultural and language barriers can lead to misinterpretation of questions. Additionally, self-reported data usually captures a single point in time, ignoring the temporal variability in demographics. This data often lacks contextual information essential for a comprehensive understanding of the responses. Ethical and privacy concerns also arise with the collection of sensitive demographic information, especially if it's not anonymized or securely stored. Social desirability bias can influence respondents to answer in a way they think is expected, and there's often a reluctance to disclose sensitive information like sexual orientation or income, leading to misleading responses. These factors collectively highlight the need for careful consideration in the collection, analysis, and interpretation of self-reported demographic data.

Furthermore, the data within these studies included participants who lived in England when they applied to medical school. Whilst in these studies, this facilitated comparisons of socioeconomic status partly derived from the Index of Multiple Deprivation data which is populated according to

the Census (which only covers England), it did not include applicants living outside of England when they applied to medical school even though they may have gone on to graduate in England and apply for GP HST in England and obtain a CCT in England.

Moreover, it is worth noting that a key limitation of the EPM, which is the only metric for performance during medical school available nationally, is that it is norm referenced such that it evaluates individual performance relative to the group. As such, it does not measure absolute mastery or competency but only indicates how one performs compared to peers, regardless of whether specific learning objectives are met. Therefore, the EPM is highly influenced by the composition of the group, making it inconsistent for comparisons across different cohorts or medical schools. Norm referencing also promotes competition over collaboration, potentially discouraging mutual support and shared learning among peers.

Additionally, whilst quantitative data can provide statistical evidence and trends, it may lack the depth and detail of qualitative data. This means that whilst it is possible to identify patterns and correlations, understanding the underlying reasons or mechanisms might be limited.

Chapter 9: Conclusions

9. Conclusions

This thesis presents several landmark findings that significantly enhance the understanding of access, experience, and outcomes from GPHST among diverse groups through the seven equalities lenses: age, sex, deprivation, ethnicity, disability, sexual orientation and religion through the use of longitudinal academic, geographic, socioeconomic and demographic data from pre-undergraduate to postgraduate training (from classroom to clinic).

The present studies have made significant contributions to understanding equity in access to GPHST in the UK. The findings highlight increasing diversity among GPHST applicants, reflecting positive trends toward inclusivity and accessibility. Evidence indicates more applications from women, ethnic minorities, individuals from high deprivation areas, LGBTQ+ individuals, and those with declared disabilities. These trends suggest progress in long-term policy efforts, such as the NHS Long Term Workforce Plan and the Widening Participation guidance issued by the Medical Schools' Council, aimed at broadening access to medical education. However, more action is required to sustain and enhance these improvements.

Furthermore, this thesis aimed to build upon the literature outlining disparities in experience during GPHST among trainees through the equalities lenses by exploring the extent to which there is equity in postgraduate high stakes examination performance. This thesis contributed the AKT_{GINI} and CSA_{GINI} indices which measure equity in academic performance in the MRCGP AKT and CSA (the two high stakes examinations necessary for CCT completion), providing a novel approach to evaluating observed variations in performance, differential attainment, to explore the extent to which variations are equitable. This method offers a reproducible and robust measure of equity, enabling equity to be tracked over time and thus filling a critical gap in the literature. Application of Gini Analyses in this thesis found that unexplained observed variations in the MRCGP AKT and CSA among diverse group through the equalities lenses did not amount to inequity in academic attainment in the AKT or CSA, indicating that no particular group was unfairly disadvantaged. Trends over a half decade period are discussed for each lens.

Moreover, the present works have contributed significant insights regarding outcomes from GPHST, notably the predictive validity of academic achievements for ARCP outcomes, underscoring the need for Widening Participation initiatives to maintain high academic standards while offering tailored support. Significant regional disparities in developmental outcomes highlighted the importance of equitable distribution of GP teaching practices. The findings emphasise the necessity of addressing

socioeconomic factors and providing targeted interventions to ensure equitable progression and outcomes from GPHST.

Finally, importantly, this study uncovered that pre-medical school exposure to deprivation is not adequately captured by the overall IMD, emphasising the need for more granular measures and that ethnicity is not adequately captured by 'White' or 'non-White' but rather there is huge importance in the disaggregation of data by level 1 and level 2 ethnicity as per the studies presented in this thesis. The study's comprehensive approach, utilising longitudinal data and intersectional analyses, provides valuable insights into the factors influencing access, experience, and outcomes in GPHST, informing policy and driving efforts towards a more equitable GP workforce representative of the diverse population it serves.

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Appendices

Appendix 1- Ethnical approval

Queen Mary
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Queen Mar Ethics of Research Committee
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c/o Professor Steve Thornton
Queen Mary University of London
Barts and The London School of Medicine and Dentistry
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16th January 2017

To Whom It May Concern:

Re: UK Medical Education Database (UKMED) Research

On the 11th November 2015, The Queen Mary Ethics of Research Committee viewed a generic proposal for research: this with regard to the analysis of data held by the UK Medical Education Database.

They noted confirmation received that this work both does not require NHS review; relates to the analysis of de-identified data that would be accessed under safe haven conditions, and that an annual report on agreed research could be provided for information.

As such, members agreed that they were prepared to give documentary confirmation that there was no need for ethical review of these potential research studies, as presented.

Additional Confirmation
It was noted (via Chair and Reviewer's Action) on the 13th January 2017 that the inclusion of additional datasets – both confirmed and proposed - will not affect the assessment above. There continues to be no need for ethical review of these studies.

Yours faithfully,

Ms Elizabeth Hall – QMREC Chair.

Appendix 2- Ethnical Approval

Educational Research | Lancaster University

4th August 2022

Dear Marina

Thank you for submitting your ethics application and additional information for **Understanding Medical Education Inequalities in UK GP training progression: A national longitudinal study from UCAS application to fully qualified GP**. The information you provided has been reviewed and I can confirm that approval has been granted for this project.

As Principal Investigator your responsibilities include:

- ensuring that (where applicable) all the necessary legal and regulatory requirements in order to conduct the research are met, and the necessary licenses and approvals have been obtained;
- reporting any ethics-related issues that occur during the course of the research or arising from the research (e.g. unforeseen ethical issues, complaints about the conduct of the research, adverse reactions such as extreme distress) to the Research Ethics Officer (Dr Murat Oztok or Dr Natasa Lackovic).
- submitting details of proposed substantive amendments to the protocol to **Prof Paul Trowler** for approval.

Please do not hesitate to contact your supervisor if you require further information about this.

Yours sincerely

Kathryn Doherty
Programme Co-ordinator
PhD in Higher Education: Research, Evaluation and Enhancement

Head of Department
Professor Paul Ashwin, BA, MSc, PhD
Professors
Carolyn Jackson, BSc, PhD
Don Passey, BSc, MA, PhD
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Paul Trowler, BA, MA, Cert Ed., PhD

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Appendix 3

Table 1- SCED 2011 levels of education

Level	ISCED 2011	Description
0	Early childhood education (01 – early childhood educational development)	Education designed to support early development in preparation for participation in school and society. Programmes designed for children below the age of 3.
1	Early childhood education (02- Pre-primary education)	Education designed to support early development in preparation for participation in school and society. Programmes designed for children from age 3 to the start of primary education.
2	Lower secondary education	First stage of secondary education building on primary education, typically with a more subject-oriented curriculum.
3	Upper secondary education	Second/final stage of secondary education preparing for tertiary education and/or providing skills relevant to employment. Usually with an increased range of subject options and streams.
4	Post-secondary non-tertiary education	Programmes providing learning experiences that build on secondary education and prepare for labour market entry and/or tertiary education. The content is broader than secondary but not as complex as tertiary education.
5	Short cycle tertiary education	Short first tertiary programmes that are typically practically-based, occupationally-specific and prepare for labour market entry. These programmes may also provide a pathway to other tertiary programmes.
6	Bachelor's or equivalent	Programmes designed to provide intermediate academic and/or professional knowledge, skills and competencies leading to a first tertiary degree or equivalent qualification.
7	Master's or equivalent	Programmes designed to provide advanced academic and/or professional knowledge, skills and competencies leading to a second tertiary degree or equivalent qualification.
8	Doctorate or equivalent	Programmes designed primarily to lead to an advanced research qualification, usually concluding with the submission and defence of a substantive dissertation of publishable quality based on original research.

Appendix 4

Table 2 - Study One Demographic data

	Applicants who applied solely to General Practice training on first ORIEL application n(%)								Applicants who applied to General Practice training with other specialities n(%)							
	2013	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
N	125	585	870	1126	1371	1220	997	824	124	358	591	618	669	615	453	356
Sex, n (% of column total)																
Male	54 (43.2)	211 (36.1)	302 (34.7)	391 (34.7)	486 (35.4)	415 (34.0)	381 (38.2)	331 (40.2)	50 (40.3)	139 (38.8)	223 (37.7)	249 (40.3)	237 (35.4)	244 (39.7)	178 (39.3)	146 (41.0)
Female	71 (56.8)	374 (63.9)	568 (65.3)	735 (65.3)	885 (64.6)	805 (66.0)	616 (61.8)	493 (59.8)	74 (59.7)	219 (61.2)	368 (62.3)	369 (59.7)	432 (64.6)	371 (60.3)	275 (60.70)	210 (59.0)
Course Type, n (% of column total)																
Foundation Course	-	1 (0.02)	12 (1.4)	12 (1.1)	23 (1.7)	14 (1.1)	6 (0.6)	17 (2.1)	-	-	2 (0.3)	3 (0.5)	6 (0.9)	3 (0.5)	6 (1.3)	10 (2.8)
Graduate Entry Medicine	120 (96)	130 (22.2)	117 (13.4)	171 (15.2)	193 (14.1)	178 (0.1)	42 (4.2)	56 (6.8)	118 (95.2)	111 (31.00)	113 (19.1)	119 (19.3)	142 (21.2)	99 (16.1)	42 (9.3)	20 (5.6)
Intercalated	-	-	-	1 (0.1)	-	1 (0.1)	-	0 (0)	-	-	-	-	-	-	-	1 (0.3)
Medicine with a Gateway Year	-	-	2 (0.2)	15 (1.3)	21 (1.5)	25 (2.0)	12 (1.2)	34 (4.1)	-	-	14 (2.4)	16 (2.6)	15 (2.2)	11 (1.8)	12 (2.6)	11 (3.1)
Medicine with a Preliminary Year	-	2 (0.34)	11 (1.3)	12 (1.1)	11 (0.8)	11 (0.9)	8 (0.8)	12 (1.5)	-	1 (0.3)	3 (0.5)	3 (0.5)	5 (0.7)	9 (1.5)	8 (1.8)	3 (0.84)
Standard Entry Medicine	5 (4)	452 (77.3)	728 (83.7)	915 (81.3)	1123 (81.9)	991 (81.2)	385 (38.6)	705 (85.6)	6 (4.8)	246 (68.7)	459 (77.7)	477 (77.2)	501 (74.9)	493 (80.2)	385 (85.0)	311 (87.4)
Teaching style, n (%)																
Traditional	6 (4.8)	5 (0.9)	11 (1.3)	25 (2.2)	24 (1.8)	32 (2.6)	24 (2.4)	19 (2.3)	8 (6.5)	4 (1.1)	25 (4.2)	16 (2.6)	22 (3.3)	14 (2.3)	18 (4)	10 (2.8)
Integrated	61 (48.8)	358 (61.2)	507 (58.3)	696 (61.8)	871 (63.5)	767 (62.9)	630 (63.2)	521 (63.2)	48 (38.7)	193 (53.9)	323 (54.7)	364 (58.9)	400 (59.8)	359 (58.4)	280 (61.8)	213 (59.8)
Problem Based Learning	53 (42.4)	190 (32.5)	278 (32.0)	324 (28.8)	367 (26.8)	330 (27)	256 (25.7)	215 (26.1)	57 (46)	135 (37.7)	191 (32.3)	196 (31.7)	191 (28.6)	186 (30.2)	108 (23.8)	101 (28.4)
Case Based Learning	5 (4.0)	32 (37.6)	74 (8.5)	81 (7.2)	108 (7.9)	87 (7.1)	87 (8.7)	66 (8)	11 (8.9)	26 (7.3)	52 (8.8)	42 (6.8)	56 (8.4)	56 (9.1)	45 (9.9)	31 (8.7)
Other																
Prior degree status																
Graduate on entry	123 (98.4)	206 (35.2)	192 (22.1)	257 (22.8)	294 (21.4)	268 (22)	145 (14.5)	95 (11.5)	112 (90.3)	153 (42.7)	154 (26.1)	178 (28.8)	216 (32.3)	150 (24.4)	86 (19)	43 (12.1)
Not graduate entry	2 (1.6)	379 (64.8)	677 (77.8)	869 (77.2)	1076 (78.5)	952 (78)	851 (85.4)	729 (88.5)	11 (8.9)	205 (57.3)	435 (73.6)	437 (70.7)	451 (67.4)	463 (75.3)	367 (81)	311 (87.4)
Not stated	0 (0)	0 (0)	1 (0.1)	0 (0)	1 (0.1)	0 (0)	1 (0.1)	0 (0)	1 (0.8)	0 (0)	2 (0.3)	3 (0.5)	2 (0.3)	2 (0.3)	0 (0)	2 (0.6)
School Type, n (% of column total)																
Private	4 (3.2)	110 (18.8)	221 (25.4)	285 (25.3)	316 (23.0)	293 (24.0)	242 (24.3)	183 (22.2)	5 (4.0)	69 (19.3)	157 (26.6)	141 (22.8)	139 (20.8)	131 (21.3)	104 (23.0)	108 (30.3)
State School (including grammar)	91 (72.8)	422 (72.1)	614 (70.6)	807 (71.7)	951 (69.4)	805 (66.0)	666 (66.8)	586 (71.1)	89 (71.8)	264 (73.7)	405 (68.5)	454 (73.5)	465 (69.5)	421 (68.5)	304 (67.1)	222 (62.4)
Unknown/Other	30 (24.0)	53 (9.1)	35 (4.02)	34 (3.02)	104 (7.6)	122 (10.0)	89 (8.9)	55 (6.7)	28 (22.6)	25 (7.0)	29 (4.9)	23 (3.7)	65 (9.7)	63 (10.2)	45 (9.9)	26 (5.7)

Ethnicity Level 2 codes, n (% of column total)																
White	94 (75.2)	386 (66.0)	481 (55.3)	680 (60.4)	858 (62.6)	724 (59.3)	626 (62.8)	465 (56.4)	86 (69.4)	206 (57.5)	304 (51.4)	311 (50.3)	353 (52.8)	306 (49.8)	220 (48.6)	172 (48.3)
Not stated	9 (7.2)	18 (3.1)	36 (4.1)	32 (2.8)	29 (2.1)	33 (2.7)	19 (1.9)	20 (2.4)	11 (8.9)	17 (4.7)	27 (4.6)	30 (4.9)	24 (3.6)	26 (4.2)	23 (5.1)	10 (2.8)
Any other ethnic	3 (2.4)	2(3.4)	10 (1.1)	15 (1.3)	19 (1.4)	19 (1.6)	9 (0.9)	4 (0.5)	0 (0)	9 (2.5)	13 (2.2)	17 (2.8)	14 (2.1)	10 (1.6)	8 (1.8)	7 (2.0)
Arab	0 (0)	1 (0.2)	7 (0.8)	12 (1.1)	6 (0.4)	12 (1.0)	7 (0.7)	6 (0.7)	0 (0)	1 (0.3)	3 (0.5)	6 (1.0)	14 (2.1)	11 (1.8)	12 (2.6)	5 (1.4)
Any other black	0 (0)	0 (0)	0 (0)	1 (0.1)	2 (0.1)	1 (0.1)	1 (0.1)	1 (0.1)	1 (0.8)	0 (0)	1 (0.2)	1 (0.2)	0 (0)	0 (0)	0 (0)	0 (0)
African	0 (0)	5 (0.85)	17 (2.0)	33 (2.9)	40 (2.9)	49 (4.01)	36 (3.6)	43 (5.2)	1 (0.8)	9 (2.5)	16 (2.7)	13 (2.1)	25 (3.7)	25 (4.1)	19 (4.2)	17 (4.8)
Caribbean	1 (<0.01)	4 (0.68)	1 (0.1)	3 (0.3)	7 (0.5)	5 (0.41)	3 (0.3)	4 (0.5)	0 (0)	0 (0)	3 (0.5)	3 (0.5)	0 (0)	2 (0.3)	3 (0.7)	2 (0.6)
Any other Asian	0 (0)	17 (0.03)	40 (4.6)	40 (3.6)	63 (4.6)	44 (3.6)	43 (4.3)	26 (3.2)	6 (4.8)	14 (3.9)	31 (5.2)	32 (5.2)	39 (5.8)	33 (5.4)	30 (6.6)	17 (4.8)
Bangladeshi	1 (<0.01)	8 (1.4)	21 (2.4)	17 (1.5)	19 (1.4)	15 (1.2)	19 (1.9)	22 (2.7)	0 (0)	2 (0.6)	8 (1.4)	18 (2.9)	9 (1.3)	13 (2.1)	7 (1.5)	10 (2.8)
Pakistani	2 (1.6)	38 (6.5)	57 (6.6)	87 (7.7)	92 (6.7)	91 (7.5)	67 (6.7)	64 (7.8)	5 (4.0)	20 (5.6)	42 (7.1)	62 (10.0)	56 (8.4)	57 (9.3)	44 (9.7)	28 (7.9)
Indian	7 (5.6)	70 (12.0)	140 (16.1)	126 (11.2)	159 (11.6)	138 (11.3)	107 (10.7)	120 (14.6)	4 (3.2)	41 (11.5)	85 (14.4)	76 (12.3)	77 (11.5)	89 (14.5)	56 (12.4)	56 (15.7)
Any other mixed group	1 (<0.01)	2 (0.34)	7 (0.8)	12 (1.1)	17 (1.2)	21 (1.7)	8 (0.8)	11 (1.3)	1 (0.8)	6 (1.7)	9 (1.5)	7 (1.1)	13 (1.9)	8 (1.3)	6 (1.3)	3 (0.8)
White and Asian	3 (2.4)	9 (0.02)	13 (1.5)	21 (1.9)	24 (1.8)	20 (1.6)	15 (1.5)	17 (2.1)	2 (1.6)	8 (2.2)	8 (1.4)	10 (1.6)	7 (1.04)	10 (1.6)	5 (1.1)	8 (2.2)
White and Black African	0 (0)	1 (0.2)	3 (0.3)	1 (0.1)	6 (0.4)	3 (0.2)	2 (0.2)	0 (0)	0 (0)	1 (0.3)	0 (0)	2 (0.3)	1 (0.1)	2 (0.3)	2 (0.4)	3 (0.8)
White and Black Caribbean	1 (<0.01)	2 (0.34)	0 (0)	6 (0.5)	1 (0.1)	8 (0.7)	4 (0.4)	2 (0.2)	0 (0)	2 (0.6)	1 (0.2)	3 (0.5)	3 (0.4)	1 (0.2)	2 (0.4)	1 (0.3)
Any other White	3 (2.4)	11 (1.88)	16 (1.8)	20 (1.8)	17 (1.2)	20 (1.6)	15 (1.5)	4 (0.5)	3 (2.4)	12 (3.4)	18 (3.0)	13 (2.1)	15 (2.2)	9 (1.5)	9 (2.0)	9 (2.5)
Irish	0 (0)	3 (0.51)	2 (0.2)	5 (0.4)	6 (0.4)	5 (0.4)	5 (0.5)	5 (0.6)	2 (1.6)	1 (0.3)	4 (0.7)	5 (0.8)	4 (0.6)	1 (0.2)	1 (0.2)	1 (0.3)
Chinese	0 (0)	8 (1.4)	19 (2.2)	15 (1.3)	6 (0.4)	12 (1.0)	11 (1.1)	10 (1.2)	2 (1.6)	9 (2.5)	18 (3.04)	9 (1.5)	15 (2.2)	12 (2.0)	6 (1.3)	7 (2.0)
Ethnicity Level 1 codes, n (% of column total)																
Not stated	9 (7.2)	18 (3.1)	36 (4.1)	32 (2.8)	29 (2.1)	33 (2.7)	19 (1.91)	20 (2.4)	11 (8.9)	17 (4.7)	27 (4.6)	30 (4.9)	24 (3.6)	26 (4.2)	23 (5.1)	10 (2.8)
Any other ethnic group	3 (2.4)	3 (0.5)	17 (2.0)	27 (2.4)	25 (1.8)	31 (2.5)	16 (1.6)	10 (1.2)	0 (0)	10 (2.8)	16 (2.7)	23 (3.7)	28 (4.2)	21 (3.4)	20 (4.4)	12 (3.4)
Black or Black British	1 (<0.01)	9 (1.5)	18 (2.3)	37 (3.3)	49 (3.6)	55 (4.5)	40 (4.01)	48 (5.8)	2 (1.6)	9 (2.5)	20 (3.4)	17 (2.8)	25 (3.7)	27 (4.4)	22 (4.9)	19 (5.3)
Asian or Asian British	10 (0.08)	141 (24.0)	277 (35.5)	285 (25.3)	339 (28.4)	300 (24.6)	247 (24.8)	242 (29.4)	17 (13.7)	86 (24.0)	184 (31.1)	197 (31.9)	196 (29.3)	204 (33.2)	143 (31.6)	118 (33.1)
Mixed	5 (0.04)	14 (2.4)	23 (2.9)	40 (3.6)	48 (3.5)	52 (4.3)	29 (2.9)	30 (3.6)	3 (2.4)	17 (4.7)	18 (3.0)	22 (3.6)	24 (3.6)	21 (3.4)	15 (3.3)	15 (4.2)
White	97 (78.0)	400 (68.4)	499 (64.0)	705 (62.6)	881 (64.3)	749 (61.4)	646 (64.8)	474 (57.5)	91 (73.4)	219 (61.2)	326 (55.2)	329 (53.2)	372 (55.6)	316 (51.4)	230 (0.5)	182 (51.1)
Sexual Orientation																
Bisexual	0 (0)	1 (0.2)	2 (0.2)	5 (0.4)	11 (0.8)	12 (1)	8 (0.8)	13 (1.6)	0 (0)	2 (0.6)	3 (0.5)	3 (0.5)	2 (0.3)	5 (0.8)	6 (1.3)	3 (0.8)
Heterosexual/Straight	87 (69.6)	371 (63.4)	603 (69.3)	834 (74.1)	1015 (74)	902 (73.9)	796 (79.8)	661 (80.2)	65 (52.4)	243 (67.9)	399 (67.5)	410 (66.3)	462 (69.1)	434 (70.6)	331 (73.1)	285 (80.1)
Lesbian/Gay	1 (0.8)	8 (1.4)	14 (1.6)	19 (1.7)	18 (1.3)	28 (2.3)	20 (2)	25 (3)	0 (0)	4 (1.1)	5 (0.8)	14 (2.3)	13 (1.9)	9 (1.5)	16 (3.5)	12 (3.4)
Other	0 (0)	0 (0)	1 (0.1)	1 (0.1)	3 (0.2)	6 (0.5)	1 (0.1)	3 (0.4)	1 (0.8)	0 (0)	1 (0.2)	1 (0.2)	1 (0.1)	1 (0.2)	1 (0.2)	1 (0.3)
Prefer not to say	11 (8.8)	54 (9.2)	75 (8.6)	109 (9.7)	145 (10.6)	112 (9.2)	87 (8.7)	78 (9.5)	19 (15.3)	33 (9.2)	75 (12.7)	87 (14.1)	88 (13.2)	81 (13.2)	48 (10.6)	38 (10.7)
Unknown	26 (20.8)	151 (25.8)	175 (20.1)	158 (14)	179 (13.1)	160 (13.1)	85 (8.5)	44 (5.3)	39 (31.5)	76 (21.2)	108 (18.3)	103 (16.7)	103 (15.4)	85 (13.8)	51 (11.3)	17 (4.8)

Religion																
Buddhist	0 (0)	1 (0.2)	6 (0.7)	7 (0.6)	8 (0.6)	6 (0.5)	7 (0.2)	2 (0.2)	0	3 (0.8)	1 (0.2)	6 (1.0)	3 (0.45)	2 (0.3)	4 (0.9)	2 (0.6)
Christian	39 (31.2)	147 (25.1)	187 (21.5)	269 (23.9)	335 (24.4)	298 (24.4)	242 (24.3)	178 (21.6)	19 (15.3)	91 (25.4)	130 (22.0)	130 (21.0)	144 (21.5)	135 (22.0)	89 (19.6)	92 (25.8)
Hindu	4 (3.2)	20 (3.4)	63 (7.2)	65 (5.8)	75 (5.5)	67 (5.5)	54 (5.4)	62 (7.5)	2 (1.6)	19 (5.3)	38 (6.4)	34 (5.5)	39 (5.8)	43 (7.0)	30 (6.6)	22 (6.2)
Jewish	0	3 (0.5)	1 (0.1)	10 (0.9)	8 (0.6)	2 (0.2)	4 (0.4)	2 (0.2)	0	3 (0.8)	0	4 (0.6)	5 (0.7)	2 (0.3)	3 (0.7)	1 (0.3)
Muslim	4 (3.2)	47 (8.0)	88 (10.1)	117 (10.4)	109 (8.0)	117 (9.6)	95 (9.5)	111 (13.5)	8 (6.5)	30 (8.4)	64 (10.8)	69 (11.1)	69 (10.3)	87 (14.1)	63 (13.9)	54 (15.2)
No religion	36 (28.8)	151 (25.8)	238 (27.4)	365 (32.4)	453 (33.0)	411 (33.7)	381 (38.2)	312 (37.9)	37 (29.8)	85 (23.7)	153 (25.9)	171 (27.7)	210 (0.3)	161 (26.2)	150 (33.1)	120 (33.7)
Sikh	1 (0.8)	9 (1.5)	20 (2.3)	12 (1.1)	28 (2.0)	27 (2.2)	17 (1.7)	18 (2.2)	0	11 (3.1)	10 (1.7)	11 (1.8)	7 (0.01)	10 (1.6)	7 (1.5)	8 (2.2)
Other	2 (1.6)	6 (0.01)	4 (0.5)	9 (0.8)	13 (1.0)	15 (1.2)	13 (1.3)	9 (1.1)	2 (1.6)	8 (2.2)	8 (1.4)	10 (1.6)	7 (0.01)	5 (0.8)	2 (0.4)	3 (0.8)
Prefer not to say	13 (10.4)	50 (8.6)	88 (10.1)	114 (10.1)	163 (0.1)	117 (9.6)	99 (9.9)	86 (10.4)	17 (13.7)	32 (8.9)	79 (13.4)	80 (12.9)	82 (0.1)	85 (13.8)	54 (11.9)	37 (0.1)
Undisclosed	26 (20.8)	151 (25.8)	175 (20.1)	158 (14.0)	179 (0.1)	160 (0.13)	85 (8.5)	44 (5.3)	39 (31.5)	76 (21.2)	108 (18.3)	103 (16.7)	103 (0.2)	85 (13.8)	51 (11.3)	17 (4.8)
Disability																
Declared disability	3 (2.4)	25 (4.3)	59 (6.8)	72 (6.4)	93 (6.8)	89 (7.3)	90 (9)	82 (10)	7 (5.6)	19 (5.3)	44 (7.4)	48 (7.8)	48 (7.2)	45 (7.3)	52 (11.5)	46 (12.9)
No disability declared	114 (91.2)	520 (88.9)	763 (87.7)	985 (87.5)	1204 (87.8)	966 (79.2)	815 (81.7)	672 (81.6)	103 (83.1)	317 (88.5)	502 (84.9)	513 (83)	557 (83.3)	471 (76.6)	346 (76.4)	269 (75.6)
Prefer not to say	8 (6.4)	40 (6.8)	48 (5.5)	69 (6.1)	74 (5.4)	74 (6.1)	45 (4.5)	42 (5.1)	14 (11.3)	22 (6.1)	45 (7.6)	56 (9.1)	62 (9.3)	51 (8.3)	24 (5.3)	27 (7.6)
Not stated	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	91 (7.5)	47 (4.7)	28 (3.4)	0 (0)	0 (0)	0 (0)	1 (0.2)	2 (0.3)	48 (7.8)	31 (6.8)	14 (3.9)
Free School Meals																
Free School Meals	14 (11.2)	52 (8.9)	75 (8.6)	104 (9.2)	32 (2.3)	11 (0.9)	6 (0.6)	2 (0.2)	10 (8.1)	40 (11.2)	62 (10.5)	62 (10)	28 (4.2)	3 (0.5)	1 (0.2)	1 (0.3)
Not on Free School Meals	96 (76.8)	485 (82.9)	700 (80.5)	919 (81.6)	387 (28.2)	147 (12)	51 (5.1)	15 (1.8)	91 (73.4)	286 (79.9)	463 (78.3)	496 (80.3)	163 (24.4)	56 (9.1)	19 (4.2)	3 (0.8)
Unknown/Prefer Not to Say																
Parental Education																
Parent Degree	66 (52.8)	314 (53.7)	511 (58.7)	669 (59.4)	307 (22.4)	108 (8.9)	45 (4.5)	11 (1.3)	62 (50)	203 (56.7)	356 (60.2)	365 (59.1)	135 (20.2)	51 (8.3)	10 (2.2)	2 (0.6)
No parent degree	48 (38.4)	236 (40.3)	306 (35.2)	391 (34.7)	125 (9.1)	53 (4.3)	17 (1.7)	7 (0.8)	48 (38.7)	127 (35.5)	192 (32.5)	214 (34.6)	62 (9.3)	10 (1.6)	10 (2.2)	2 (0.6)
Unknown/Prefer Not to Say																
Income Support																
Income Support	21 (16.8)	94 (16.1)	112 (12.9)	168 (14.9)	52 (3.8)	20 (1.6)	9 (0.9)	2 (0.2)	14 (11.3)	51 (14.2)	85 (14.4)	108 (17.5)	46 (6.9)	6 (1)	3 (0.7)	1 (0.3)
No Income Support	89 (71.2)	412 (70.4)	630 (72.4)	806 (71.6)	354 (25.8)	132 (10.8)	49 (4.9)	12 (1.5)	90 (72.6)	262 (73.2)	417 (70.6)	423 (68.4)	136 (20.3)	50 (8.1)	17 (3.8)	3 (0.8)
Unknown/Prefer not to say																

Deprivation																
Index of Multiple Deprivation																
1ST Quintile (most deprived)	6 (4.8)	66 (11.3)	89 (10.2)	124 (11)	133 (9.7)	129 (10.6)	96 (9.6)	74 (9)	14 (11.3)	40 (11.2)	69 (11.7)	69 (11.2)	77 (11.5)	79 (12.8)	63 (13.9)	48 (13.5)
2nd Quintile	22 (17.6)	78 (13.3)	107 (12.3)	171 (15.2)	175 (12.8)	153 (12.5)	134 (13.4)	117 (14.2)	19 (15.3)	56 (15.6)	78 (13.2)	103 (16.7)	118 (17.6)	96 (15.6)	79 (17.4)	44 (12.4)
3rd Quintile	31 (24.8)	105 (17.9)	173 (19.9)	200 (17.8)	283 (20.6)	213 (17.5)	187 (18.8)	143 (17.4)	21 (16.9)	62 (17.3)	123 (20.8)	134 (21.7)	125 (18.7)	120 (19.5)	79 (17.4)	57 (16)
4th Quintile	24 (19.2)	144 (24.6)	228 (26.2)	270 (24)	327 (23.9)	318 (26.1)	235 (23.6)	202 (24.5)	36 (29)	94 (26.3)	144 (24.4)	129 (20.9)	140 (20.9)	134 (21.8)	88 (19.4)	86 (24.2)
5th Quintile (least deprived)	42 (33.6)	192 (32.8)	269 (30.9)	357 (31.7)	451 (32.9)	403 (33)	344 (34.5)	288 (35)	34 (27.4)	105 (29.3)	177 (29.9)	182 (29.4)	208 (31.1)	186 (30.2)	144 (31.8)	120 (33.7)
Unknown																
Education Deprivation																
1ST Quintile (most deprived)	4 (3.2)	49 (8.4)	44 (5.1)	91 (8.1)	76 (5.5)	80 (6.6)	73 (7.3)	53 (6.4)	11 (8.9)	25 (7)	39 (6.6)	42 (6.8)	55 (8.2)	48 (7.8)	37 (8.2)	28 (7.9)
2nd Quintile	12 (9.6)	60 (10.3)	98 (11.3)	103 (9.1)	146 (10.6)	117 (9.6)	110 (11)	67 (8.1)	13 (10.5)	40 (11.2)	60 (10.2)	66 (10.7)	79 (11.8)	75 (12.2)	52 (11.5)	32 (9)
3rd Quintile	21 (16.8)	85 (14.5)	149 (17.1)	177 (15.7)	233 (17)	180 (14.8)	135 (13.5)	134 (16.3)	14 (11.3)	68 (19)	108 (18.3)	115 (18.6)	91 (13.6)	94 (15.3)	74 (16.3)	52 (14.6)
4th Quintile	28 (22.4)	140 (23.9)	193 (22.2)	252 (22.4)	312 (22.8)	305 (25)	230 (23.1)	196 (23.8)	29 (23.4)	81 (22.6)	148 (25)	130 (21)	155 (23.2)	136 (22.1)	92 (20.3)	76 (21.3)
5th Quintile (least deprived)	60 (48)	251 (42.9)	382 (43.9)	499 (44.3)	602 (43.9)	534 (43.8)	448 (44.9)	374 (45.4)	57 (46)	143 (39.9)	236 (39.9)	264 (42.7)	288 (43)	262 (42.6)	198 (43.7)	167 (46.9)
Unknown																
Children and Young People's Deprivation																
1ST Quintile (most deprived)	6 (4.8)	42 (7.2)	48 (5.5)	103 (9.1)	160 (11.7)	190 (15.6)	170 (17.1)	153 (18.6)	11 (8.9)	28 (7.8)	35 (5.9)	54 (8.7)	78 (11.7)	96 (15.6)	90 (19.9)	58 (16.3)
2nd Quintile	15 (12)	75 (12.8)	105 (12.1)	132 (11.7)	213 (15.5)	196 (16.1)	183 (18.4)	160 (19.4)	19 (15.3)	53 (14.8)	77 (13)	85 (13.8)	103 (15.4)	101 (16.4)	50 (11)	62 (17.4)
3rd Quintile	20 (16)	85 (14.5)	138 (15.9)	157 (13.9)	237 (17.3)	244 (20)	220 (22.1)	172 (20.9)	13 (10.5)	61 (17)	113 (19.1)	107 (17.3)	104 (15.5)	111 (18)	96 (21.2)	74 (20.8)
4th Quintile	30 (24)	138 (23.6)	201 (23.1)	271 (24.1)	298 (21.7)	263 (21.6)	215 (21.6)	164 (19.9)	31 (25)	73 (20.4)	129 (21.8)	123 (19.9)	153 (22.9)	133 (21.6)	100 (22.1)	71 (19.9)
5th Quintile (least deprived)	54 (43.2)	245 (41.9)	374 (43)	459 (40.8)	461 (33.6)	323 (26.5)	208 (20.9)	175 (21.2)	50 (40.3)	142 (39.7)	237 (40.1)	248 (40.1)	230 (34.4)	174 (28.3)	117 (25.8)	90 (25.3)
Unknown																
Adult Skills Deprivation																
1ST Quintile (most deprived)	3 (2.4)	51 (8.7)	50 (5.7)	115 (10.2)	157 (11.5)	190 (15.6)	170 (17.1)	152 (18.4)	11 (8.9)	24 (6.7)	40 (6.8)	55 (8.9)	74 (11.1)	97 (15.8)	87 (19.2)	58 (16.3)

2nd Quintile	12 (9.6)	63 (10.8)	105 (12.1)	124 (11)	214 (15.6)	191 (15.7)	180 (18.1)	158 (19.2)	9 (7.3)	37 (10.3)	61 (10.3)	67 (10.8)	101 (15.1)	91 (14.8)	51 (11.3)	61 (17.1)
3rd Quintile	17 (13.6)	91 (15.6)	147 (16.9)	175 (15.5)	257 (18.7)	236 (19.3)	216 (21.7)	174 (21.1)	14 (11.3)	63 (17.6)	108 (18.3)	105 (17)	110 (16.4)	110 (17.9)	104 (23)	71 (19.9)
4th Quintile	33 (26.4)	148 (25.3)	225 (25.9)	279 (24.8)	308 (22.5)	280 (23)	217 (21.8)	173 (21)	29 (23.4)	91 (25.4)	153 (25.9)	165 (26.7)	141 (21.1)	143 (23.3)	99 (21.9)	74 (20.8)
5th Quintile (least deprived)	60 (48)	232 (39.7)	339 (39)	429 (38.1)	433 (31.6)	319 (26.1)	213 (21.4)	167 (20.3)	61 (49.2)	142 (39.7)	229 (38.7)	225 (36.4)	242 (36.2)	174 (28.3)	112 (24.7)	91 (25.6)
Unknown																
Barriers to Housing and Services																
1ST Quintile (most deprived)	29 (23.2)	167 (28.5)	239 (27.5)	298 (26.5)	346 (25.2)	325 (26.6)	281 (28.2)	206 (25)	33 (26.6)	99 (27.7)	175 (29.6)	160 (25.9)	173 (25.9)	171 (27.8)	134 (29.6)	107 (30.1)
2nd Quintile	29 (23.2)	138 (23.6)	216 (24.8)	265 (23.5)	326 (23.8)	263 (21.6)	224 (22.5)	198 (24)	33 (26.6)	80 (22.3)	136 (23)	148 (23.9)	154 (23)	129 (21)	118 (26)	79 (22.2)
3rd Quintile	25 (20)	101 (17.3)	149 (17.1)	200 (17.8)	276 (20.1)	230 (18.9)	161 (16.1)	173 (21)	22 (17.7)	72 (20.1)	114 (19.3)	113 (18.3)	135 (20.2)	108 (17.6)	84 (18.5)	71 (19.9)
4th Quintile	22 (17.6)	94 (16.1)	131 (15.1)	186 (16.5)	224 (16.3)	222 (18.2)	174 (17.5)	135 (16.4)	23 (18.5)	57 (15.9)	92 (15.6)	95 (15.4)	120 (17.9)	112 (18.2)	70 (15.5)	48 (13.5)
5th Quintile (least deprived)	20 (16)	85 (14.5)	131 (15.1)	173 (15.4)	197 (14.4)	176 (14.4)	156 (15.6)	112 (13.6)	13 (10.5)	49 (13.7)	74 (12.5)	101 (16.3)	86 (12.9)	95 (15.4)	47 (10.4)	50 (14)
Unknown																
Geographical Barriers																
1ST Quintile (most deprived)	29 (23.2)	190 (32.5)	265 (30.5)	294 (26.1)	313 (22.8)	281 (23)	206 (20.7)	159 (19.3)	31 (25)	98 (27.4)	177 (29.9)	132 (21.4)	157 (23.5)	148 (24.1)	142 (31.3)	87 (24.4)
2nd Quintile	23 (18.4)	121 (20.7)	170 (19.5)	231 (20.5)	262 (19.1)	166 (13.6)	166 (16.6)	140 (17)	18 (14.5)	66 (18.4)	117 (19.8)	140 (22.7)	158 (23.6)	129 (21)	90 (19.9)	73 (20.5)
3rd Quintile	18 (14.4)	96 (16.4)	136 (15.6)	194 (17.2)	257 (18.7)	180 (14.8)	180 (18.1)	159 (19.3)	22 (17.7)	76 (21.2)	108 (18.3)	108 (17.5)	132 (19.7)	111 (18)	71 (15.7)	61 (17.1)
4th Quintile	23 (18.4)	88 (15)	143 (16.4)	196 (17.4)	267 (19.5)	196 (16.1)	196 (19.7)	146 (17.7)	15 (12.1)	49 (13.7)	96 (16.2)	111 (18)	105 (15.7)	113 (18.4)	76 (16.8)	65 (18.3)
5th Quintile (least deprived)	32 (25.6)	90 (15.4)	152 (17.5)	207 (18.4)	270 (19.7)	248 (20.3)	248 (24.9)	220 (26.7)	38 (30.6)	68 (19)	93 (15.7)	126 (20.4)	116 (17.3)	114 (18.5)	74 (16.3)	69 (19.4)
Unknown																
Wider Barriers to Housing and Services																
1ST Quintile (most deprived)	37 (29.6)	133 (22.7)	209 (24)	262 (23.3)	321 (23.4)	248 (20.3)	231 (23.2)	189 (22.9)	40 (32.3)	88 (24.6)	158 (26.7)	177 (28.6)	166 (24.8)	130 (21.1)	81 (17.9)	75 (21.1)
2nd Quintile	17 (13.6)	75 (12.8)	135 (15.5)	191 (17)	259 (18.9)	259 (21.2)	192 (19.3)	155 (18.8)	29 (23.4)	60 (16.8)	87 (14.7)	111 (18)	122 (18.2)	122 (19.8)	85 (18.8)	58 (16.3)
3rd Quintile	21 (16.8)	113 (19.3)	163 (18.7)	189 (16.8)	250 (18.2)	247 (20.2)	182 (18.3)	169 (20.5)	17 (13.7)	61 (17)	100 (16.9)	117 (18.9)	129 (19.3)	111 (18)	89 (19.6)	64 (18)

4th Quintile	19 (15.2)	104 (17.8)	159 (18.3)	212 (18.8)	258 (18.8)	212 (17.4)	193 (19.4)	150 (18.2)	13 (10.5)	72 (20.1)	107 (18.1)	101 (16.3)	116 (17.3)	120 (19.5)	89 (19.6)	81 (22.8)
5th Quintile (least deprived)	31 (24.8)	160 (27.4)	200 (23)	268 (23.8)	281 (20.5)	250 (20.5)	198 (19.9)	161 (19.5)	25 (20.2)	76 (21.2)	139 (23.5)	111 (18)	135 (20.2)	132 (21.5)	109 (24.1)	77 (21.6)
Unknown																
Living Environment																
1ST Quintile (most deprived)	37 (29.6)	130 (22.2)	232 (26.7)	298 (26.5)	326 (23.8)	222 (18.2)	157 (15.7)	138 (16.7)	35 (28.2)	101 (28.2)	161 (27.2)	200 (32.4)	199 (29.7)	153 (24.9)	90 (19.9)	71 (19.9)
2nd Quintile	12 (9.6)	104 (17.8)	158 (18.2)	191 (17)	242 (17.7)	217 (17.8)	197 (19.8)	152 (18.4)	17 (13.7)	67 (18.7)	116 (19.6)	129 (20.9)	112 (16.7)	106 (17.2)	96 (21.2)	65 (18.3)
3rd Quintile	24 (19.2)	122 (20.9)	146 (16.8)	231 (20.5)	250 (18.2)	242 (19.8)	206 (20.7)	173 (21)	30 (24.2)	64 (17.9)	106 (17.9)	101 (16.3)	131 (19.6)	115 (18.7)	80 (17.7)	58 (16.3)
4th Quintile	21 (16.8)	117 (20)	145 (16.7)	214 (19)	276 (20.1)	246 (20.2)	209 (21)	143 (17.4)	16 (12.9)	50 (14)	105 (17.8)	91 (14.7)	113 (16.9)	116 (18.9)	98 (21.6)	76 (21.3)
5th Quintile (least deprived)	31 (24.8)	112 (19.1)	185 (21.3)	188 (16.7)	275 (20.1)	289 (23.7)	227 (22.8)	218 (26.5)	26 (21)	75 (20.9)	103 (17.4)	96 (15.5)	113 (16.9)	125 (20.3)	89 (19.6)	85 (23.9)
Unknown																
Indoor Deprivation																
1ST Quintile (most deprived)	37 (29.6)	130 (22.2)	232 (26.7)	292 (25.9)	328 (23.9)	219 (18)	157 (15.7)	139 (16.9)	35 (28.2)	101 (28.2)	161 (27.2)	199 (32.2)	189 (28.3)	138 (22.4)	73 (16.1)	60 (16.9)
2nd Quintile	12 (9.6)	104 (17.8)	158 (18.2)	203 (18)	245 (17.9)	226 (18.5)	207 (20.8)	154 (18.7)	17 (13.7)	67 (18.7)	116 (19.6)	126 (20.4)	108 (16.1)	108 (17.6)	93 (20.5)	61 (17.1)
3rd Quintile	24 (19.2)	122 (20.9)	146 (16.8)	230 (20.4)	254 (18.5)	236 (19.3)	203 (20.4)	154 (18.7)	30 (24.2)	64 (17.9)	105 (17.8)	99 (16)	145 (21.7)	123 (20)	101 (22.3)	59 (16.6)
4th Quintile	21 (16.8)	117 (20)	145 (16.7)	212 (18.8)	260 (19)	248 (20.3)	194 (19.5)	169 (20.5)	16 (12.9)	50 (14)	106 (17.9)	96 (15.5)	109 (16.3)	110 (17.9)	87 (19.2)	82 (23)
5th Quintile (least deprived)	31 (24.8)	112 (19.1)	185 (21.3)	185 (16.4)	282 (20.6)	287 (23.5)	235 (23.6)	208 (25.2)	26 (21)	75 (20.9)	103 (17.4)	97 (15.7)	117 (17.5)	136 (22.1)	99 (21.9)	93 (26.1)
Unknown																
Outdoor Deprivation																
1ST Quintile (most deprived)	37 (29.6)	130 (22.2)	232 (26.7)	304 (27)	340 (24.8)	259 (21.2)	195 (19.6)	167 (20.3)	35 (28.2)	101 (28.2)	162 (27.4)	206 (33.3)	214 (32)	172 (28)	133 (29.4)	90 (25.3)
2nd Quintile	12 (9.6)	104 (17.8)	158 (18.2)	196 (17.4)	236 (17.2)	197 (16.1)	167 (16.8)	133 (16.1)	17 (13.7)	67 (18.7)	116 (19.6)	124 (20.1)	106 (15.8)	117 (19)	84 (18.5)	70 (19.7)
3rd Quintile	24 (19.2)	122 (20.9)	146 (16.8)	215 (19.1)	248 (18.1)	229 (18.8)	174 (17.5)	160 (19.4)	30 (24.2)	64 (17.9)	105 (17.8)	99 (16)	126 (18.8)	113 (18.4)	76 (16.8)	59 (16.6)
4th Quintile	21 (16.8)	117 (20)	145 (16.7)	218 (19.4)	274 (20)	248 (20.3)	210 (21.1)	145 (17.6)	16 (12.9)	50 (14)	105 (17.8)	94 (15.2)	118 (17.6)	109 (17.7)	79 (17.4)	67 (18.8)
5th Quintile (least deprived)	31 (24.8)	112 (19.1)	185 (21.3)	189 (16.8)	271 (19.8)	283 (23.2)	250 (25.1)	219 (26.6)	26 (21)	75 (20.9)	103 (17.4)	94 (15.2)	104 (15.5)	104 (16.9)	81 (17.9)	69 (19.4)
Unknown																

Income Deprivation																
1ST Quintile (most deprived)	10 (8)	77 (13.2)	100 (11.5)	149 (13.2)	144 (10.5)	144 (11.8)	114 (11.4)	99 (12)	16 (12.9)	48 (13.4)	81 (13.7)	83 (13.4)	100 (14.9)	88 (14.3)	70 (15.5)	46 (12.9)
2nd Quintile	24 (19.2)	64 (10.9)	114 (13.1)	141 (12.5)	187 (13.6)	154 (12.6)	128 (12.8)	106 (12.9)	19 (15.3)	43 (12)	73 (12.4)	106 (17.2)	115 (17.2)	96 (15.6)	78 (17.2)	39 (11)
3rd Quintile	24 (19.2)	87 (14.9)	134 (15.4)	182 (16.2)	211 (15.4)	156 (12.8)	144 (14.4)	119 (14.4)	14 (11.3)	56 (15.6)	103 (17.4)	121 (19.6)	95 (14.2)	94 (15.3)	66 (14.6)	62 (17.4)
4th Quintile	31 (24.8)	155 (26.5)	243 (27.9)	292 (25.9)	377 (27.5)	344 (28.2)	252 (25.3)	218 (26.5)	35 (28.2)	104 (29.1)	165 (27.9)	126 (20.4)	165 (24.7)	139 (22.6)	96 (21.2)	83 (23.3)
5th Quintile (least deprived)	36 (28.8)	202 (34.5)	275 (31.6)	358 (31.8)	450 (32.8)	418 (34.3)	358 (35.9)	282 (34.2)	40 (32.3)	106 (29.6)	169 (28.6)	181 (29.3)	193 (28.8)	198 (32.2)	143 (31.6)	125 (35.1)
Unknown																
Employment Deprivation																
1ST Quintile (most deprived)	6 (4.8)	72 (12.3)	83 (9.5)	118 (10.5)	116 (8.5)	114 (9.3)	93 (9.3)	68 (8.3)	11 (8.9)	39 (10.9)	68 (11.5)	63 (10.2)	69 (10.3)	68 (11.1)	54 (11.9)	41 (11.5)
2nd Quintile	21 (16.8)	80 (13.7)	117 (13.4)	176 (15.6)	189 (13.8)	143 (11.7)	112 (11.2)	94 (11.4)	23 (18.5)	58 (16.2)	92 (15.6)	102 (16.5)	102 (15.2)	93 (15.1)	60 (13.2)	30 (8.4)
3rd Quintile	28 (22.4)	112 (19.1)	185 (21.3)	223 (19.8)	278 (20.3)	218 (17.9)	158 (15.8)	135 (16.4)	21 (16.9)	75 (20.9)	139 (23.5)	149 (24.1)	125 (18.7)	93 (15.1)	74 (16.3)	49 (13.8)
4th Quintile	32 (25.6)	155 (26.5)	251 (28.9)	279 (24.8)	317 (23.1)	255 (20.9)	213 (21.4)	163 (19.8)	27 (21.8)	90 (25.1)	134 (22.7)	150 (24.3)	146 (21.8)	123 (20)	87 (19.2)	79 (22.2)
5th Quintile (least deprived)	38 (30.4)	166 (28.4)	230 (26.4)	326 (29)	469 (34.2)	486 (39.8)	420 (42.1)	364 (44.2)	42 (33.9)	95 (26.5)	158 (26.7)	153 (24.8)	226 (33.8)	238 (38.7)	178 (39.3)	156 (43.8)
Unknown																
Health and Disability																
1ST Quintile (most deprived)	9 (7.2)	66 (11.3)	91 (10.5)	131 (11.6)	125 (9.1)	126 (10.3)	92 (9.2)	76 (9.2)	13 (10.5)	41 (11.5)	67 (11.3)	67 (10.8)	79 (11.8)	70 (11.4)	51 (11.3)	42 (11.8)
2nd Quintile	20 (16)	88 (15)	105 (12.1)	152 (13.5)	202 (14.7)	187 (15.3)	138 (13.8)	110 (13.3)	19 (15.3)	59 (16.5)	100 (16.9)	95 (15.4)	105 (15.7)	117 (19)	72 (15.9)	48 (13.5)
3rd Quintile	26 (20.8)	100 (17.1)	163 (18.7)	226 (20.1)	272 (19.8)	221 (18.1)	186 (18.7)	139 (16.9)	21 (16.9)	66 (18.4)	105 (17.8)	142 (23)	124 (18.5)	89 (14.5)	74 (16.3)	57 (16)
4th Quintile	28 (22.4)	140 (23.9)	217 (24.9)	274 (24.3)	334 (24.4)	268 (22)	262 (26.3)	232 (28.2)	25 (20.2)	80 (22.3)	141 (23.9)	131 (21.2)	157 (23.5)	145 (23.6)	100 (22.1)	70 (19.7)
5th Quintile (least deprived)	42 (33.6)	191 (32.6)	290 (33.3)	339 (30.1)	436 (31.8)	414 (33.9)	318 (31.9)	267 (32.4)	46 (37.1)	111 (31)	178 (30.1)	182 (29.4)	203 (30.3)	194 (31.5)	156 (34.4)	138 (38.8)
Unknown																
Crime																
1ST Quintile (most deprived)	26 (20.8)	82 (14)	119 (13.7)	161 (14.3)	171 (12.5)	195 (16)	142 (14.2)	119 (14.4)	24 (19.4)	55 (15.4)	97 (16.4)	97 (15.7)	111 (16.6)	118 (19.2)	75 (16.6)	62 (17.4)

2nd Quintile	20 (16)	100 (17.1)	150 (17.2)	199 (17.7)	222 (16.2)	193 (15.8)	157 (15.7)	136 (16.5)	22 (17.7)	65 (18.2)	88 (14.9)	112 (18.1)	135 (20.2)	116 (18.9)	80 (17.7)	69 (19.4)
3rd Quintile	24 (19.2)	102 (17.4)	150 (17.2)	231 (20.5)	306 (22.3)	232 (19)	156 (15.6)	153 (18.6)	24 (19.4)	77 (21.5)	118 (20)	122 (19.7)	125 (18.7)	115 (18.7)	98 (21.6)	69 (19.4)
4th Quintile	27 (21.6)	137 (23.4)	214 (24.6)	236 (21)	293 (21.4)	265 (21.7)	243 (24.4)	184 (22.3)	31 (25)	84 (23.5)	147 (24.9)	155 (25.1)	166 (24.8)	126 (20.5)	100 (22.1)	73 (20.5)
5th Quintile (least deprived)	28 (22.4)	164 (28)	233 (26.8)	295 (26.2)	377 (27.5)	331 (27.1)	298 (29.9)	232 (28.2)	23 (18.5)	76 (21.2)	141 (23.9)	131 (21.2)	131 (19.6)	140 (22.8)	100 (22.1)	82 (23)
Unknown																
Mean Deprivation Score																
Overall Index of Multiple Deprivation Score	16.34 (13.74)	16.34 (13.74)	15.91 (12.54)	16.58 (13.51)	15.68 (12.55)	15.93 (13.17)	15.83 (12.93)	15.41 (12.17)	15.87 (11.53)	16.53 (13.57)	16.40 (13.25)	16.79 (13.43)	16.24 (13.01)	16.42 (13.35)	16.43 (13.38)	15.82 (12.92)
Education Skills Deprivation Score	12.54 (14.04)	12.54 (14.04)	11.54 (12.43)	12.17 (13.75)	11.55 (12.90)	11.57 (13.19)	12.07 (13.76)	11.27 (12.50)	10.94 (12.38)	12.46 (13.45)	11.89 (12.99)	12.22 (13.56)	11.88 (13.22)	12.00 (13.56)	12.32 (13.98)	11.56 (13.24)
Children and Young People's Deprivation score	11.99 (14.07)	11.99 (14.07)	11.16 (12.77)	12.70 (14.96)	15.70 (17.22)	18.49 (19.14)	20.27 (19.32)	20.79 (19.57)	11.98 (14.24)	12.34 (13..97)	11.58 (13.22)	12.92 (15.05)	15.60 (17.19)	18.39 (19.12)	20.03 (19.56)	20.39 (19.60)
Adult Skills Deprivation Score	13.09 (16.31)	13.09 (16.31)	11.92 (14.05)	14.00 (17.10)	16.05 (17.39)	18.44 (19.19)	20.27 (19.66)	20.82 (19.57)	9.90 (12.60)	12.58 (15.30)	12.18 (14.69)	13.80 (16.73)	15.71 (17.19)	18.25 (19.12)	20.02 (19.75)	20.38 (19.63)
Barriers to Housing and Services Deprivation Score	24.50 (11.51)	24.50 (11.51)	24.44 (11.61)	24.12 (11.79)	24.01 (11.34)	24.00 (11.43)	24.37 (11.82)	24.07 (11.05)	24.03 (10.94)	24.48 (11.45)	24.65 (11.57)	24.10 (11.74)	24.02 (11.22)	24.03 (11.53)	24.67 (11.58)	24.33 (11.17)
Geographical Barriers Deprivation Score	0.23 (0.09)	0.23 (0.86)	0.17 (0.87)	2.39 (9.74)	8.28 (15.72)	15.23 (20.06)	16.57 (19.08)	18.62 (20.34)	-0.04 (0.91)	0.20 (0.86)	0.19 (1.31)	2.76 (10.83)	9.27 (17.42)	16.19 (20.66)	18.23 (20.45)	19.78 (21.34)
Wider Barriers to Housing and Services Deprivation Score	-0.06 (0.77)	-0.062 (0.77)	-0.002 (0.75)	2.09 (8.64)	9.26 (17.11)	16.24 (20.08)	19.62 (20.65)	21.22 (21.21)	0.12 (0.77)	-0.03 (0.76)	0.02 (0.79)	2.35 (9.17)	9.12 (17.04)	15.77 (19.77)	18.61 (20.09)	20.49 (20.78)
Living Environment Deprivation Score	21.88 (16.85)	21.88 (16.85)	24.00 (18.59)	23.92 (17.98)	23.04 (18.45)	20.42 (16.69)	19.66 (15.87)	19.69 (16.19)	24.09 (19.86)	22.79 (17.52)	24.30 (18.52)	25.11 (18.66)	24.02 (19.04)	21.37 (17.28)	20.34 (16.27)	20.00 (16.46)
Indoor Deprivation Score	21.89 (19.83)	21.89 (16.85)	24.52 (22.15)	24.28 (21.31)	23.53 (22.22)	20.02 (19.67)	19.53 (19.00)	19.23 (18.79)	24.86 (23.84)	22.99 (20.71)	24.84 (22.10)	25.63 (22.21)	24.40 (22.82)	20.83 (20.18)	19.68 (18.95)	19.09 (18.91)
Outdoor Deprivation Score	21.89 (19.83)	21.89 (19.83)	24.52 (22.15)	24.62 (21.84)	23.73 (22.33)	21.45 (21.19)	20.13 (19.96)	20.96 (20.99)	24.86 (23.84)	22.99 (20.71)	24.86 (22.10)	26.11 (22.72)	25.27 (23.46)	22.94 (21.84)	21.81 (20.82)	22.18 (21.89)
Income Deprivation Score	0.12 (0.11)	0.12 (0.11)	0.12 (0.11)	0.12 (0.12)	0.11 (0.10)	0.11 (0.10)	0.11 (0.10)	0.11 (0.09)	0.11 (0.08)	0.12 (0.11)	0.12 (0.11)	0.12 (0.12)	0.12 (0.11)	0.12 (0.10)	0.12 (0.10)	0.11 (0.10)
Employment Deprivation Score	0.08 (0.05)	0.08 (0.05)	0.08 (0.05)	0.08 (0.05)	0.08 (0.05)	0.08 (0.05)	0.07 (0.05)	0.07 (0.05)	0.07 (0.05)	0.08 (0.05)	0.08 (0.05)	0.08 (0.05)	0.08 (0.05)	0.08 (0.05)	0.08 (0.05)	0.07 (0.05)
Health and Disability Deprivation Score	-0.35 (0.87)	-0.35 (0.87)	-0.38 (0.83)	-0.31 (0.85)	-0.35 (0.83)	-0.35 (0.85)	-0.36 (0.79)	-0.37 (0.79)	-0.41 (0.87)	-0.33 (0.87)	-0.34 (0.85)	-0.31 (0.85)	-0.34 (0.84)	-0.34 (0.85)	-0.36 (0.82)	-0.37 (0.82)
Crime Deprivation Score	-0.21 (0.83)	-0.21 (0.83)	-0.19 (0.82)	-0.17 (0.81)	-0.20 (0.79)	-0.16 (0.85)	-0.24 (0.82)	-0.19 (0.80)	-0.05 (0.77)	-0.17 (0.82)	-0.17 (0.82)	-0.15 (0.80)	-0.15 (0.79)	-0.12 (0.85)	-0.19 (0.82)	-0.17 (0.82)
Mean Deprivation Decile																
Overall Index of Multiple Deprivation Score	6.68 (2.48)	6.64 (2.82)	6.64 (2.67)	6.56 (2.78)	6.71 (2.70)	6.71 (2.74)	6.73 (2.73)	6.79 (2.72)	6.44 (2.70)	6.47 (2.76)	6.47 (2.75)	6.37 (2.75)	6.36 (2.85)	6.36 (2.83)	6.34 (2.94)	6.63 (2.87)

Education Skills Deprivation Score	7.64 (2.35)	7.20 (2.67)	7.34 (2.51)	7.29 (2.66)	7.35 (2.53)	7.40 (2.56)	7.31 (2.63)	7.43 (2.51)	7.37 (2.74)	7.13 (2.60)	7.18 (2.57)	7.23 (2.60)	7.19 (2.69)	7.15 (2.70)	7.18 (2.74)	7.37 (2.67)
Children and Young People's Deprivation score	7.36 (2.51)	7.19 (2.68)	7.31 (2.6)	7.09 (2.73)	6.53 (2.84)	6.08 (2.89)	5.71 (2.84)	5.65 (2.86)	7.03 (2.76)	6.95 (2.73)	7.09 (2.60)	6.95 (2.80)	6.63 (2.86)	6.15 (2.91)	5.97 (2.93)	5.92 (2.90)
Adult Skills Deprivation Score	7.70 (2.27)	7.07 (2.68)	7.17 (2.53)	6.93 (2.74)	6.45 (2.80)	6.10 (2.89)	5.74 (2.84)	5.64 (2.84)	7.54 (2.67)	7.20 (2.51)	7.15 (2.60)	6.99 (2.67)	6.68 (2.85)	6.21 (2.90)	5.95 (2.88)	5.97 (2.90)
Barriers to Housing and Services Deprivation Score	5.06 (2.9)	4.76 (2.87)	4.79 (2.86)	4.90 (2.90)	4.90 (2.83)	4.92 (2.84)	4.86 (2.93)	4.85 (2.78)	4.60 (2.70)	4.80 (2.82)	4.68 (2.80)	4.92 (2.87)	4.85 (2.78)	4.92 (2.90)	4.52 (2.75)	4.64 (2.82)
Geographical Barriers Deprivation Score	5.53 (3.01)	4.69 (2.96)	4.93 (3.04)	5.07 (2.98)	5.36 (2.94)	5.51 (3.02)	5.77 (3.03)	5.83 (3.00)	5.73 (3.29)	5.04 (3.10)	4.87 (2.93)	5.32 (2.94)	5.09 (2.89)	5.23 (2.97)	4.86 (3.00)	5.27 (3.01)
Wider Barriers to Housing and Services Deprivation Score	5.40 (3.22)	5.79 (3.10)	5.55 (3.03)	5.55 (3.05)	5.40 (2.98)	5.45 (2.93)	5.34 (2.95)	5.33 (2.94)	4.68 (3.04)	5.46 (3.02)	5.46 (3.20)	5.05 (3.00)	5.29 (3.05)	5.50 (2.97)	5.79 (2.90)	5.68 (2.93)
Living Environment Deprivation Score	5.50 (3.25)	5.46 (2.91)	5.26 (3.06)	5.16 (2.93)	5.40 (3.01)	5.78 (2.91)	5.84 (2.82)	5.89 (2.92)	5.22 (3.05)	5.16 (3.06)	5.05 (3.00)	4.73 (3.02)	4.99 (3.04)	5.35 (2.99)	5.53 (2.87)	5.77 (2.99)
Indoor Deprivation Score	5.50 (3.25)	5.46 (2.92)	5.26 (3.06)	5.16 (2.90)	5.40 (3.03)	5.81 (2.91)	5.82 (2.85)	5.91 (2.91)	5.22 (3.05)	5.16 (3.06)	5.05 (2.97)	4.76 (3.02)	5.08 (3.02)	5.50 (2.97)	5.71 (2.81)	6.07 (2.91)
Outdoor Deprivation Score	5.50 (3.25)	5.46 (2.92)	5.26 (3.06)	5.15 (2.94)	5.37 (3.01)	5.68 (2.99)	5.85 (2.99)	5.80 (3.03)	5.22 (3.05)	5.16 (3.06)	5.04 (2.97)	4.69 (3.02)	4.87 (3.04)	5.04 (2.99)	5.04 (3.01)	5.26 (3.03)
Income Deprivation Score	6.62 (2.63)	6.77 (2.89)	6.68 (2.83)	6.58 (2.92)	6.72 (2.80)	6.77 (2.86)	6.77 (2.87)	6.73 (2.84)	6.68 (2.90)	6.57 (2.90)	6.49 (2.88)	6.29 (2.89)	6.27 (2.97)	6.40 (2.97)	6.28 (3.04)	6.66 (2.95)
Employment Deprivation Score	6.73 (2.57)	6.44 (2.71)	6.50 (2.57)	6.44 (2.70)	6.75 (2.68)	7.00 (2.78)	7.11 (2.78)	7.21 (2.71)	6.59 (2.73)	6.32 (2.67)	6.24 (2.67)	6.26 (2.65)	6.61 (2.81)	6.78 (2.85)	6.81 (2.93)	7.17 (2.87)
Health and Disability Deprivation Score	6.75 (2.64)	6.56 (2.79)	6.72 (2.71)	6.49 (2.75)	6.62 (2.66)	6.62 (2.75)	6.69 (2.66)	6.75 (2.65)	6.66 (2.81)	6.41 (2.77)	6.44 (2.77)	6.42 (2.73)	6.43 (2.80)	6.45 (2.83)	6.60 (2.87)	6.71 (2.90)
Crime Deprivation Score	5.68 (2.89)	6.22 (2.84)	6.18 (2.85)	6.07 (2.83)	6.22 (2.76)	6.08 (2.88)	6.34 (2.87)	6.19 (2.84)	5.65 (2.79)	5.88 (2.81)	6.04 (2.83)	5.88 (2.78)	5.71 (2.78)	5.68 (2.90)	5.79 (2.84)	5.82 (2.89)
Mean UCAS tariff	290.85 (237.03)	290.85 (237.03)	346.07 (208.99)	358.43 (221.40)	377.50 (216.13)	389.08 (218.65)	439.12 (193.63)	451.31 (183.46)	-	279.48 (238.65)	355.54 (220.49)	351.23 (226.89)	363.03 (224.74)	387.09 (221.94)	437.38 (199.91)	452.55 (187.22)
Mean SJT score	-	-	861.59 (25.64)	847.45 (38.36)	875.73 (32.50)	891.61 (33.45)	894.96 (29.31)	894.13 (28.46)	-	-	862.356 (25.17)	845.84 (27.37)	874.882 (33.09)	891.30 (33.25)	894.60 (30.27)	894.00 (27.92)
Mean EPM score	37.3 (2.20)	37.30 (2.20)	38.13 (2.73)	38.36 (2.82)	38.47 (2.81)	38.54 (2.79)	38.45 (2.73)	38.11 (2.78)	-	37.28 (2.19)	38.20 (2.74)	38.40 (2.83)	38.52 (2.84)	38.54 (2.81)	38.49 (2.77)	38.14 (2.76)

Appendix 5

Table 3- Study One Descriptive Statistics: Indirect Application to GPHST, Direct Application to GPHST and Offered GPHST National Training Number

	N (n=10902)	Indirect application to GPHST N (%)	Direct application to GPHST N (%)	Offered GPHST National Training Number N (%)
Sex				
Male	4037 (37.0)	1336 (33.1)	2701 (66.9)	3230 (80)
Female	6865 (63.0)	2377 (34.6)	4488 (65.4)	5817 (84.7)
Course Type				
Foundation Course	119 (1.1)	35 (29.4)	84 (70.6)	102 (85.7)
Graduate Entry Medicine	1805 (16.6)	498 (27.6)	1307 (72.4)	1458 (80.8)
Medicine with a Gateway Year	203 (1.9)	68 (33.5)	135 (66.5)	160 (78.8)
Medicine with a Preliminary Year	102 (0.9)	26 (25.5)	76 (74.5)	89 (87.3)
Standard Entry Medicine	8670 (79.5)	3086 (35.6)	5584 (64.4)	7235 (83.4)
Unknown/other (international medicine)	3 (0)			3
Teaching Style				
Traditional	263 (2.4)	85 (32.3)	178 (67.7)	221 (84)
Integrated	6591 (60.5)	2383 (36.2)	4208 (63.8)	5511 (83.6)
Problem Based Learning	3178 (29.2)	925 (29.1)	2253 (70.9)	2596 (81.7)
Case Based Learning	859 (7.9)	314 (36.6)	545 (63.4)	711 (82.8)
Unknown/Other	11 (0.1)			
Graduate on Entry				
Graduate on entry	2672 (24.5)	720 (26.9)	1952 (73.1)	2142 (80.2)
Not graduate entry	8215 (75.4)	2990 (36.4)	5225 (63.6)	6893 (83.9)
Not stated	15 (0.1)			
School type				
Private	2508 (23)	979 (39)	1529 (61)	2081 (83)
State School (including grammar)	7566 (69.4)	2473 (32.7)	5093 (67.3)	6295 (83.2)
Unknown/ Other	828 (7.6)	261 (31.5)	567 (68.5)	671 (81)
Ethnicity				
White	6272 (57.5)	2394 (38.2)	3878 (61.8)	5250 (83.7)
Not stated	364 (3.3)	116 (31.9)	248 (68.1)	274 (75.3)
Any other ethnic	159 (1.5)	43 (27)	116 (73)	120 (75.5)
Arab	103 (0.9)	25 (24.3)	78 (75.7)	89 (86.4)
Any other black	9 (0.1)	3 (33.3)	6 (66.7)	6 (66.7)
African	348 (3.2)	143 (41.1)	205 (58.9)	275 (79)
Caribbean	41 (0.4)	16 (39.0)	25 (60.1)	38 (92.7)
Any other Asian	475 (4.4)	121 (25.5)	354 (74.5)	391 (82.3)
Bangladeshi	189 (1.7)	48 (25.4)	141 (74.6)	152 (80.4)

Pakistani	812 (7.4)	198 (24.4)	614 (75.6)	668 (82.3)
Indian	1351 (12.4)	338 (25)	1013 (75)	1156 (85.6)
Any other mixed group	132 (1.2)	52 (39.4)	80 (60.6)	104 (78.8)
White and Asian	180 (1.7)	67 (37.2)	113 (62.8)	142 (78.9)
White and Black African	27 (0.2)	13 (48.1)	14 (51.9)	23 (85.2)
White and Black Caribbean	37 (0.3)	17 (45.9)	20 (54.1)	32 (86.5)
Any other White	194 (1.8)	64 (33)	130 (67)	158 (81.4)
Irish	50 (0.5)	18 (36)	32 (64)	37 (74)
Chinese	159 (1.5)	38 (23.9)	121 (76.1)	132 (83)
Ethnicity				
Not Stated	364 (3.3)	116 (31.9)	248 (68.1)	274 (75.3)
Any other ethnic group	262 (2.4)	68 (26)	194 (74)	209 (79.8)
Black or Black British	398 (3.7)	161 (40.5)	237 (59.5)	319 (80.2)
Asian or Asian British	2986 (27.4)	743 (24.9)	2243 (75.1)	2499 (83.7)
Mixed	376 (3.4)	149 (39.6)	227 (60.4)	301 (80.1)
White	6516 (59.8)	2476 (38)	4040 (62)	5445 (83.6)
Sexual Orientation				
Bisexual	76 (0.7)	39 (51.3)	37 (48.7)	59 (77.6)
Heterosexual/Straight	7898 (72.4)	2625 (33.2)	5273 (66.8)	6651 (84.2)
Lesbian/Gay	206 (1.9)	96 (46.6)	110 (53.4)	162 (78.6)
Other	22 (0.2)	11 (50)	11 (50)	18 (81.8)
Prefer not to say	1140 (10.5)	423 (37.1)	717 (62.9)	895 (78.5)
Unknown	1560 (14.3)	519 (33.3)	1041 (66.7)	1262 (80.9)
Religion				
Buddhist	58 (0.5)	13 (22.4)	45 (77.6)	51 (87.9)
Christian	2525 (23.2)	850 (33.7)	1675 (66.3)	2138 (84.7)
Hindu	637 (5.8)	147 (23.1)	400 (62.8)	548 (86)
Jewish	48 (0.4)	14 (29.2)	34 (70.8)	39 (81.3)
Muslim	1132 (10.4)	266 (23.5)	866 (76.5)	933 (82.4)
No religion	3434 (31.5)	1395 (40.6)	2039 (59.4)	2874 (83.7)
Sikh	196 (1.8)	38 (19.4)	160 (81.6)	168 (85.7)
Other	116 (1.1)	37 (31.9)	79 (68.1)	87 (75)
Prefer not to say	1196 (11)	436 (36.5)	760 (63.5)	947 (79.2)
Undisclosed	1560 (14.3)	519 (33.3)	1041 (66.7)	1262 (80.9)
Disability				
Declared disability	822 (7.5)	285 (34.7)	537 (65.3)	672 (81.8)
No disability declared	9117 (83.6)	3062 (33.6)	6055 (66.4)	7589 (83.2)
Prefer not to say	701 (6.4)	242 (34.5)	459 (65.5)	556 (79.3)
Not stated	262 (2.4)	124 (47.3)	138 (52.7)	230 (87.8)
Free School Meals				
Free School Meals	503 (4.6)	141 (28)	362 (72)	399 (79.3)
Not on Free School Meals	4377 (40.1)	1431 (32.7)	2946 (67.3)	3518 (80.4)

Unknown/Prefe r not to say	6022 (55.2)	2141 (35.6)	3881 (64.4)	256 (4.3)
Parent Degree				
Parent Degree	3215 (29.5)	1125 (35)	2090 (65)	2605 (81)
No parent degree	1848 (17)	498 (26.9)	1350 (73.1)	1458 (78.9)
Unknown/Prefe r Not to Say	5839 (53.6)	2090 (35.8)	3749 (64.2)	106 (1.8)
Income Support				
Income Support	792 (7.3)	226 (28.5)	566 (71.5)	623 (78.7)
No Income Support	3882 (35.6)	1279 (32.9)	2603 (67.1)	3125 (80.5)
Unknown/Prefe r not to say	6228 (57.1)	2208 (35.5)	4020 (64.5)	421 (6.8)
Index of Multiple Deprivation				
1ST Quintile (most deprived)	1176 (10.8)	345 (29.3)	831 (70.7)	950 (80.8)
2nd Quintile	1550 (14.2)	489 (31.5)	1061 (68.5)	1283 (82.8)
3rd Quintile	2056 (18.9)	660 (32.1)	1396 (67.9)	1719 (83.6)
4th Quintile	2599 (23.8)	906 (34.9)	1693 (65.1)	2184 (84)
5th Quintile (least deprived)	3502 (32.1)	1304 (37.2)	2198 (62.8)	2895 (82.7)
Unknown	19 (0.2)			
Education				
1ST Quintile (most deprived)	755 (6.9)	221 (29.3)	534 (70.7)	613 (81.2)
2nd Quintile	1130 (10.4)	318 (28.1)	812 (71.9)	946 (83.7)
3rd Quintile	1730 (15.9)	535 (30.9)	1195 (69.1)	1431 (82.7)
4th Quintile	2503 (23)	874 (34.9)	1629 (65.1)	2096 (83.7)
5th Quintile (least deprived)	4765 (43.7)	1756 (36.9)	3009 (63.1)	3945 (82.8)
Unknown	19 (0.2)			
Children and Young People's Deprivation				
1ST Quintile (most deprived)	1322 (12.1)	427 (32.3)	895 (67.7)	1115 (84.3)
2nd Quintile	1629 (14.9)	538 (33)	1091 (67)	1341 (82.3)
3rd Quintile	1952 (17.9)	625 (32)	1327 (68)	1646 (84.3)
4th Quintile	2393 (22)	826 (34.5)	1567 (65.5)	1990 (83.2)
5th Quintile (least deprived)	3587 (32.9)	1288 (35.9)	2299 (64.1)	2939 (81.9)
Unknown	19 (0.2)			
Adult Skills Deprivation				
1ST Quintile (most deprived)	1334 (12.2)	424 (31.8)	910 (68.2)	1125 (84.3)
2nd Quintile	1525 (14)	515 (33.8)	1010 (66.2)	1278 (83.8)
3rd Quintile	1998 (18.3)	652 (32.6)	1346 (67.4)	1692 (84.7)
4th Quintile	2558 (23.5)	875 (34.2)	1683 (65.8)	2111 (82.5)
5th Quintile (least deprived)	3468 (31.8)	1238 (35.7)	2230 (64.3)	2825 (81.5)
Unknown	19 (0.2)			
Barriers to Housing and Services				
1ST Quintile (most deprived)	2943 (27)	1019 (34.6)	1924 (65.4)	2448 (83.2)

2nd Quintile	2536 (23.3)	837 (33)	1699 (67)	2093 (82.5)
3rd Quintile	2034 (18.7)	664 (32.6)	1370 (67.4)	1692 (83.2)
4th Quintile	1805 (16.6)	639 (35.4)	1166 (64.6)	1510 (83.7)
5th Quintile (least deprived)	1565 (14.4)	545 (34.8)	1020 (65.2)	1288 (82.3)
Unknown	19 (0.2)			
Geographical Barriers				
1ST Quintile (most deprived)	2709 (24.8)	905 (33.4)	1804 (66.6)	2260 (83.4)
2nd Quintile	2114 (19.4)	711 (33.6)	1403 (66.4)	1726 (81.6)
3rd Quintile	1955 (17.9)	662 (33.9)	1293 (66.1)	1613 (82.5)
4th Quintile	1909 (17.5)	644 (33.7)	1265 (66.3)	1619 (84.8)
5th Quintile (least deprived)	2196 (20.1)	782 (35.6)	1414 (64.4)	1813 (82.6)
Unknown	19 (0.2)			
Wider Barriers to Housing and Services				
1ST Quintile (most deprived)	2545 (23.3)	845 (33.2)	1700 (66.8)	2082 (81.8)
2nd Quintile	1957 (18)	639 (32.7)	1318 (67.3)	1628 (83.2)
3rd Quintile	2022 (18.5)	699 (34.6)	1323 (65.4)	1675 (82.8)
4th Quintile	2006 (18.4)	707 (35.2)	1299 (64.8)	1687 (84.1)
5th Quintile (least deprived)	2353 (21.6)	814 (34.6)	1539 (65.4)	1959 (83.3)
Unknown	19 (0.2)			
Living Environment				
1ST Quintile (most deprived)	2550 (23.4)	800 (31.4)	1750 (68.6)	2064 (80.9)
2nd Quintile	1981 (18.2)	618 (31.2)	1363 (68.8)	1669 (84.3)
3rd Quintile	2079 (19.1)	728 (35)	1351 (65)	1742 (83.8)
4th Quintile	2036 (18.7)	746 (36.6)	1290 (63.4)	1695 (83.3)
5th Quintile (least deprived)	2237 (20.5)	812 (36.3)	1425 (63.7)	1861 (83.2)
Unknown	19 (0.2)			
Indoor Deprivation				
1ST Quintile (most deprived)	2490 (22.8)	790 (31.7)	1700 (68.3)	2023 (81.2)
2nd Quintile	2005 (18.4)	630 (31.4)	1375 (68.6)	1691 (84.3)
3rd Quintile	2095 (19.2)	738 (35.2)	1357 (64.8)	1734 (82.8)
4th Quintile	2022 (18.5)	743 (36.7)	1279 (63.3)	1694 (83.8)
5th Quintile (least deprived)	2271 (20.8)	803 (35.4)	1468 (64.6)	1889 (83.2)
Unknown	19 (0.2)			
Outdoor Deprivation				
1ST Quintile (most deprived)	2777 (25.5)	865 (31.1)	1912 (68.9)	2259 (81.3)
2nd Quintile	1904 (17.5)	563 (29.6)	1341 (70.4)	1593 (83.7)
3rd Quintile	1990 (18.3)	710 (35.7)	1280 (64.3)	1649 (82.9)
4th Quintile	2016 (18.5)	738 (36.6)	1278 (63.4)	1710 (84.8)

5th Quintile (least deprived)	2196 (20.1)	828 (37.7)	1368 (62.3)	1820 (82.9)
Unknown	19 (0.2)			
Income Deprivation				
1ST Quintile (most deprived)	1369 (12.6)	405 (29.6)	964 (70.4)	1106 (80.8)
2nd Quintile	1487 (13.6)	458 (30.8)	1029 (69.2)	1223 (82.2)
3rd Quintile	1668 (15.3)	550 (33)	1118 (67)	1410 (84.5)
4th Quintile	2825 (25.9)	994 (35.2)	1831 (64.8)	2354 (83.3)
5th Quintile (least deprived)	3534 (32.4)	1297 (36.7)	2237 (63.3)	2938 (83.1)
Unknown	19 (0.2)			
Employment Deprivation				
1ST Quintile (most deprived)	1083 (9.9)	327 (30.2)	756 (69.8)	889 (82.1)
2nd Quintile	1492 (13.7)	448 (30)	1044 (70)	1218 (81.6)
3rd Quintile	2062 (18.9)	661 (32.1)	1401 (67.9)	1733 (84)
4th Quintile	2501 (22.9)	881 (35.2)	1620 (64.8)	2092 (83.6)
5th Quintile (least deprived)	3745 (34.4)	1387 (37)	2358 (63)	3099 (82.8)
Unknown	19 (0.2)			
Health and Disability Deprivation				
1ST Quintile (most deprived)	1146 (10.5)	333 (29.1)	813 (70.9)	939 (81.9)
2nd Quintile	1617 (14.8)	497 (30.7)	1120 (69.3)	1322 (81.8)
3rd Quintile	2011 (18.4)	640 (31.8)	1371 (68.2)	1694 (84.2)
4th Quintile	2604 (23.9)	915 (35.1)	1689 (64.9)	2175 (83.5)
5th Quintile (least deprived)	3505 (32.2)	1319 (37.6)	2186 (62.4)	2901 (82.8)
Unknown	19 (0.2)			
Crime Deprivation				
1ST Quintile (most deprived)	1654 (15.2)	513 (31)	1141 (69)	1351 (81.7)
2nd Quintile	1864 (17.1)	597 (32)	1267 (68)	1545 (82.9)
3rd Quintile	2102 (19.3)	685 (32.6)	1417 (67.4)	1712 (81.4)
4th Quintile	2481 (22.8)	856 (34.5)	1625 (65.5)	2075 (83.6)
5th Quintile (least deprived)	2782 (25.5)	1053 (37.9)	1729 (62.1)	2348 (84.4)
Unknown	19 (0.2)			

Appendix 6

Table 4- Study One: Odds of: a) Sole application to GPHST v application to GPHST with other specialities, b) direct application to GPHST after foundation training v application to GPHST later down the line and c) offer of a GPHST National training number v no offer of a GPHST National Training Number among the first application made for higher speciality training via ORIEL						
	Sole application to GPHST		**Direct application to GPHST**		**Offer of GPHST National Training Number**	
	Odds Ratio	**P value**	**Odds Ratio**	**P value**	**Odds Ratio**	**P value**
Sex						
Female	1.119 (1.031-1.213)	0.007	0.934 (0.860-1.014)	0.103	1.387 (1.253-1.535)	0.0001
Male	0.894 (0.824-0.970)	0.007	1.071 (0.986-1.163)	0.103	0.721 (0.652-0.798)	0.0001
Course Type						
Graduate entry medicine	0.715 (0.644-0.794)	0.0001	1.450 (1.300-1.623)	0.0001	0.833 (0.732-0.949)	0.006
Standard entry medicine	1.398 (1.260-1.552)	0.0001	0.690 (0.616-0.771)	0.0001	1.200 (1.054-1.367)	0.006
Level 1 Ethnicity						
White	1.353 (1.246 to 1.469)	0.0001	0.631 (0.579-0.687)	0.0001	1.060 (0.955-1.177)	0.274
Asian or Asian British	1.341 (1.225-1.467)	0.0001	1.850 (1.679 - 2.038)	0.0001	1.009 (0.898-1.135)	0.877
Black or Black British	0.846 (0.684-1.045)	0.121	0.902 (0.734-1.109)	0.328	0.794 (0.616-1.025)	0.077
Mixed	0.828 (0.667-1.029)	0.089	0.934 (0.755-1.155)	0.527	0.789 (0.608-1.025)	0.076
Any other ethnic group	0.4711 (0.368-0.604)	0.0001	1.749 (1.321-2.315)	0.0001	0.776 (0.570-1.056)	0.107
Level 2 Ethnicity						
White	1.401 (1.291-1.520)	0.0001	0.634 (0.583-0.689)	0.0001	1.083 (0.977-1.202)	0.130
Irish	0.741 (0.417-1.314)	0.305	1.098 (0.615-1.960)	0.753	0.554 (0.294-1.046)	0.069
Any other White Ethnic Group	0.547 (0.410-0.729)	0.0001	1.254 (0.926-1.699)	0.144	0.854 (0.591-1.235)	0.402
Pakistani	0.720 (0.619-0.837)	0.0001	1.914 (1.618-2.265)	0.0001	0.903 (0.745-1.094)	0.298
Indian	0.813 (0.719-0.920)	0.001	1.850 (1.619 - 2.114)	0.0001	1.154 (0.978-1.362)	0.090
Bangladeshi	0.827 (0.611-1.119)	0.217	1.813 (1.302 - 2.526)	0.0004	0.800 (0.555-1.153)	0.231
Chinese	0.471 (0.344-0.646)	0.0001	1.966 (1.361 - 2.840)	0.0003	0.952 (0.626-1.448)	0.817
Arab	0.445 (0.301-0.657)	0.0001	1.926 (1.224 - 3.031)	0.005	1.238 (0.702-2.183)	0.462

Any other Asian Ethnic Group	0.613 (0.508-0.741)	0.0001	1.806 (1.460-2.234)	0.0001	0.906 (0.709-1.158)	0.430
African	0.810 (0.646-1.014)	0.067	0.885 (0.711-1.102)	0.275	0.733 (0.562-0.957)	0.023
Caribbean	0.978 (0.505-1.891)	0.946	0.965 (0.514-1.810)	0.911	2.466 (0.760-8.003)	0.133
Any other Black Ethnic group	0.908 (0.227-3.633)	0.925	1.235 (0.309-4.941)	0.766	0.389 (0.097-1.559)	0.183
White and Asian	0.955 (0.695-1.311)	0.775	1.041 (0.766-1.415)	0.796	0.727 (0.505-1.047)	0.087
White and Black African	0.660 (0.306-1.425)	0.290	0.665 (0.312-1.417)	0.290	1.120 (0.386-3.244)	0.836
White and Black Caribbean	0.838 (0.426-1.650)	0.609	0.726 (0.380-1.389)	0.334	1.246 (0.484-3.205)	0.649
Any other mixed group	0.677 (0.476-0.962)	0.030	0.950 (0.667-1.352)	0.775	0.723 (0.474-1.103)	0.133
Any other ethnic group	0.471 (0.344-0.646)	0.0001	1.665 (1.169-2.372)	0.0047	0.600 (0.415-0.865)	0.006
Socioeconomic status (most deprived quintile) v least deprived quintile						
IMD	0.770 (0.671-0.882)	0.0002	0.785 (0.687–0.896)	0.0003	0.881 (0.744-1.044)	0.144
LE	0.712 (0.632-0.802)	0.0001	0.855 (0.777-0.940)	0.001	0.858 (0.740-0.995)	0.043
Indoor LE	0.785 (0.697-0.884)	0.0001	0.837 (0.794-0.961)	0.006	0.876 (0.755-1.017)	0.087
Outdoor LE	0.241 (0.216-0.269)	0.0001	0.839 (0.765-0.921)	0.0002	0.901 (0.778-1.043)	0.163
Income	0.764 (0.671-0.869)	0.0001	0.792 (0.700-0.900)	0.0002	0.843 (0.730-0.975)	0.021
Employment	0.809 (0.703-0.931)	0.003	0.823 (0.718-0.943)	0.005	0.955 (0.800-1.140)	0.612
Health and Disability	0.876 (0.763-1.006)	0.060	0.774 (0.676-0.885)	0.0002	0.922 (0.786-1.082)	0.320
Crime	0.669 (0.588-0.760)	0.0001	0.851 (0.760-0.952)	0.005	0.824 (0.701-0.968)	0.019
Education	0.846 (0.721-0.991)	0.039	0.790 (0.672-0.929)	0.004	0.897 (0.737-1.093)	0.282
CYP	1.086 (0.951-1.240)	0.225	1.093 (0.967-1.236)	0.156	1.119 (0.956-1.310)	0.161
Adult	1.159 (1.015-1.324)	0.030	1.123 (0.993-1.270)	0.064	1.225 (1.033-1.453)	0.020
BHS	0.882 (0.775-1.004)	0.057	0.965 (0.883-1.055)	0.429	1.064 (0.905-1.250)	0.455
Geographical Barriers	0.992 (0.879-1.120)	0.901	1.038 (0.947-1.138)	0.426	1.063 (0.916-1.235)	0.421
wBHS	0.925 (0.822-1.040)	0.925	1.064 (0.945-1.198)	0.301	0.904 (0.780-1.049)	0.183
Socioeconomic status (most deprived quintile) v all other quintiles						
IMD	0.812 (0.717-0.920)	0.001	1.275 (1.117-1.455)	0.0003	0.846 (0.725-0.987)	0.034

LE	0.759 (0.693 - 0.832)	0.0001	1.170 (1.064-1.287)	0.001	0.833 (0.743-0.934)	0.002
Indoor LE	0.814 (0.742 - 0.893)	0.0001	1.145 (1.040-1.259)	0.006	0.856 (0.762-0.961)	0.009
Outdoor LE	0.733 (0.671 - 0.801)	0.0001	1.284 (1.152-1.431)	0.0001	0.859 (0.768-0.961)	0.008
Income	0.816 (0.726 - 0.916)	0.001	1.264 (1.117-1.430)	0.0002	0.843 (0.730-0.975)	0.021
Employment	0.849 (0.746 - 0.967)	0.013	1.216 (1.061-1.393)	0.005	0.933 (0.792-1.100)	0.409
Health and Disability	0.873 (0.769 - 0.991)	0.036	1.293 (1.131-1.479)	0.0002	0.922 (0.786-1.082)	0.320
Crime	0.820 (0.736 - 0.913)	0.0003	1.175 (1.050-1.316)	0.005	0.899 (0.785-1.030)	0.126
Education	0.869 (0.746-1.012)	0.071	1.267 (1.077-1.489)	0.004	0.877 (0.725-1.060)	0.175
CYP	1.036 (0.917-1.170)	0.572	1.093 (0.967-1.236)	0.156	1.119 (0.956-1.310)	0.161
Adult	1.068 (0.946-1.206)	0.287	1.123 (0.993-1.270)	0.064	1.119 (0.956-1.309)	0.161
BHS	0.941 (0.861-1.028)	0.177	0.965 (0.883-1.055)	0.429	1.019 (0.911-1.141)	0.738
Geographical Barriers	0.961 (0.878-1.053)	0.393	1.038 (0.947-1.138)	0.426	1.043 (0.928-1.172)	0.479
wBHS	0.933 (0.850-1.023)	0.140	1.050 (0.956-1.153)	0.311	0.899 (0.800-1.009)	0.072
Disability						
Declared disability	1.182 (1.020-1.370)	0.027	0.953 (0.820-1.107)	0.528	0.902 (0.749-1.086)	0.276
Sexual Orientation						
Heterosexual	1.042 (0.819-1.327)	0.737	1.856 (1.475-2.336)	0.0001	1.451 (1.096-1.921)	0.009
Bisexual	1.081 (0.665-1.758)	0.753	0.472 (0.301 - 0.742)	0.001	0.651 (0.378-1.120)	0.121
Lesbian/Gay	0.909 (0.681-1.214)	0.518	0.570 (0.432 - 0.753)	0.0001	0.690 (0.492-0.969)	0.032
Religion						
Christianity	0.946 (0.847-1.056)	0.320	1.348 (1.211-1.501)	0.0001	1.077 (0.935-1.240)	0.306
Buddhism	0.816 (0.475-1.401)	0.461	2.368 (1.273 - 4.406)	0.007	1.420 (0.641-3.144)	0.388
Hinduism	0.837 (0.701-0.999)	0.049	1.862 (1.523 - 2.276)	0.0001	1.200 (0.942-1.528)	0.140
Judaism	0.772 (0.428-1.391)	0.389	1.662 (0.888-3.108)	0.112	0.844 (0.407-1.753)	0.650
Islam	0.718 (0.624-0.825)	0.0001	2.227 (1.911 - 2.597)	0.0001	0.914 (0.765-1.091)	0.319
Sikhism	0.955 (0.703-1.299)	0.770	2.881 (2.010 - 4.130)	0.0001	1.169 (0.776-1.762)	0.455

Appendix 7

Table 5 - Study One: Decision tree analysis for direct applications to GPHST

	Level 1	Level 2	Level 3	Probability of direct application to GPHST	Chi squared	P value
4	Age >35			77.4%	90.015	<0.001
6	Age </=29	Indian, Pakistani, Bangladeshi, Chinese, Caribbean, African, Arab		80.7%	27.862	<0.001
12	Age </=29	British, Irish	EPM Decile </= 4	52.1%	10.587	0.022
13	Age </=29	British, Irish	EPM Decile > 4	72.5%	10.587	0.022
14	Age 30-32	No religion	UCAS tariff </= 505	72.4%	8.563	0.027
15	Age 29-32	No religion	UCAS tariff > 505	52.6%	8.563	0.027
16	Age 30-32	Religion: Christian, Jewish	UCAS tariff </= 505	56.3%	10.386	0.010
17	Age 30-32	Religion: Christian, Jewish	UCAS tariff > 505	64.7%	10.386	0.010
18	Age 30-32	Religion: Buddhist, Hindu, Sikh, Muslim	EPM Decile </= 4	73.4%	9.962	0.030
19	Age 30-32	Religion: Buddhist, Hindu, Sikh, Muslim	EPM Decile > 4	85.3%	9.962	0.030
20	Age 33-35	Ethnicity: British, Irish	Wider BHS deprivation: Least deprived 80%	55.8%	4.314	0.038
21	Age 33-35	Ethnicity: British, Irish	Wider BHS deprivation: Most deprived 20%	65.1%	4.314	0.038
22	Age 33-35	Ethnicity: Chinese, Indian, Pakistani, Bangladeshi, African, Arab, Caribbean	Wider BHS deprivation: Least deprived 80%	84.5%	9.161	0.022
23	Age 33-35	Ethnicity: Chinese, Indian, Pakistani, Bangladeshi, African, Arab, Caribbean	Wider BHS deprivation: Most deprived 20%	81%	9.161	0.022

Appendix 8

Table 6- Study One: Decision tree analysis for sole applications to GPHST

Node	Level 1	Level 2	Level 3	Probability of sole application to GPHST	Chi squared	P value
3	Age 32-35	-	-	63.2%	93.738	<0.001
9	Age 30-31	Ethnicity: Chinese, Arab, African, Caribbean	-	39.6%	45.897	<0.001
11	Age>35	Course type: Standard entry medicine, medicine with a preliminary year, Foundation Course	-	60.5%	10.477	0.018
12	Age</=30	Ethnicity: British, Irish	Living Environment Deprivation Decile: Least deprived 80%	79.2%	4.220	0.040
13	Age</=30	Ethnicity: British, Irish	Living Environment Deprivation Decile: Most deprived 20%	67.3%	4.220	0.040
14	Age</=30	Ethnicity: Chinese, Indian, Pakistani, Bangladeshi, African, Arab, Caribbean	UCAS tariff </=507	65.3%	20.016	0.001
15	Age</=30	Ethnicity: Chinese, Indian, Pakistani, Bangladeshi, African, Arab, Caribbean	UCAS tariff 508-598	74.0%	20.016	0.001
16	Age</=30	Ethnicity: Chinese, Indian, Pakistani, Bangladeshi, African, Arab, Caribbean	UCAS tariff >598	48.6%	20.016	0.001
17	Age 30-31	Ethnicity: British, Irish	UCAS tariff <479	79.5%	17.319	<0.001
18	Age 30-31	Ethnicity: British, Irish	UCAS tariff >/=479	68.5%	17.319	<0.001
19	Age 30-31	Ethnicity: Indian, Pakistani, Bangladeshi	No declared Disability	64.9%	12.305	0.001

20	Age 30-31	Ethnicity: Indian, Pakistani, Bangladeshi	Disability	47.3%	12.305	0.001
21	Age>35	Course type: Graduate entry programme, Medicine with a Gateway Year	Income Deprivation: Least deprived 80%	52.6%	4.311	0.038
22	Age>35	Course type: Graduate entry programme, Medicine with a Gateway Year	Income Deprivation: Most deprived 20%	39.7%	4.311	0.038

Appendix 9

Table 7- Study Two Demographic Data

	N (%)	UCAS tariff		UCAT scores						SJT		EPM		AKT score			CSA score		
		n	UCAS tariff	n	UCAT total	Abstract	Decision	Quant.	Verbal	n	SJT	n	EPM	n	AKT pass rate	AKT score	n	CSA pass rate	CSA score
Sex																			
Male	4696 (37.8)	4696	355.92 (232.81)	4375	2587.66 (223.22)	626.71 (81.60)	641.29 (81.60)	670.32 (90.72)	613.84 (76.27)	4002	870.61 (35.64)	3982	38.01 (2.82)	1859	1597 (85.9)	153.69 (16.36)	1349	1187 (88.0)	83.96 (8.87)
Female	7720 (62.2)	7720	372.85 (225.37)	7259	2567.62 (218.21)	634.14 (78.90)	646.77 (90.50)	646.84 (78.34)	608.70 (76.66)	6613	878.85 (34.39)	6596	38.70 (2.79)	3175	2798 (88.1)	155.60 (16.27)	2137	2012 (94.2)	87.78 (8.59)
Course type																			
Foundation Course	131 (1.1)	131	375.28 (134.81)	114	2398.16 (231.28)	586.84 (79.45)	579.12 (96.29)	611.14 (68.35)	562.72 (71.76)	123	866.96 (35.65)	123	36.99 (2.43)	38	26 (68.42)	145.63 (17.93)	28	25 (89.29)	85.71 (9.26)
Graduate Entry Medicine	2079 (16.7)	2079	71.55 (163.05)	1717	2642.08 (230.66)	638.29 (84.61)	653.63 (93.04)	666.55 (85.41)	663.56 (80.85)	1436	877.66 (35.58)	1428	39.23 (2.88)	998	870 (87.17)	155.44 (16.54)	732	676 (92.35)	87.18 (9.32)
Medicine with a Gateway Year	225 (1.8)	225	348.08 (123.05)	218	2359.91 (231.38)	587.52 (75.41)	596.10 (100.89)	598.99 (75.64)	552.02 (76.01)	221	866.36 (36.38)	221	37.25 (2.52)	53	31 (58.49)	137.94 (20.84)	25	21 (84.00)	83.60 (9.09)
Medicine with a Preliminary Year	122 (1.0)	122	195.61 (189.58)	108	2507.59 (178.98)	617.96 (69.23)	622.13 (91.31)	638.89 (68.88)	607.22 (67.82)	117	872.73 (36.51)	117	38.40 (2.75)	43	36 (83.72)	148.60 (17.80)	28	26 (92.86)	83.32 (7.40)
Standard Entry Medicine	9857 (79.4)	9856	431.01 (189.58)	9474	2507.59 (178.98)	631.77 (78.89)	645.28 (89.15)	655.73 (78.43)	608.47 (74.55)	8716	875.83 (34.89)	9756	38.21 (2.76)	3901	3431 (87.95)	3431 (87.95)	2673	2451 (91.69)	86.13 (8.76)
Unknown/other	2 (<.01)																		
Teaching style																			
Traditional	321 (2.4)	321	445.50 (266.31)	294	2770.14 (199.38)	672.69 (79.00)	698.03 (87.59)	718.78 (80.31)	667.01 (77.18)	286	891.52 (31.96)	284	38.35 (2.75)	100	97 (97.00)	168.38 (12.02)	68	65 (95.59)	89.87 (7.67)
Integrated	7464 (56.5)	7464	384.95 (218.80)	7014	2566.59 (223.86)	630.25 (80.04)	644.16 (91.74)	653.11 (80.06)	608.40 (76.48)	6462	875.34 (34.68)	6434	38.47 (2.81)	3004	2638 (87.82)	155.38 (16.18)	2057	1892 (91.98)	86.59 (8.99)
Problem Based Learning	3610 (27.3)	3610	302.47 (236.11)	3364	2565.56 (206.92)	627.58 (78.04)	638.09 (87.90)	651.11 (77.61)	607.29 (75.82)	2985	873.99 (35.63)	2978	38.28 (2.84)	1558	1308 (83.95)	151.94 (16.45)	1108	1007 (90.88)	85.34 (8.70)
Case Based Learning	1005 (7.6)	1005	432.39 (204.97)	949	2613.77 (214.24)	640.47 (82.78)	656.70 (85.74)	671.35 (77.20)	621.87 (72.04)	880	879.64 (35.54)	880	38.54 (2.81)	371	351 (94.61)	159.76 (14.54)	253	235 (92.89)	87.23 (8.77)
Other	16	16																	

Graduate on entry																			
Graduate on entry	3089 (24.9)	3089	59.80 (140.98)	2669	2601.34 (230.56)	628.27 (84.22)	642.31 (93.48)	651.45 (86.86)	620.21 (80.62)	2290	874.80 (36.66)	2726	39.05 (2.89)	1416	1187 (83.83)	152.68 (17.05)	1004	925 (92.13)	86.18 (9.12)
Not graduate entry	9310 (75.0)	9310	468.86 (144.95)	8958	2567.48 (216.56)	632.27 (78.71)	645.47 (89.73)	656.98 (77.68)	607.83 (75.07)	8308	876.04 (34.63)	9201	38.28 (2.78)	3613	3206 (88.74)	155.79 (15.93)	2478	2273 (91.73)	86.37 (8.78)
Not stated	17 (0.1)	17																	
School type																			
Private	2896 (23.3)	2896	431.17 (165.37)	2789	2585.16 (206.78)	636.01 (78.94)	651.52 (86.31)	658.63 (77.98)	615.51 (73.17)	2554	875.10 (34.81)	2835	38.20 (2.73)	1145	1009 (88.12)	155.41 (15.81)	770	697 (90.52)	86.34 (8.81)
State School (including grammar)	8587 (69.2)	8587	373.16 (230.61)	8059	2569.49 (222.21)	629.89 (79.59)	642.48 (91.46)	655.08 (79.49)	608.83 (77.19)	7325	874.69 (34.98)	8268	38.48 (2.83)	3667	3111 (84.84)	154.81 (16.47)	2500	2304 (92.16)	86.33 (8.89)
Unknown/ Other	933 (7.5)	933																	
Ethnicity n (%)																			
White	7128 (57.4)	7128	352.43 (237.2)	6614	2606.04 (210.47)	641.87 (80.10)	663.36 (84.30)	669.89 (77.52)	630.92 (72.05)	5929	881.06 (33.58)	6788	38.88 (2.69)	2972	2745	154.89 (16.33)	2029	1936	86.30 (8.89)
Not stated	431 (3.5)	431	329.07 (239.69)	398	257.63 (222.54)	630.28 (72.65)	645.25 (87.50)	668.37 (85.27)	627.74 (75.96)	344	868.05 (33.62)	399	37.70 (2.84)	165	139	151.70 (16.23)	121	108	73.69 (1.06)
Any other ethnic	189 (1.5)	189	384.19 (229.25)	175	2524.51 (239.57)	639.26 (79.03)	643.09 (89.05)	651.83 (85.41)	590.34 (79.71)	167	864.11 (38.05)	182	37.46 (2.54)	69	54	149.07 (18.77)	47	41	82.45 (9.58)
Arab	119 (1.0)	119	460.07 (186.39)	111	2541.62 (249.28)	641.53 (80.09)	649.10 (92.12)	661.62 (88.91)	589.37 (78.71)	112	873.07 (36.79)	119	38.08 (2.93)	32	28	136.03 (1.64)	22	17	83.46 (8.47)
Any other black	10 (0.1)	10	370.0 (226.86)	9	2467.78 (155.22)	614.44 (55.25)	638.89 (85.36)	597.78 (50.19)	616.67 (55.00)	9	858.78 (50.90)	9	38.67 (2.69)	4	4	156.25 (13.43)	3	3	88.33 (7.51)
African	383 (3.1)	383	342.76 (210.37)	357	2443.50 (235.06)	609.83 (81.34)	632.04 (93.29)	627.65 (73.36)	573.98 (73.09)	359	860.25 (39.27)	382	37.09 (2.61)	115	79	144.23 (19.45)	72	61	80.74 (8.49)
Caribbean	54 (0.4)	54	334.07 (208.04)	52	2495.96 (217.11)	621.92 (85.98)	648.27 (91.12)	627.31 (89.14)	598.46 (63.91)	45	872.51 (38.75)	53	36.94 (2.73)	20	14	145.60 (16.15)	14	10	78.57 (8.43)
Any other Asian	542 (4.4)	542	394.77 (203.99)	515	2543.57 (225.78)	652.87 (83.75)	645.51 (89.93)	663.73 (77.35)	581.46 (73.70)	492	868.57 (36.41)	532	37.09 (2.64)	211	152	136.38 (1.94)	144	125	81.86 (7.95)
Bangladeshi	204 (1.6)	204	411.03 (165.60)	200	2498.05 (216.34)	633.00 (76.24)	632.05 (100.43)	651.35 (71.11)	581.65 (62.31)	188	864.97 (36.36)	202	37.10 (2.44)	69	57	146.22 (15.77)	56	42	80.27 (8.80)
Pakistani	921 (7.4)	921	408.12 (189.15)	896	2482.71 (226.88)	626.07 (80.68)	629.02 (89.88)	647.99 (80.71)	579.63 (70.16)	834	864.71 (34.87)	903	37.15 (2.65)	363	292	148.49 (16.52)	257	221	82.78 (8.75)
Indian	1513 (12.2)	1513	417.22 (196.56)	1473	2548.15 (215.57)	645.49 (79.89)	648.01 (90.13)	662.48 (76.60)	592.17 (68.27)	1346	872.98 (35.34)	1491	37.64 (2.69)	666	539	150.79 (16.38)	473	416	83.90 (8.77)

Any other mixed group	152 (1.2)	152	328.26 (231.83)	139	2591.22 (218.81)	641.15 (83.70)	669.78 (82.98)	665.04 (82.81)	615.25 (66.80)	132	872.80 (33.64)	147	37.78 (2.82)	47	39	151.43 (16.73)	30	26	84.47 (9.23)
White and Asian	216 (1.7)	216	379.42 (222.27)	198	2594.19 (216.88)	644.65 (78.14)	668.59 (96.48)	665.66 (72.30)	615.30 (72.92)	186	875.58 (32.80)	209	38.17 (2.63)	88	79	136.15 (2.00)	56	53	87.36 (8.75)
White and Black African	31 (0.2)	31	278.39 (238.90)	28	2517.86 (201.70)	621.79 (71.39)	652.14 (76.18)	637.14 (69.11)	606.79 (76.11)	28	874.21 (31.66)	31	38.61 (2.79)	15	11	136.20 (2.18)	7	7	86.57 (6.16)
White and Black Caribbean	43 (0.3)	43	396.30 (214.78)	39	2563.33 (211.93)	643.85 (87.92)	643.33 (80.93)	661.54 (88.81)	614.62 (57.39)	36	871.56 (37.60)	40	38.75 (2.93)	15	14	156.40 (17.80)	9	9	84.67 (7.79)
Any other White	235 (1.9)	235	241.14 (257.73)	204	2567.06 (227.44)	630.39 (79.75)	661.23 (94.99)	665.34 (71.91)	610.10 (76.58)	195	874.65 (34.58)	220	38.66 (2.74)	87	72	136.68 (2.28)	69	60	84.13 (8.54)
Irish	59 (0.5)	59	255.78 (254.82)	50	2599.40 (212.82)	640.60 (81.90)	664.00 (96.00)	658.40 (97.61)	636.40 (97.61)	50	636.40 (74.77)	55	37.96 (2.71)	22	19	151.23 (14.71)	15	15	88.80 (8.25)
Chinese	186 (1.5)	186	437.06 (248.57)	176	2647.10 (192.47)	671.76 (82.33)	676.59 (84.37)	690.34 (69.79)	608.41 (67.67)	163	867.68 (33.95)	181	37.39 (2.59)	74	58	150.64 (15.63)	62	49	81.52 (8.96)
Ethnicity n (%)																			
Not stated	431 (3.5)	431	329.07 (239.69)	398	2571.63 (222.54)	619.10 (73.56)	633.49 (90.47)	658.44 (85.45)	622.51 (76.44)	344	968.05 (33.62)	341	37.84 (2.89)	165	139 (84.24(	151.70 (16.23)	121	108 (89.26)	85.17 (9.03)
Any other ethnic group	308 (2.5)	308	413.50 (216.58)	286	2531.15 (243.09)	627.34 (81.82)	633.60 (93.45)	642.66 (85.31)	581.89 (82.30)	279	867.71 (37.74)	279	37.83 (2.74)	101	82 (81.19)	151.35 (18.71)	69	58 (84.06)	82.77 (9.19)
Black or Black British	447 (3.6)	447	342.31 (210.03)	418	2450.55 (231.74)	597.42 (82.48)	615.65 (98.47)	612.75 (79.98)	569.09 (72.52)	413	861.55 (39.57)	411	37.24 (2.65)	139	97 (69.78)	144.78 (18.88)	89	74 (83.15)	80.65 (8.52)
Asian or Asian British	3366 (27.1)	3366	411.83 (197.44)	3260	2531.71 (222.72)	630.92 (80.92)	629.83 (94.49)	649.06 (79.10)	582.70 (72.21)	3023	869.19 (35.54)	3008	37.48 (2.7)	1383	1098 (79.39)	149.22 (16.60)	992	853 (85.99)	82.96 (8.71)
Mixed	442 (3.6)	442	356.38 (227.77)	404	2584.90 (216.24)	628.74 (79.64)	652.13 (90.79)	652.03 (76.84)	609.43 (71.85)	382	874.14 (33.39)	381	38.25 (2.77)	165	143 (86.67)	154.59 (16.66)	102	95 (93.14)	86.22 (8.66)
White	7422 (59.8)	7422	348.13 (238.89)	6868	2604.83 (211.08)	634.64 (79.17)	654.22 (86.62)	662.02 (78.82)	627.00 (73.66)	6174	880.80 (33.65)	6158	39.06 (2.72)	3081	2836 (92.04)	158.20 (15.00)	2113	2011 (95.17)	88.30 (8.36)
Sexual Orientation																			
Bisexual	84 (0.6)	84	391.90 (221.02)	79	2674.56 (231.69)	656.20 (79.18)	666.33 (88.99)	679.24 (81.00)	640.00 (76.95)	75	887.61 (35.73)	75	38.61 (2.67)	17	13 (76.47)	153.06 (17.03)	6	5 (83.33)	81.33 (5.09)
Heterosexual/Straight	8956 (67.8)	8956	375.73 (224.411)	8429	2574.56 (220.88)	632.26 (80.72)	645.84 (91.24)	655.60 (79.58)	608.06 (75.90)	7797	876.52 (35.34)	7775	38.45 (2.81)	3467	3169 (91.40)	155.07 (16.38)	2492	2296 (92.13)	86.41 (8.91)
Lesbian/Gay	242 (1.8)	242	364.47 (236.94)	228	2611.63 (205.39)	631.32 (75.90)	663.07 (84.83)	663.33 (84.62)	622.06 (76.16)	217	880.33 (33.98)	217	38.76 (2.70)	76	67 (88.16)	156.17 (15.30)	50	47 (94.00)	87.82 (8.76)

Other	26 (0.2)	26	407.00 (255.58)	23	2636.52 (207.60)	665.22 (72.54)	677.83 (94.67)	678.26 (90.24)	617.83 (56.00)	24	872.63 (32.43)	24	38.08 (2.75)	5	5 (100)	158.80 (14.75)	2	2 (100)	93.00 (4.24)
Prefer not to say	1324 (10.0)	1324	331.22 (228.35)	1221	2596.75 (215.39)	629.91 (76.93)	645.10 (86.96)	662.69 (81.45)	625.63 (75.20)	1122	873.96 (33.72)	1120	38.29 (2.87)	504	439 (87.10)	154.78 (16.01)	335	299 (89.25)	85.91 (9.20)
Unknown	2580 (19.5)			2341	2592.43 (235.60)									785	675 (85.99)		601	550 (91.51)	
Religion																			
Buddhist	66 (0.5)	66	362.94 (255.40)	63	2570.95 (207.96)	627.62 (78.96)	648.41 (108.63)	661.59 (70.35)	586.83 (76.53)	62	868.82 (35.61)	62	37.79 (2.46)	28	21 (75.00)	149.07 (15.99)	19	15 (78.95)	80.95 (8.40)
Christian	2848	2848	366.96 (230.94)	2637	2569.64 (215.01)	629.42 (79.33)	645.52 (87.80)	651.28 (79.71)	612.27 (75.04)	2386	878.25 (35.88)	2383	38.72 (2.75)	1195	1051 (87.95)	155.19 (16.24)	812	758 (93.35)	87.34 (8.99)
Hindu	715 (5.4)	715	416.49 (194.84)	699	2560.50 (214.73)	642.85 (77.69)	639.56 (90.57)	660.20 (76.14)	583.52 (71.80)	652	873.71 (37.00)	650	37.64 (2.71)	311	249 (80.06)	149.93 (17.04)	206	181 (87.86)	83.30 (9.05)
Jewish	61 (0.5)	61	382.11 (174.84)	57	2567.19 (222.40)	632.81 (67.61)	640.53 (80.12)	644.74 (99.81)	632.46 (87.29)	54	871.82 (34.75)	54	38.44 (2.76)	28	24 (85.71)	152.0 (16.14)	14	12 (85.71)	83.07 (8.70)
Muslim	1293 (9.8)	1293	405.42 (189.72)	1253	2488.08 (228.64)	616.38 (80.45)	617.13 (97.20)	636.33 (79.40)	575.43 (72.12)	1169	865.90 (36.22)	1168	37.36 (2.71)	489	379 (77.51)	147.68 (17.42)	351	296 (84.33)	82.21 (8.46)
No religion	3920 (29.7)	3920	358.45 (237.89)	3655	2618.24 (212.01)	637.08 (81.11)	658.36 (87.89)	665.82 (79.04)	626.18 (73.96)	3423	880.86 (33.69)	3416	38.93 (2.78)	1513	1406 (92.93)	158.90 (14.52)	1011	961 (95.05)	88.09 (8.33)
Sikh	222 (1.7)	222	395.32 (218.84)	216	2525.69 (237.08)	628.98 (78.25)	635.42 (104.76)	650.88 (77.45)	580.74 (65.38)	192	873.37 (33.16)	191	37.76 (2.63)	97	76 (78.35)	151.98 (18.68)	72	66 (91.67)	86.25 (9.03)
Other	135 (1.0)	135	329.73 (232.01)	123	2563.82 (224.84)	628.70 (83.69)	646.91 (85.43)	645.61 (87.70)	606.02 (80.93)	1189	872.73 (33.01)	1180	38.16 (2.83)	50	47 (94.00)	154.54 (16.31)	37	31 (83.78)	85.95 (8.88)
Prefer not to say	1372 (10.4)	1372	352.43 (235.68)	1277	2597.16 (215.25)	634.87 (78.41)	648.25 (87.90)	663.62 (80.47)	619.17 (73.90)	108	874.41 (36.40)	107	37.95 (2.71)	538	467 (86.80)	155.98 (13.93)	363	329 (90.63)	83.40 (9.54)
Undisclosed	2580 (19.5)			2341										785	675 (85.99)				
Disability																			
Declared disability	925 (7.5)	925	333.04 (231.72)	858	2576.74 (225.79)	632.19 (79.90)	641.48 (93.88)	655.41 (80.52)	605.52 (80.48)	833	875.40 (39.33)	831	37.82 (2.83)	288	235 (81.60)	151.35 (17.63)	194	172 (88.66)	85.84 (9.32)
No disability declared	10,366 (83.5)	10 366	371.08 (226.78)	9722	630.98 (80.06)	630.98 (80.06)	644.68 (90.48)	654.73 (79.28)	610.59 (75.92)	8793	875.33 (34.60)	8759	38.54 (2.80)	4424	3891 (87.95)	155.24 (16.10)	3094	2850 (92.11)	86.39 (8.85)
Prefer not to say	828 (6.7)	828	335.11 (237.82)	767	2582.88 (231.92)	629.84 (80.20)	640.77 (92.71)	658.83 (84.52)	617.43 (80.48)	694	871.08 (34.54)	693	37.94 (2.89)	302	252 (83.44)	153.25 (17.96)	198	177 (89.39)	85.34 (9.07)
Not stated	297 (2.4)	297		974															
Free School Meals																			
Free School Meals		579	300.16 (227.15)	522	2456.26 (228.73)	615.38 (77.53)	609.14 (99.15)	628.85 (76.94)	602.89 (82.81)	419	846.10 (30.63)	539	37.91 (2.78)	363	289	155.98 (15.60)	287	257	83.87 (8.71)

Not on Free School Meals		5135	341.10 (229.31)	4676	2535.21 (215.88)	630.28 (78.13)	635.93 (91.93)	648.22 (72.02)	620.78 (76.66)	3722	853.39 (26.73)	4821	38.24 (2.71)	3237	2884	149.97 (16.93)	2591	2395	86.83 (8.84)
Unknown/Prefer Not to Say																			
Parent Degree																			
Parent Degree		3793	353.31 (226.25)	3453	2547.63 (214.64)	634.40 (78.10)	638.90 (92.00)	649.83 (71.18)	624.49 (77.28)	2817	853.86 (26.81)	3579	38.25 (2.72)	2362	2130	153.19 (16.74)	1859	1723	86.97 (8.81)
No parent degree		2129	303.55 (233.37)	1922	2488.67 (221.93)	618.81 (77.79)	622.53 (93.96)	639.57 (74.85)	607.75 (77.29)	1484	850.10 (27.80)	1969	38.13 (2.73)	1367	1154	154.84 (14.45)	1121	1027	85.80 (8.85)
Unknown/Prefer Not to Say																			
Income Support																			
Income Support		907	320.47 (228.86)	826	2489.48 (225.57)	620.84 (77.33)	622.34 (97.96)	637.43 (75.33)	608.87 (83.57)	655	847.58 (28.89)	851	38.12 (2.79)	572	479	152.84 (16.45)	445	406	84.93 (8.98)
No Income Support		4561	336.78 (230.85)	4142	2537.35 (215.60)	631.11 (77.82)	636.23 (91.79)	648.68 (72.11)	621.33 (76.26)	3299	853.77 (26.85)	4268	38.25 (2.71)	2875	2579	73.86 (1.14)	2310	2140	86.91 (8.78)
Unknown/Prefer not to say																			
Deprivation																			
Overall Index of Multiple Deprivation Score																			
1ST Quintile (most deprived)	1326 (10.0)	1305	346.31 (220.21)	1227	2482.21 (242.43)	611.44 (80.32)	633.09 (99.00)	633.09 (81.49)	578.90 (79.88)	1121	866.85 (37.37)	1262	37.51 (2.78)	505	400 (79.21)	149.15 (17.21)	360	312 (86.67)	82.64 (8.56)
2nd Quintile	1794 (13.6)	1773	325.16 (237.19)	1630	2553.61 (224.19)	625.50 (82.24)	651.33 (90.74)	651.33 (77.95)	601.37 (78.62)	1528	871.10 (36.27)	1710	37.96 (2.81)	692	557 (80.49)	151.67 (17.36)	494	441 (89.27)	84.50 (8.74)
3rd Quintile	2390 (18.1)	2365	361.63 (232.73)	2208	2579.87 (218.95)	630.90 (80.00)	657.17 (92.30)	657.17 (81.60)	612.28 (76.27)	2031	876.41 (35.02)	2267	38.43 (2.76)	982	857 (87.27)	154.30 (16.43)	660	602 (91.21)	86.10 (9.07)
4th Quintile	2959 (22.4)	2938	375.68 (225.80)	2745	2590.16 (209.61)	633.38 (78.39)	659.70 (78.82)	659.70 (78.82)	616.35 (75.36)	2473	878.15 (33.26)	2819	38.47 (2.74)	1231	1111 (90.25)	156.45 (15.52)	864	802 (92.82)	87.24 (8.79)
5th Quintile (least deprived)	4036 (30.5)	4015	387.78 (222.95)	3808	2601.09 (210.64)	639.12 (78.91)	661.16 (87.53)	661.16 (78.70)	619.87 (72.41)	3445	878.68 (34.44)	3866	38.49 (2.76)	1614	1462 (90.58)	157.23 (15.42)	1100	1034 (94.00)	87.70 (8.59)
Unknown	707 (5.4)																		
Education Skills Deprivation Score																			

1ST Quintile (most deprived)	852 (6.4)	830	372.17 (217.56)	787	2481.89 (235.80)	609.56 (78.56)	613.80 (96.94)	634.84 (81.58)	581.41 (78.60)	700	868.58 (37.32)	804	37.52 (2.76)	311	250 (80.39)	150.34 (17.05)	232	209 (90.09)	83.56 (7.80)
2nd Quintile	1302 (9.9)	1290	339.65 (234.17)	1196	2539.13 (233.17)	620.24 (82.02)	632.58 (97.55)	646.51 (78.75)	596.84 (80.48)	1110	871.02 (36.69)	1246	38.04 (2.83)	509	422 (82.91)	152.39 (17.39)	344	303 (88.08)	84.77 (9.36)
3rd Quintile	1963 (14.9)	1952	349.83 (233.49)	1816	2566.51 (222.04)	626.81 (80.44)	643.45 (90.71)	655.23 (79.57)	606.52 (77.27)	1676	874.29 (36.08)	1880	38.28 (2.81)	810	696 (86.89)	153.59 (16.54)	563	523 (90.90)	86.39 (8.63)
4th Quintile	2890 (21.9)	2869	356.83 (231.99)	2698	2585.10 (217.68)	631.71 (80.56)	646.00 (89.43)	656.88 (80.29)	614.75 (74.14)	2443	876.74 (34.06)	2755	38.46 (2.75)	1154	1017 (88.13)	155.62 (16.48)	804	730 (90.80)	86.08 (9.20)
5th Quintile (least deprived)	5498 (41.6)	5455	383.11 (223.32)	5121	2595.96 (210.48)	638.75 (78.35)	652.06 (87.18)	660.63 (79.17)	617.72 (74.72)	4669	878.01 (34.26)	5239	38.39 (2.76)	2240	2002 (89.38)	156.18 (15.60)	1535	1426 (92.90)	87.14 (8.76)
Unknown	707 (5.4)																		
Children and Young People's Deprivation score																			
1ST Quintile (most deprived)	1497 (11.3)	1469	370.88 (230.84)	1385	2586.79 (229.96)	632.78 (81.90)	652.01 (90.24)	660.84 (85.40)	63.49 (74.87)	1342	883.31 (36.43)	1436	38.37 (2.87)	421	364 (86.46)	154.42 (16.99)	256	231 (90.23)	85.13 (8.33)
2nd Quintile	1845 (14.0)	1837	347.55 (238.95)	1714	2573.71 (232.77)	628.28 (82.51)	644.53 (93.34)	655.03 (81.87)	605.08 (79.69)	1598	877.18 (36.73)	1768	38.19 (2.82)	666	557 (83.63)	152.48 (16.93)	434	386 (88.94)	84.35 (9.28)
3rd Quintile	2220 (16.8)	2200	360.16 (232.40)	2070	2575.65 (221.54)	628.09 (82.00)	645.26 (89.94)	657.27 (81.97)	606.90 (75.41)	1923	878.86 (35.57)	2128	38.29 (2.79)	822	705 (85.77)	153.02 (16.46)	548	498 (90.88)	85.75 (8.65)
4th Quintile	2728 (20.6)	2715	369.26 (225.23)	2555	2577.41 (217.62)	631.35 (78.99)	645.92 (90.67)	656.92 (79.23)	613.67 (74.50)	2310	875.98 (33.84)	2609	38.43 (2.76)	1117	986 (88.27)	155.70 (16.51)	783	723 (92.34)	86.77 (9.10)
5th Quintile (least deprived)	4215 (31.9)	4175	375.13 (221.78)	3894	2570.22 (212.01)	633.98 (77.77)	641.10 (89.70)	652.57 (76.17)	615.73 (77.23)	3425	870.30 (33.49)	3983	38.23 (2.74)	1998	1775 (88.84)	156.11 (15.66)	1457	1353 (92.86)	87.04 (8.76)
Unknown	707 (5.4)																		
Adult Skills Deprivation Score																			
1ST Quintile (most deprived)	1510 (11.4)	1484	385.30 (224.89)	1417	2580.30 (235.39)	631.39 (81.24)	648.99 (92.53)	660.88 (84.41)	603.51 (75.00)	1353	882.97 (36.13)	1453	38.34 (2.86)	456	394 (86.40)	154,30 (16.79)	286	264 (92.31)	85.43 (8.51)
2nd Quintile	1704 (12.9)	1695	356.80 (235.59)	1589	2583.17 (222.45)	629.01 (81.52)	648.70 (90.45)	657.33 (80.77)	605.59 (76.83)	1508	878.96 (35.81)	1647	38.27 (2.77)	596	508 (85.23)	152.84 (16.30)	382	345 (90.31)	85.28 (8.92)
3rd Quintile	2279 (17.2)	2267	374.59 (228.19)	2151	2572.54 (219.70)	628.09 (80.15)	643.70 (90.00)	656.92 (80.36)	608.01 (75.34)	1982	878.22 (35.96)	2198	38.31 (2.82)	846	727 (85.93)	153.81 (16.85)	575	527 (91.65)	86.31 (8.82)
4th Quintile	2917 (22.1)	2901	368.56 (225.39)	2721	2578.25 (218.53)	632.29 (79.89)	645.05 (91.14)	656.53 (79.64)	614.50 (76.30)	2452	875.69 (33.73)	2784	38.37 (2.77)	1238	1092 (88.21)	155.62 (15.84)	868	789 (90.90)	85.93 (9.15)
5th Quintile (least deprived)	4095 (31.0)	4049	357.97 (228.00)	3740	2569.38 (214.97)	633.57 (78.91)	641.72 (89.82)	651.78 (77.56)	614.29 (77.54)	3303	869.97 (33.89)	3842	38.22 (2.74)	1888	1666 (88.24)	155.68 (16.22)	1367	1266 (92.61)	87.00 (8.79)
Unknown	707 (5.4)																		
Barriers to Housing and Services Deprivation Score																			

1ST Quintile (most deprived)	3416 (25.9)	3370	346.37 (229.79)	3141	2574.40 (226.03)	630.82 (80.33)	644.50 (92.87)	655.39 (79.53)	609.98 (78.61)	2867	875.51 (36.00)	3236	38.30 (2.78)	1329	1152 (11.44)	154.68 (16.51)	949	862 (90.83)	86.00 (9.08)
2nd Quintile	2916 (22.1)	2898	363.89 (227.01)	2720	2575.94 (224.51)	635.15 (82.41)	646.70 (91.11)	654.56 (82.63)	607.62 (75.73)	2492	874.94 (35.07)	2793	38.21 (2.78)	1216	1051 (86.43)	154.17 (16.27)	866	792 (91.45)	85.90 (8.90)
3rd Quintile	2323 (18.6)	2300	371.31 (228.51)	2152	2581.43 (213.75)	631.20 (78.09)	646.43 (88.25)	655.83 (80.05)	612.74 (75.69)	1961	876.58 (34.41)	2209	38.23 (2.80)	935	808 (86.42)	154.21 (16.64)	620	577 (93.06)	86.14 (8.71)
4th Quintile	2072 (15.7)	2057	382.76 (222.61)	1930	2575.34 (215.87)	629.69 (79.40)	643.04 (88.14)	656.77 (79.53)	614.34 (76.51)	1758	876.88 (34.72)	1979	38.37 (2.79)	813	719 (88.44)	155.51 (15.75)	532	498 (93.61)	87.18 (8.59)
5th Quintile (least deprived)	1778 (13.5)	1771	384.62 (230.71)	1675	2567.74 (215.84)	628.38 (78.60)	641.57 (91.32)	656.83 (76.37)	610.04 (74.94)	1520	876.88 (34.72)	1707	38.42 (2.77)	731	657 (89.88)	156.63 (16.17)	511	462 (90.41)	86.82 (9.05)
Unknown	707 (5.4)																		
Geographical Barriers Deprivation Score																			
1ST Quintile (most deprived)	3155 (23.9)	3118	356.21 (228.57)	2900	2574.35 (213.14)	631.16 (80.53)	645.59 (90.18)	654.34 (76.97)	613.93 (77.58)	2593	873.21 (33.18)	2997	38.29 (2.77)	1368	1223 (89.40)	156.31 (15.57)	990	931 (94.04)	87.60 (8.68)
2nd Quintile	2456 (18.6)	2431	377.85 (223.56)	2310	2571.09 (216.39)	631.30 (77.64)	641.66 (90.05)	655.31 (79.73)	610.39 (77.28)	2074	874.22 (34.74)	2345	38.19 (2.75)	1012	696 (68.77)	155.84 (15.57)	689	638 (92.60)	86.76 (8.72)
3rd Quintile	2242 (17.0)	2234	381.84 (226.46)	2091	2578.14 (223.44)	632.77 (81.38)	645.49 (89.49)	654.95 (81.94)	610.31 (76.15)	1929	876.42 (34.53)	2160	38.21 (2.79)	892	773 (86.2)	154.73 (16.65)	610	559 (91.64)	85.57 (8.77)
4th Quintile	2190 (16.6)	2171	372.42 (228.23)	2047	2575.52 (223.58)	632.00 (80.30)	645.08 (90.83)	654.72 (80.20)	607.57 (76.38)	1899	876.97 (36.13)	2097	38.35 (2.84)	852	723 (84.86)	153.68 (17.52)	577	519 (89.95)	85.50 (9.07)
5th Quintile (least deprived)	2462 (18.6)	2441	349.53 (232.66)	2270	2577.77 (226.45)	629.84 (80.34)	645.64 (92.56)	659.48 (81.58)	609.92 (74.90)	2103	878.80 (36.96)	2325	38.44 (2.78)	900	772 (85.78)	152.96 (16.52)	612	544 (88.89)	85.16 (9.14)
Unknown	707 (5.4)																		
Wider Barriers to Housing and Services Deprivation Score																			
1ST Quintile (most deprived)	1940 (22.3)	2894	348.51 (229.53)	2459	2559.17 (231.34)	631.98 (81.35)	640.56 (94.19)	651.66 (82.05)	603.53 (77.66)	2763	873.28 (37.82)	1202	38.09 (2.78)	1202	991 (82.45)	151.94 (17.24)	856	755 (88.20)	84.27 (9.02)
2nd Quintile	2206 (16.7)	2192	362.91 (228.84)	1901	2580.04 (218.43)	633.30 (79.78)	647.91 (90.58)	656.62 (79.88)	608.58 (74.60)	2100	877.18 (34.94)	854	38.23 (2.79)	854	746 (87.35)	153.69 (16.08)	584	529 (90.58)	85.35 (8.98)
3rd Quintile	2323 (17.6)	2301	370.65 (226.81)	1967	2579.74 (216.34)	628.87 (79.79)	643.97 (87.89)	657.10 (79.77)	614.39 (76.66)	2221	877.63 (34.00)	894	38.43 (2.82)	894	800 (89.49)	156.48 (15.73)	597	557 (93.30)	87.21 (8.64)
4th Quintile	2307 (17.5)	2292	374.76 (227.85)	1991	2584.31 (219.06	631.01 (79.53)	648.14 (90.27)	658.16 (78.97)	613.82 (75.45)	2220	876.73 (33.79)	923	38.40 (2.76)	923	813 (88.08)	155.73 (15.97)	625	584 (93.44)	87.42 (8.65)
5th Quintile (least deprived)	2729 (20.7)	2717	378.53 (227.01)	2280	2576.85 (213.52)	631.59 (79.47)	644.21 (89.24)	655.99 (78.47)	613.82 (75.45)	2620	874.86 (34.03)	1151	38.35 (2.76)	1151	1037 (90.10)	156.95 (15.75)	816	766 (93.87)	87.58 (8.64)
Unknown	707 (5.4)																		
Living Environment Deprivation Score																			

1ST Quintile (most deprived)	2981 (22.6)	2951	339.09 (225.70)	2732	2537.84 (229.63)	627.93 (78.49)	633.12 (94.68)	645.89 (80.74)	598.40 (80.28)	2516	868.27 (35.78)	3825	37.86 (2.79)	1297	1067 (82.27)	151.64 (17.16)	915	801 (87.54)	83.97 (8.97)
2nd Quintile	2247 (17.0)	2212	376.83 (229.73)	2106	2557.70 (228.27)	624.06 (83.06)	638.30 (94.16)	651.57 (78.82)	605.25 (79.53)	1913	874.09 (36.54)	2156	38.22 (2.81)	877	760 (86.70)	154.90 (16.44)	621	566 (91.14)	85.73 (9.07)
3rd Quintile	2391 (18.1)	2379	365.89 (229.44)	2219	2589.28 (217.20)	634.06 (80.14)	650.54 (88.64)	657.50 (81.50)	615.21 (74.63)	2016	876.83 (34.12)	2280	38.38 (2.78)	936	840 (89.74)	155.83 (15.77)	641	592 (92.36)	87.21 (8.72)
4th Quintile	2325 (17.6)	2313	383.92 (225.66)	2163	2591.78 (207.50)	634.54 (77.97)	647.82 (85.22)	660.85 (78.14)	617.78 (72.92)	1993	879.26 (33.20)	2228	38.45 (2.72)	931	828 (88.94)	156.18 (15.99)	634	606 (95.58)	87.70 (8.43)
5th Quintile (least deprived)	2561 (19.4)	2541	374.53 (228.58)	2398	2605.35 (208.99)	636.34 (80.24)	655.24 (87.35)	664.25 (78.66)	618.80 (72.28)	2160	881.80 (33.91)	2435	38.64 (2.75)	983	892 (90.74)	157.05 (15.28)	667	626 (93.85)	87.83 (8.54)
Unknown	707 (5.4)																		
Indoor Deprivation Score																			
1ST Quintile (most deprived)	2893 (21.9)	2870	345.23 (225.97)	2660	2534.68 (229.86)	627.19 (79.00)	632.05 (94.60)	645.16 (80.24)	598.44 (80.15)	2437	868.26 (35.91)	2746	37.91 (2.80)	1275	1053 (82.59)	151.74 (17.10)	906	793 (87.53)	84.02 (8.98)
2nd Quintile	2292 (17.3)	2254	369.96 (231.15)	2141	2562.60 (228.64)	626.49 (82.88)	640.07 (93.84)	653.01 (80.45)	606.38 (78.97)	1951	874.51 (36.15)	2194	38.21 (2.81)	893	768 (86.00)	154.78 (16.66)	635	579 (91.18)	85.74 (9.03)
3rd Quintile	2420 (18.3)	2404	357.11 (229.58)	2236	2588.15 (214.22)	631.36 (78.26)	649.36 (88.40)	655.88 (79.87)	615.95 (74.77)	2040	876.66 (34.65)	2304	38.37 (2.78)	939	844 (89.88)	155.77 (15.54)	643	593 (92.22)	87.12 (8.76)
4th Quintile	2321 (17.6)	2306	389.98 (222.55)	2158	2592.86 (209.03)	635.88 (79.35)	648.77 (85.78)	661.27 (77.57)	617.13 (73.22)	1986	879.03 (33.24)	2221	38.45 (2.74)	920	821 (89.24)	156.17 (16.10)	626	600 (95.85)	87.82 (8.44)
5th Quintile (least deprived)	2579 (19.5)	2562	375.44 (229.77)	2423	2603.42 (210.13)	636.25 (80.37)	654.80 (87.63)	664.59 (79.75)	617.27 (72.95)	2184	881.51 (33.73)	2459	38.58 (2.74)	997	901 (90.37)	157.01 (15.34)	668	626 (93.71)	87.72 (8.54)
Unknown	707 (5.4)																		
Outdoor Deprivation Score																			
1ST Quintile (most deprived)	3277 924.4)	3198	341.29 (225.90)	2977	2546.60 (227.36)	629.43 (79.23)	637.07 (93.53)	647.85 (80.33)	598.60 (80.04)	2765	870.13 (35.66)	3074	37.88 (2.81)	1336	1101 (82.41)	151.63 (17.04)	922	808 (87.64)	83.94 (8.93)
2nd Quintile	2168 (16.4)	2133	385.60 (226.70)	2028	2558.56 (227.36)	626.09 (81.48)	638.81 (93.81)	654.12 (79.76)	605.39 (77.01)	1837	873.03 (36.70)	2080	38.10 (2.77)	889	771 (86.73)	154.94 (16.46)	627	570 (90.91)	85.80 (9.11)
3rd Quintile	2284 (17.3)	2271	365.96 (229.61)	2109	2583.93 (218.42)	632.74 (82.31)	647.65 (88.37)	654.44 (80.53)	614.71 (76.51)	1907	876.53 (34.19)	2171	38.35 (2.77)	918	823 (89.65)	154.94 (16.46)	629	581 (92.37)	85.80 (9.11)
4th Quintile	2321 (17.6)	2309	382.58 (228.86)	2167	2589.67 (211.65)	634.48 (78.35)	646.75 (87.22)	658.90 (78.00)	617.35 (74.81)	1989	879.10 (33.27)	2224	38.56 (2.76)	925	828 (89.51)	156.52 (15.95)	644	618 (95.96)	87.86 (8.34)
5th Quintile (least deprived)	2505 (19.0)	2485	368.60 (228.09)	2337	2605.07 (208.85)	634.29 (78.99)	655.01 (87.91)	655.01 (87.91)	665.30 (79.62)	2100	881.77 (34.04)	2375	38.71 (2.71)	956	864 (90.38)	156.90 (15.18)	656	614 (93.60)	87.70 (8.61)
Unknown	707 (5.4)																		
Income Deprivation Score																			

1ST Quintile (most deprived)	1540 (11.7)	1517	350.24 (217.53)	1426	2482.68 (240.53)	613.47 (79.82)	615.03 (98.72)	632.76 (81.13)	578.58 (78.56)	1302	866.58 (37.29)	1468	37.49 (2.75)	571	447 (78.28)	148.97 (17.62)	414	358 (86.47)	82.46 (8.51)
2nd Quintile	1721 (13.0)	1707	337.31 (231.49)	1579	2565.79 (217.75)	626.23 (79.86)	643.31 (91.04)	655.07 (78.50)	602.39 (77.51)	1484	873.08 (35.49)	1640	38.04 (2.85)	682	559 (81.96)	152.29 (17.20)	457	408 (89.28)	84.87 (8.55)
3rd Quintile	1930 (14.6)	1918	355.65 (235.89)	1784	2576.96 (217.77)	632.60 (81.16)	643.06 (90.84)	657.34 (80.82)	611.70 (77.25)	1643	875.52 (34.79)	1844	38.35 (2.72)	808	711 (88.00)	154.55 (16.01)	565	515 (91.15)	85.86 (9.14)
4th Quintile	3268 (24.7)	3256	368.05 (230.21)	3056	2587.20 (215.59)	631.83 (78.83)	648.62 (88.21)	658.48 (79.38)	618.13 (73.90)	2740	877.39 (34.26)	3124	38.48 (2.76)	1363	1218 (89.36)	155.95 (15.81)	945	890 (94.18)	87.48 (8.65)
5th Quintile (least deprived)	4046 (30.6)	3998	389.38 (223.36)	3773	2603.74 (208.59)	639.32 (79.42)	654.13 (86.60)	661.65 (78.54)	619.74 (73.57)	3429	879.27 (34.16)	3848	38.53 (2.75)	1600	1452 (90.75)	157.38 (15.34)	1097	1020 (92.98)	87.56 (8.76)
Unknown	707 (5.4)																		
Employment Deprivation Score																			
1ST Quintile (most deprived)	1225 (9.3)	1208	352.72 (222.07)	1133	2489.00 (240.24)	613.04 (81.08)	617.15 (99.44)	636.90 (79.64)	583.32 (79.47)	1021	866.54 (37.51)	1171	37.56 (2.76)	478	380 (79.50)	149.82 (17.27)	346	305 (88.15)	83.14 (8.66)
2nd Quintile	1714 (13.0)	1697	340.66 (233.26)	1562	2534.42 (226.92)	622.48 (81.60)	630.98 (91.42)	645.77 (78.42)	596.18 (79.32)	1443	869.11 (35.74)	1628	38.00 (2.80)	720	590 (81.94)	151.68 (17.12)	498	445 (89.36)	84.44 (8.71)
3rd Quintile	2389 (18.1)	2373	364.39 (227.53)	2224	2572.15 (214.95)	628.46 (78.00)	643.82 (91.04)	654.85 (79.86)	612.65 (77.34)	2014	873.80 (34.44)	2280	38.26 (2.78)	1045	909 (86.99)	154.71 (16.46)	746	675 (90.48)	86.13 (9.21)
4th Quintile	2888 (21.9)	2877	375.19 (226.21)	2703	2580.68 (215.43)	632.84 (77.47)	646.50 (88.82)	656.39 (80.26)	617.79 (74.80)	2390	874.71 (34.40)	2782	38.41 (2.74)	1264	1124 (88.92)	156.13 (15.94)	900	846 (94.00)	87.11 (8.51)
5th Quintile (least deprived)	4289 (32.5)	4241	376.34 (228.90)	3996	2613.74 (208.05)	640.66 (80.61)	657.17 (86.10)	664.96 (78.98)	618.17 (72.74)	3730	882.63 (33.63)	4083	38.56 (2.77)	1517	1384 (91.23)	157.10 (15.26)	988	920 (93.12)	87.73 (8.75)
Unknown	707 (5.4)																		
Health and Disability Deprivation Score																			
1ST Quintile (most deprived)	1300 (9.8)	1280	336.58 (228.84)	1189	2494.12 (237.81)	611.52 (80.08)	618.12 (96.72)	637.80 (77.87)	586.58 (79.37)	1092	867.56 (36.93)	1236	37.66 (2.77)	512	406 (79.30)	149.97 (17.21)	356	314 (88.20)	83.25 (8.37)
2nd Quintile	1877 (14.2)	1852	347.38 (234.69)	1730	2549.57 (230.58)	624.33 (82.06)	637.28 (91.67)	650.37 (82.48)	599.45 (79.63)	1583	872.58 (36.66)	1780	38.00 (2.82)	700	587 (83.86)	152.23 (16.99)	494	439 (88.87)	84.45 (8.88)
3rd Quintile	2306 (17.5)	2288	369.69 (231.70)	2147	2574.42 (219.79)	630.02 (81.36)	645.46 (90.31)	655.03 (80.49)	611.56 (77.67)	1975	874.62 (34.71)	2210	38.39 (2.76)	984	847 (86.08)	154.84 (16.66)	679	615 (90.57)	86.16 (9.20)
4th Quintile	2982 (22.6)	2954	379.72 (223.22)	2785	2584.04 (210.79)	633.07 (77.59)	649.01 (89.34)	657.63 (79.18)	614.48 (74.07)	2538	878.23 (34.26)	2858	38.44 (2.77)	1201	1077 (89.68)	156.05 (16.14)	823	760 (92.35)	86.81 (8.70)
5th Quintile (least deprived)	4040 (30.6)	4022	373.61 (225.83)	3767	2606.71 (208.94)	640.37 (78.67)	652.90 (87.40)	662.79 (78.54)	620.11 (73.09)	3410	878.74 (34.01)	3840	38.47 (2.75)	1627	1470 (9.04)	156.76 (15.19)	1126	1063 (94.40)	87.79 (8.65)
Unknown	707 (5.4)																		
Crime Deprivation Score																			

1ST Quintile (most deprived)	1883 (14.3)	1854	339.24 (229.72)	1723	2541.58 (238.98)	623.31 (84.61)	634.19 (95.78)	647.84 (82.26)	596.81 (82.12)	1589	871.81 (35.68)	1779	37.84 (2.82)	703	571 (81.22)	151.43 (17.40)	495	439 (88.69)	84.21 (8.86)
2nd Quintile	2161 (16.4)	2135	352.82 (233.26)	1987	2550.20 (224.74)	628.24 (79.19)	637.69 (92.58)	647.82 (79.39)	601.48 (77.60)	1836	873.69 (36.46)	2060	38.09 (2.81)	880	753 (85.57)	152.73 (16.32)	601	537 (89.35)	84.84 (9.03)
3rd Quintile	2442 (18.5)	2417	364.88 (229.66)	2257	2578.10 (218.55)	631.24 (78.25)	643.92 (88.71)	656.36 (82.24)	609.55 (76.44)	2059	875.24 (35.10)	2316	38.18 (2.76)	1001	871 (87.01)	155.01 (16.17)	682	615 (90.18)	85.49 (8.97)
4th Quintile	2836 (21.5)	2820	377.07 (225.74)	2670	2589.17 (216.59)	633.16 (80.77)	649.48 (89.71)	658.44 (78.73)	616.31 (74.22)	2407	876.73 (34.71)	2705	38.46 (2.80)	1146	1019 (88.92)	156.11 (16.39)	803	745 (92.78)	87.31 (8.93)
5th Quintile (least deprived)	3183 (24.1)	3170	383.87 (223.21)	2981	2596.59 (206.49)	636.60 (78.11)	651.80 (87.53)	662.59 (77.33)	620.60 (72.67)	2707	879.10 (33.78)	3064	38.64 (2.70)	1294	1173 (90.65)	157.06 (15.28)	897	855 (95.32)	88.16 (8.25)
Unknown	707 (5.4)																		

Appendix 10

Table 8- Study Two: Z-score change during Medical School Study

Demographic Characteristics	Category	Z score UCAS tariff (mean)	Z score UCAS tariff (SD)	Z score EPM (mean)	Z score EPM (SD)	Change (mean)	Change (SD)	P value	95% CI
Sex	Male	0	1.00	-0.09	0.99	-0.09	1.43	P<0.001	(6.900 to 23.577)
	Female	0.07	0.96	0.15	0.99	0.08	1.38		
Age	Graduate	-1.34	0.62	0.25	1.02	1.59	1.18	P=0.001	(-2.054 to -1.958)
	Undergraduate	0.44	0.64	0.01	0.99	-0.43	1.10		
Ethnicity: White v Non White	White	-0.02	1.02	0.27	0.97	0.29	1.42	P<0.001	(0.657 to 0.755)
	Non White	0.2	0.88	-0.24	0.96	-0.41	1.23		
Ethnicity: White v Asian or Asian British	White	-0.02	1.02	0.27	0.97	0.29	1.42	P< 0.001	
	Asian or Asian British	0.18	0.87	-0.22	0.98	-0.40	1.22		
Ethnicity: White v Black or Black British	White	-0.02	1.02	0.27	0.97	0.29	1.42	P < 0.001	
	Black or Black British	0.09	0.91	-0.37	0.99	-0.46	1.36		
Ethnicity: White v Mixed Ethnicity	White	-0.02	1.02	0.27	0.97	0.29	1.42	P < 0.001	
	Mixed ethnicity	0.10	0.90	-0.33	0.97	-0.43	1.24		
Index of Multiple Deprivation	Most deprived quintile	-0.05	0.95	-0.22	1.00	-0.17	1.38	P < 0.001	(0.073 to 0.248)
	Least deprived quintile	0.14	0.94	0.13	0.99	-0.01	1.38		
Adult Skills Deprivation Score	Most deprived quintile	0.07	0.93	-0.21	0.99	-0.28	1.34	P < 0.001	(0.155 to 0.355)
	Least deprived quintile	0.12	0.95	0.10	0.99	-0.02	1.37		
CYP Deprivation Score	Most deprived quintile	0.04	1.00	0.09	1.03	0.05	1.44	P=0.014	(-0.193 to -0.021)
	Least deprived quintile	0.10	0.94	0.04	0.98	-0.06	1.37		
Income Deprivation Score	Most deprived quintile	-0.03	0.94	-0.22	0.99	-0.19	1.35	P < 0.001	(0.106 to 0.269)
	Least deprived quintile	0.15	0.95	0.15	0.99	0	1.37		
Employment Deprivation Score	Most deprived quintile	-0.03	0.96	-0.20	0.99	-0.17	1.37	P < 0.001	(0.155 to 0.334)
	Least deprived quintile	0.09	0.98	0.16	0.99	0.07	1.40		
Income Support	Income support	-0.12	0.97	0.00	1.00	0.12	1.49	P=0.578	
	No income support	-0.05	1.00	0.05	0.97	0.10	1.41		
Free school meals	Free school meals	-0.03	0.97	0.04	0.97	0.07	1.41	P=0.416	
	No free school meals	-0.20	0.97	-0.08	1.00	0.12	1.38		
Disability	Disability	-0.12	1.00	-0.13	1.00	-0.01	1.38	P=0.517	
	No Disability	0.07	0.97	0.09	0.99	0.02	1.39		
Sexual Orientation	Heterosexual	0.04	0.98	0.03	1.00	-0.01	1.38	P=0.691	
	LGBTQ+	0.03	1.03	0.14	0.96	0.11	1.38		
Religion	Identifies with a mainstream religious group	0.08	0.95	-0.07	0.99	-0.15	1.31	P < 0.001	(0.327 to 0.443)
	No religious group	-0.04	1.04	0.20	0.99	0.24	0.02		

Appendix 10

Table 9- Study Two: Z-score change during Postgraduate Training

Demographic Characteristics	Category	Z score EPM tariff (mean)	Z score EPM tariff (SD)	Z score AKT (mean)	Z score AKT (SD)	Change (mean)	Change (SD)	P value	95% CI
Sex	Male	-0.11	0.98	-0.08	1.01	0.02	0.97	P=0.000	(0.064 to 0.177)
	Female	0.13	0.97	0.04	1.00	-0.09	0.94		
Age	Graduate	0.25	1.02	-0.14	1.04	-0.39	0.95	P=0.564	
	Non-graduate	0.01	0.99	0.07	0.98	0.06	0.93		
Ethnicity: White v Non White	White	0.25	0.96	0.20	0.92	-0.05	0.94	P=0.513	
	Non White	-0.27	0.93	-0.33	1.04	-0.06	0.98		
Ethnicity: White v Asian or Asian British	White	0.25	0.96	0.20	0.92	-0.05	0.94	P=0.452	
	Asian or Asian British	-0.24	0.97	-0.28	1.02	-0.04	0.96		
Ethnicity: White v Black or Black British	White	0.25	0.96	0.20	0.92	-0.05	0.94	P=0.751	
	Black or Black British	-0.35	0.99	-0.44	0.99	-0.09	0.95		
Ethnicity: White v Mixed Ethnicity	White	0.25	0.96	0.20	0.92	-0.05	0.94	P=0.643	
	Mixed ethnicity	-0.30	0.98	-0.38	1.05	-0.08	0.97		
Index of Multiple Deprivation	Most deprived quintile	-0.19	0.98	-0.35	1.06	-0.16	0.98	P=0.000	(0.095 to 0.294)
	Least deprived quintile	0.11	0.97	0.14	0.94	0.03	0.92		
Adult Skills Deprivation Score	Most deprived quintile	-0.19	0.97	-0.27	1.05	-0.08	1.01	P=0.089	
	Least deprived quintile	0.05	0.97	0.08	0.96	0.02	0.92		
CYP Deprivation Score	Most deprived quintile	0.14	1.02	-0.01	1.04	-0.15	0.92	P=0.000	(0.107 to 0.306)
	Least deprived quintile	0.02	0.96	0.07	0.96	0.05	0.92		
Income Deprivation Score	Most deprived quintile	-0.21	0.96	-0.37	1.08	-0.16	0.98	P=0.000	(0.091 to 0.280)
	Least deprived quintile	0.13	0.96	0.15	0.94	0.03	0.92		
Employment Deprivation Score	Most deprived quintile	-0.19	0.97	-0.31	1.06	-0.13	1.00	P=0.016	(0.024 to 0.231)
	Least deprived quintile	0.13	0.97	0.13	0.93	0	0.92		
Income Support	Income support	-0.05	1.00	-0.14	1.00	-0.09	0.98	P=0.011	(0.028 to 0.209)
	No income support	0.04	0.95	0.06	0.95	0.02	0.93		
Free school meals	Free school meals	-0.17	0.97	-0.29	1.04	-0.13	1.01	P=0.012	(0.032 to 0.260)
	No free school meals	0.04	0.96	0.06	0.96	0.02	0.93		
Disability	Disability	-0.07	1.00	-0.21	1.07	-0.13	0.95	P=0.154	
	No Disability	0.06	0.97	0.01	0.99	-0.05	0.95		
Sexual Orientation	Heterosexual	0.08	1.00	0.01	1.00	-0.07	0.94	P=0.888	
	LGBTQ+	0.27	0.96	0.05	0.95	-0.22	0.94		
Religion	Identifies with a mainstream religious group	-0.03	0.99	-0.15	1.04	-0.12	0.96	P=0.089	
	No religious group	0.25	0.99	0.25	0.89	0	0.92		

Appendix 11

Table 10- Study Two: Odds of success in the MRCGP AKT and MRCGP CSA

	AKT performance		CSA performance	
	Odds Ratio	**P value**	**Odds Ratio**	**P value**
Sex				
Female	1.218 (1.028-1.442)	0.023	2.197 (1.721-2.804)	<0.0001
Male	0.821 (0.693-0.973)	0.023	0.455 (0.357-0.581)	<0.0001
Course type				
Graduate entry medicine	0.931 (0.755-1.148)	0.503	1.093 (0.806-1.484)	0.567
Standard entry medicine	1.074 (0.871-1.324)	0.503	0.915 (0.674-1.241)	0.567
Ethnicity level 1				
White	3.000 (2.522-3.569)	<0.0001	3.140 (2.431-4.055)	<0.0001
Asian or Asian British	0.333 (0.277-0.400)	<0.0001	0.311 (0.238-0.407)	<0.0001
Black or Black British	0.200 (0.136-0.293)	<0.0001	0.250 (0.139-0.451)	<0.0001
Mixed	0.562 (0.352-0.900)	0.016	0.688 (0.312-1.521)	0.356
Any other ethnic group	0.73 (0.2226-0.625)	0.0002	0.267 (0.136-0.525)	0.0001
Ethnicity level 2				
White	3.089 (2.592-3.682)	<0.0001	3.262 (2.51-4.233)	<0.0001
Irish	0.524 (0.154-1.783)	0.301	N/A	N/A
Any other White Ethnic Group	0.397 (0.224-0.704)	0.002	0.320 (0.154-0.665)	0.002
Pakistani	0.340 (0.254-0.456)	<0.0001	0.295 (0.196-0.444)	<0.0001
Indian	0.351 (0.277-0.444)	<0.0001	0.351 (0.248-0.496)	<0.0001
Bangladeshi	0.393 (0.208-0.743)	0.004	0.144 (0.076-0.273)	<0.0001
Chinese	0.300 (0.170-0.530)	<0.0001	0.181 (0.095-0.345)	<0.0001
Arab	0.579 (0.201-1.665)	0.310	0.163 (0.059-0.452)	<0.001
Any other Asian Ethnic Group	0.213 (0.153-0.296)	<0.0001	0.316 (0.187-0.535)	<0.0001
African	0.181 (0.120-0.275)	<0.0001	0.266 (0.136-0.523)	0.0001
Caribbean	0.193 (0.073-0.507)	0.001	0.120 (0.037-0.390)	0.0004
Any other Black Ethnic group	N/A	N/A	N/A	N/A
White and Asian	0.726 (0.359-1.466)	0.372	0.849 (0.26-2.766)	0.785
White and Black African	0.227 (0.072-0.720)	0.012	N/A	N/A
White and Black Caribbean	1.158 (0.152-8.844)	0.888	N/A	N/A
Any other mixed group	0.403 (0.186-0.873)	0.021	0.312 (0.107-0.913)	0.033
Any other ethnic group	0.298 (0.165-0.536)	<0.0001	0.328 (0.136-0.793)	0.013
Socioeconomic status (most deprived quintile) v least deprived quintile				
IMD	0.396 (0.302-0.520)	<0.0001	0.415 (0.280-0.615)	<0.0001
LE	0.473 (0.366-0.613)	<0.0001	0.460 (0.317-0.668)	<0.0001
Indoor LE	0.505 (0.392-0.652)	<0.0001	0.471 (0.325-0.681)	0.0001
Outdoor LE	0.499 (0.386-0.645)	<0.0001	0.485 (0.335-0.701)	0.0001
Income	0.367 (0.283-0.477)	<0.0001	0.483 (0.335-0.695)	0.0001

Employment	0.521 (0.351-0.773)	0.001	0.550 (0.365-0.827)	0.004
Health and Disability	0.409 (0.312-0.536)	<0.0001	0.443 (0.294-0.668)	0.0001
Crime	0.446 (0.342-0.582)	<0.0001	0.385 (0.254-0.584)	<0.0001
Education	0.487 (0.357-0.665)	<0.0001	0.695 (0.433-1.114)	0.131
CYP	0.802 (0.587-1.096)	0.167	0.710 (0.449-1.123)	0.143
Adult	0.530 (0.318-0.883)	0.015	0.957 (0.593-1.547)	0.859
BHS	0.657 (0.501-0.862)	0.002	1.051 (0.727-1.518)	0.792
Geographical Barriers	1.399 (1.085-1.803)	0.010	1.973 (1.370-2.840)	0.0003
wBHS	0.516 (0.405-0.659)	<0.0001	0.488 (0.343-0.695)	0.0001
Socioeconomic status (most deprived quintile) v all other quintiles				
IMD	0.508 (0.403-0.642)	<0.0001	0.539 (0.387-0.752)	<0.0003
LE	0.569 (0.477-0.678)	<0.0001	0.509 (0.396-0.653)	<0.0001
Indoor LE	0.590 (0.495-0.705)	<0.0001	0.509 (0.397-0.654)	<0.0001
Outdoor LE	0.573 (0.481-0.683)	<0.0001	0.515 (0.401-0.660)	<0.0001
Income	0.469 (0.377-0.584)	<0.0001	0.521 (0.382-0.712)	<0.0001
Employment	0.522 (0.410-0.663)	<0.0001	0.634 (0.446-0.901)	0.011
Health and Disability	0.511 (0.405-0.644)	<0.0001	0.637 (0.450-0.901)	0.011
Crime	0.572 (0.464-0.707)	<0.0001	0.658 (0.483-0.896)	0.008
Education	0.571 (0.426-0.765)	0.0002	0.804 (0.514-1.260)	0.342
CYP	0.921 (0.687-1.233)	0.580	0.818 (0.531-1.259)	0.361
Adult	0.915 (0.690-1.213)	0.537	1.086 (0.691-1.709)	0.720
BHS	0.925 (0.768-1.115)	0.414	0.851 (0.654-1.107)	0.230
Geographical Barriers	1.969 (1.627-2.384)	<0.0001	1.592 (1.184-2.141)	0.002
wBHS	0.589 (0.492-0.705)	<0.0001	0.571 (0.442-0.737)	0.0001
Disability				
Declared disability	0.607 (0.445-0.829)	0.002	0.669 (0.421-1.063)	0.089
Sexual Orientation				
Heterosexual	1.728 (0.950-3.143)	0.073	0.868 (0.311-2.421)	0.786
Bisexual	0.306 (0.099-0.943)	0.039	0.427 (0.050-3.672)	0.438
Lesbian/Gay	0.700 (0.346-1.418)	0.322	1.337 (0.413-4.336)	0.628
Religion				
No religion	2.540 (2.023-3.190)	<0.0001	1.317 (0.924-1.878)	0.128
Christianity	0.555 (0.427-0.722)	<0.0001	0.730 (0.491-1.086)	0.120
Buddhism	2.229 (0.914-5.435)	0.078	0.195 (0.063-0.610)	0.005
Hinduism	2.984 (2.053-4.338)	<0.0001	0.377 (0.227-0.625)	0.0002
Judaism	4.458 (1.502-13.230)	0.007	0.312 (0.068-1.433)	0.134
Islam	2.560 (1.844-3.554)	<0.0001	0.280 (0.187-0.420)	<0.0001
Sikhism	3.520 (2.028-6.112)	<0.0001	0.572 (0.237-1.384)	0.215

Appendix 12

Table 11: Study Two- Odds of failure in the MRCGP AKT and CSA

	AKT performance		CSA performance	
	Odds Ratio	**P value**	**Odds Ratio**	**P value**
Sex				
Female	0.821 (0.693-0.973)	0.023	0.455 (0.357-0.581)	<0.0001
Male	1.218 (1.028-1.442)	0.023	2.200 (1.721-2.804)	<0.0001
Course type				
Graduate entry medicine	1.074 (0.871-1.324)	0.503	0.915 (0.674-1.241)	0.567
Standard entry medicine	0.931 (0.755-1.148)	0.503	1.093 (0.806-1.484)	0.567
Ethnicity level 1				
White	0.333 (0.280-0.397)	<0.0001	0.319 (0.247-0.411)	<0.0001
Asian or Asian British	3.005 (2.500-3.613)	<0.0001	3.213 (2.458-4.199)	<0.0001
Black or Black British	5.012 (3.411-7.365)	<0.0001	3.996 (2.216-7.206)	<0.0001
Mixed	1.781 (1.116-2.842)	0.016	1.453 (0.657-3.211)	0.356
Any other ethnic group	2.682 (1.601-4.493)	0.0002	3.729 (1.905-7.341)	0.0001
Ethnicity level 2				
White	0.324(0.272-0.386)	<0.0001	0.307 (0.236-0.398)	<0.0001
Irish	1.909 (0.561-6.501)	0.301	N/A	N/A
Any other White Ethnic Group	2.519 (1.421-4.466)	0.002	3.123 (1.503-6.485)	0.002
Pakistani	2.940 (2.195-3.94)	<0.0001	3.391 (2.252-5.105)	<0.0001
Indian	2.849 (2.25-3.608)	<0.0001	2.852 (2.017-4.033)	<0.0001
Bangladeshi	2.546 (1.346-4.814)	0.004	6.939 (3.66-13.155)	<0.0001
Chinese	3.336 (1.887-5.897)	<0.0001	5.523 (2.895-10.536)	<0.0001
Arab	1.728 (0.601-4.968)	0.310	6.123 (2.211-16.956)	0.0004
Any other Asian Ethnic Group	4.694 (3.375-6.527)	<0.0001	3.164 (1.871-5.352)	<0.0001
African	5.511 (3.633-8.359)	<0.0001	3.754 (1.912-7.372)	0.0001
Caribbean	5.183 (1.973-13.615)	0.0008	8.327 (2.564-27.047)	0.0004
Any other Black Ethnic group	N/A	N/A	N/A	N/A
White and Asian	1.378 (0.682-2.782)	0.372	1.178 (0.361-3.841)	0.785
White and Black African	4.397 (1.389-13.92)	0.012	N/A	N/A
White and Black Caribbean	0.864 (0.113-6.598)	0.888	N/A	N/A
Any other mixed group	2.481 (1.145-5.372)	0.021	3.203 (1.095-9.365)	0.033
Any other ethnic group	3.359 (1.866-6.047)	<0.0001	3.046 (1.262-7.357)	0.013
Socioeconomic status (most deprived quintile) v least deprived quintile				
IMD	2.525 (1.923 - 3.315)	<0.0001	2.410 (1.627-3.570)	<0.0001
LE	2.113 (1.632 - 2.736)	<0.0001	2.173 (1.498-3.152)	<0.0001
Indoor LE	1.979 (1.533 - 2.554)	<0.0001	2.124 (1.468-3.073)	<0.0001
Outdoor LE	2.005 (1.55 - 2.592)	<0.0001	2.063 (1.426-2.983)	<0.0001
Income	2.722 (2.096 - 3.534)	<0.0001	2.072 (1.439-2.984)	<0.0001
Employment	2.684 (2.019 - 3.567)	<0.0001	1.819 (1.209-2.737)	0.004

Health and Disability	2.445 (1.867 - 3.202)	<0.0001	2.257 (1.497-3.402)	<0.0001
Crime	2.241 (1.717 - 2.925)	<0.0001	2.597 (1.7133-3.983)	<0.0001
Education	2.052 (1.505 - 2.800)	<0.0001	1.440 (0.897-2.310)	0.131
CYP	1.246 (0.912 - 1.703)	0.166	1.408 (0.890-2.227)	0.143
Adult	1.181 (0.873 - 1.598)	0.281	1.045 (0.646-1.688)	0.859
BHS	1.364 (1.023 - 1.819)	0.034	0.952 (0.659-1.375)	0.792
Geographical Barriers	0.715 (0.555 - 0.922)	<0.0001	0.507 (0.352-0.730)	<0.0001
wBHS	1.937 (1.518 - 2.472)	<0.0001	2.049 (1.439-2.919)	<0.0001
Socioeconomic status (most deprived quintile) v all other quintiles				
IMD	1.967 (1.558-2.484)	<0.0001	1.853 (1.331—2.581)	0.0003
LE	1.758 (1.475-2.096)	<0.0001	1.966 (1.532-2.524)	<0.0001
Indoor LE	1.694 (1.419-2.022)	<0.0001	1.964 (1.529-2.512)	<0.0001
Outdoor LE	1.744 (1.465-2.078)	<0.0001	1.943 (1.514-2.494)	<0.0001
Income	2.131 (1.711-2.653)	<0.0001	1.918 (1.404-2.621)	<0.0001
Employment	1.917 (1.509-2.436)	<0.0001	1.577 (1.110-2.240)	0.011
Health and Disability	1.957 (1.552-2.469)	<0.0001	1.571 (1.110-2.223)	0.011
Crime	1.747 (1.415-2.157)	<0.0001	1.520 (1.1116-2.070)	0.008
Education	1.752 (1.307-2.349)	<0.0001	1.243 (0.794-1.947)	0.342
CYP	1.086 (0.811-1.455)	0.580	1.223 (0.794-1.883)	0.361
Adult	1.093 (0.824-1.448)	0.537	0.920 (0.585-1.448)	0.720
BHS	1.081 (0.897-1.301)	0.414	1.175 (0.903-1.530)	0.230
Geographical Barriers	0.508 (0.420-0.615)	<0.0001	0.628 (0.467-0.845)	0.002
wBHS	1.697 (1.418-2.031)	<0.0001	1.752 (1.357-2.262)	<0.0001
Disability				
Declared disability	1.646 (1.206-2.248)	0.002	1.494 (0.941-2.373)	0.089
Sexual Orientation				
Heterosexual	1.626 (0.897-2.951)	0.110	0.868 (0.311-2.421)	0.786
Bisexual	3.272 (1.06-10.098)	0.039	2.343 (0.272-20.154)	0.438
Lesbian/Gay	1.429 (0.705-2.894)	0.322	0.748 (0.231-2.424)	0.628
Religion				
No religion	0.394 (0.314-0.494)	<0.0001	0.004 (0.003-0.005)	<0.0001
Christianity	1.800 (1.385-2.341)	<0.0001	1.369 (0.921-2.035)	0.120
Buddhism	4.380 (1.821-10.536)	0.001	5.125 (1.641-16.010)	0.005
Hinduism	3.272 (2.327-4.600)	<0.0001	2.655 (1.601-4.402)	0.0002
Judaism	2.190 (0.746-6.427)	0.154	3.203 (0.698-14.701)	0.134
Islam	3.814 (2.856-5.093)	<0.0001	3.571 (2.383-5.352)	<0.0001
Sikhism	3.631 (2.155-6.117)	<0.0001	1.747 (0.723-4.224)	0.215

Appendix 13

Table 12- Study Two: AKT_{GINI}

	Overall pass rate	Overall mean score (SD)	2016			2017			2018			2019			2020		
			Pass rate	Mean Score	AKT_{GINI} Index 2016	Pass rate	Mean Score	AKT_{GINI} Index 2017	Pass rate	Mean Score	AKT_{GINI} Index 2018	Pass rate	Mean Score	AKT_{GINI} 2019	Pass rate	Mean Score	AKT_{GINI} Index 2020
Sex																	
Male	85.9%	153.69 (16.36)	357/554 90.6%	148.20 (11.80)	5.4	563/639 88.1%	155.17 (16.03)	5.6	719/811 88.7%	156.01 (15.95)	5.8	769/882 87.2%	154.90 (17.19)	6.4	272/318 85.5%	154.78 (17.20)	6.3
Female	88.1%	155.60 (16.27)	197/223 88.3%	154.61 (14.95)	4.6	325/381 85.2%	152.99 (15.20)	4.8	402/475 84.6%	153.76 (16.01)	5.7	447/517 86.5%	153.02 (17.78)	6.2	148/177 83.6%	153.15 (17.58)	7
Course type																	
Graduate	87.2%	155.44 (16.54)	141/161 87.6%	157.69 (14.83)	5.5	138/162 85.2%	153.85 (15.74)	6.3	192/220 87.3%	155.67 (16.68)	6	201/232 86.6%	154.32 (18.01)	6.9	63/76 82.9%	151.41 (17.82)	6.7
Undergraduate	88.0%	148.60 (17.80)	407/450 90.4%	148.20 (11.80)	5.3	730/832 87.7%	154.91 (14.34)	5.7	902/1031 87.5%	151.50 (16.24)	5.8	985/1119 88.0%	141.07 (21.50)	6.3	346/399 86.7%	154.25 (17.29)	6.3
Ethnicity																	
Asian or Asian Black	79.4%	149.22 (16.60)	375/400 93.8%	150.41 (14.96)	5.6	529/580 91.2%	157.69 (14.84)	5.8	718/788 91.1%	158.06 (14.91)	5.3	792/852 93.0%	158.25 (1597)	6.7	276/304 90.8%	149.55 (18.88)	5.7
Black or Black British	69.8%	144.78 (18.88)	125/152 82.2%	144.83 (14.96)	6.4	266/327 81.3%	149.71 (15.43)	6.1	282/359 78.6%	149.26 (16.43)	5.8	303/386 78.5%	147.88 (17.59)	8.3	97/125 77.6%	149.55 (18.88)	6.8
Mixed	86.7%	154.59 (16.66)	9/12 75.0%	144.83 (19.00)	6.7	18/21 85.7%	148.10 (17.77)	5.9	26/34 76.5%	149.32 (15.77)	4.7	27/48 56.3%	140.33 (21.55)	5.1	12/19 63.2%	141.05 (18.27)	7.8
White	92.0%	158.20 (15.00)	17/21 81.0%	153.76 (19.32)	4.8	26/30 86.7%	154.57 (17.20)	5.2	37/38 97.4%	158.95 (13.52)	5.2	42/49 85.7%	152.39 (14.84)	5.6	14/20 70.0%	148.55 (21.82)	5.3
Deprivation																	
IMD- most deprived quintile	79.2%	149.15 (17.21)	54/64 84.4%	150.45 (15.33)	5.4	90/101 89.1%	150.39 (13.59)	5.0	105/134 78.4%	151.48 (17.38)	6.4	108/148 73.0%	146.22 (18.46)	7.2	30/43 69.8%	144.35 (19.95)	7.8
IMD all other quintiles	88.2%	155.53 (16.10)	498/551 90.4%	156.85 (14.76)	5.2	797/918 86.8%	154.78 (15.92)	5.7	1014/1149 88.3%	155.63 (15.79)	4.8	1106/1249 88.6%	155.12 (17.05)	6.1	389/450 86.4%	154.47 (16.73)	6.0
CYP- most deprived quintile	86.5%	154.42 (16.99)	39/45 86.7%	151.84 (14.9)	5.2	45/51 88.2%	150.45 (15.71)	4.3	85/101 84.2%	155.53 (17.50)	3.9	138/158 87.3%	154.87 (17.85)	3.5	47/55 85.5%	156.76 (16.26)	3.1
CYP all other quintiles	87.4%	154.93 (16.26)	513/570 90.0%	156.53 (14.89)	5.0	842/968 87.0%	154.55 (15.74)	4.0	1034/1182 87.5%	155.16 (15.88)	3.7	1076/1239 86.8%	154.08 (17.37)	3.4	372/438 84.9%	153.18 (17.35)	3.0

Adult Skills- most deprived quintile	86.4%	154.30 (16.79)	47/52 90.4%	152.73 (15.12)	9.0	55/61 90.2%	152.26 (14.64)	8.1	92/114 80.7%	153.99 (17.47)	7.8	138/158 87.3%	154.54 (17.99)	7.7	48/56 85.7%	155.34 (15.68)	7.5
Adult Skills- all other quintiles	87.4%	154.95 (16.28)	505/563 89.7%	156.51 (14.89)	7.0	832/958 86.8%	154.48 (15.82)	6.1	1027/1169 87.9%	155.31 (15.86)	5.8	1076/1239 86.8%	154.13 (17.35)	5.5	371/437 84.9%	153.36 (17.45)	5.7
Income- most deprived quintile	78.3%	148.97 (17.62)	57/69 82.6%	150.07 (15.05)	7.1	105/120 87.5%	150.88 (14.91)	8.5	111/148 75.0%	150.09 (17.67)	9.0	127/173 73.4%	145.90 (18.78)	9.5	30/42 71.4%	145.36 (20.49)	9.7
Income all other quintiles	88.5%	155.65 (15.99)	495/546 90.7%	156.96 (14.75)	6.5	782/899 87.0%	154.81 (15.82)	6.6	1008/1135 88.8%	155.86 (15.66)	7.1	1087/1224 88.8%	155.34 (16.90)	6.9	389/451 86.3%	154.35 (16.74)	7.0
Employment- most deprived quintile	79.5%	149.82 (17.27)	59/67 88.1%	152.49 (15.48)	6.7	91/104 87.5%	149.00 (14.61)	7.5	94/125 75.2%	150.94 (17.59)	7.8	87/122 71.3%	146.75 (18.77)	7.9	34/43 79.1%	149.00 (19.05)	8.4
Employment- all other quintiles	88.1%	155.42 (16.13)	493/548 90.0%	156.64 (14.82)	5.0	796/915 87.0%	154.96 (15.78)	5.3	1025/1158 88.5%	155.65 (15.77)	5.5	1127/1275 88.4%	154.88 (17.12)	5.7	385/450 85.6%	154.02 (17.03)	5.8
Disability																	
Disability	81.6%	151.35 (17.63)	23/26 88.5%	151.42 (15.89)	5.7	53/66 80.3%	150.20 (17.01)	6.3	61/73 83.6%	153.60 (18.53)	6.5	68/83 81.9%	151.78 (17.33)	6.7	24/31 77.4%	147.13 (19.15)	6.9
No declared disability	88.0%	155.24 (16.10)	500/558 (89.6%)	156.19 (14.98)	5.4	786/895 (87.8%)	154.87 (15.50)	5.7	995/1135 (87.7%)	155.40 (15.66)	5.7	1076/1226 (87.8%)	154.63 (17.29)	5.9	357/417 85.6%	154.06 (17.00)	6.2
Sexual Orientation																	
Heterosexual	91.4%	155.07 (16.38)	363/400 90.8%	156.61 (14.50%)	5.3	644/733 87.9%	154.45 (15.50)	5.7	823/955 86.2%	155.19 (16.48)	5.8	931/1065 87.4%	154.56 (17.64)	6.4	314/365 86.0%	154.17 (16.761)	6.1
LGBTQ+	86.0%	154.01 (16.23)	11/11 100%	154.37 (16.07)	14.9	9/13 69.2%	154.08 (16.95)	7.0	23/27 85.2%	154.45 (14.98)	5.1	25/28 89.3%	152.90 (16.16)	4.6	14/15 93.3%	152.61 (18.70)	3.4
Religion																	
Religion	83.8%	152.58 (16.98)	222/249 89.2%	155.96 (14.91)	5.5	385/452 85.2%	152.24 (16.06)	5.9	472/569 83.0%	152.43 (16.99)	5.9	506/611 (82.8%)	151.73 (18.28)	6.6	167/209 79.9%	149.87 (17.59)	6.7
No religion	92.9%	158.90 (14.52)	153/162 94.4%	158.22 (13.60)	4.7	251/275 91.3%	158.09 (14.44)	7.4	362/395 91.6%	159.20 (14.49)	4.3	436/467 93.4%	158.61 (15.45)	1.7	156/163 95.7%	160.22 (13.47)	4.4

Appendix 14

Table 13 – Study Two: CSA $_{GINI}$

	Overall pass rate	Overall mean score (SD)	2016			2017			2018			2019			2020		
			Pass rate	Mean Score	CSA_{GINI} Index 2016	Pass rate	Mean Score	CSA_{GINI} Index 2017	Pass rate	Mean Score	CSA_{GINI} Index 2018	Pass rate	Mean Score	CSA_{GINI} Index 2019	Pass rate	Mean Score	CSA_{GINI} Index 2020
Sex																	
Male	88.0%	83.96 (8.87)	72/79 91.1%	84.48 (8.66)	4.9	214/237 90.3%	83.95 (8.90)	5.5	312/361 86.4%	83.52 (9.32)	5.6	433/493 87.8%	84.11 (8.65)	5.4	152/175 (86.9%)	84.10 (8.70)	5.3
Female	94.2%	87.78 (8.59)	99/102 97.1%	90.51 (8.69)	5.6	327/346 94.5%	87.48 (8.61)	6.0	537/576 93.2%	87.83 (8.85)	6.3	721/767 94.0%	87.54 (8.46)	5.8	318/336 (94.6%)	87.60 (8.25)	5.4
Course type																	
Graduate	92.4%	87.18 (9.32)	123/128 96.1%	87.50 (9.26)	5.9	205/215 95.3%	86.23 (8.68)	5.7	213/239 89.1%	86.08 (9.67)	6.4	288/316 91.1%	85.64 (8.91)	5.9	85/95 89.5%	86.00 (9.42)	6.2
Undergraduate	91.7%	86.13 (8.76)	48/53 90.6%	88.79 (8.93)	5.4	336/368 91.3%	85.94 (9.02)	5.9	636/695 91.5%	86.29 (9.06)	5.9	866/944 91.7%	86.38 (8.61)	5.6	385/416 92.5%	86.50 (8.36)	5.4
Ethnicity																	
Asian or Asian Black	86.0%	82.96 (8.71)	22/28 78.6%	83.54 (9.48)	6.1	136/156 87.2%	82.41 (8.44)	5.7	243/291 83.5%	82.02 (9.18)	6.2	318/368 86.4%	83.43 (8.47)	5.7	134/149 89.9%	84.08 (8.38)	5.6
Black or Black British	83.2%	80.65 (8.52)	2/3 66.7%	76.67 (4.93)	7.2	13/15 86.7%	79.67 (8.62)	7.0	15/20 75.0%	79.70 (10.40)	6.8	33/36 91.7%	82.67 (7.48)	4.9	11/15 73.3%	78.87 (8.48)	5.5
Mixed	93.1%	86.22 (8.66)	5/5 100%	89.60 (9.37)	5.6	18/19 (94.7%)	86.16 (9.26)	5.7	23/25 (92.0%)	86.08 (9.74)	6.0	32/35 91.4%	86.69 (8.65)	5.3	16/17 94.1%	84.41 (6.81)	4.2
White	95.2%	88.30 (8.36)	129/131 98.5%	89.24 (8.53)	5.4	347/363 95.6%	87.93 (8.41)	5.4	525/551 95.3%	88.82 (8.35)	5.3	700/741 94.5%	87.96 (8.39)	5.3	297/314 (94.6)	88.06 (8.14)	5.2
Deprivation																	
IMD- most deprived quintile	86.7%	82.64 (8.56)	15/17 88.2%	82.53 (9.27)	6.0	50/61 82.0%	81.36 (9.13)	6.2	76/94 80.9%	81.38 (9.42)	6.4	124/135 91.9%	83.90 (7.56)	5.0	46/52 88.5%	82.65 (8.22)	5.5
IMD all other quintiles	92.3%	86.72 (8.84)	156/164 95.1%	88.23 (9.10)	5.8	491/522 94.1%	86.60 (8.71)	5.7	772/842 91.7%	86.70 (9.11)	5.9	1025/1120 91.5%	86.48 (8.79)	5.7	422/457 92.3%	86.82 (8.52)	5.5
CYP- most deprived quintile	90.2%	85.13 (8.33)	12/13 92.3%	85.69 (9.03)	4.5	510/544 93.8%	86.32 (8.84)	3.5	36/44 81.8%	81.95 (8.55)	3.4	97/102 95.1%	85.90 (7.44)	3.1	55/58 94.8%	88.00 (8.08)	3.0
CYP all other quintiles	91.9%	86.39 (8.94)	159/168 94.6%	88.05 (9.17)	4.0	510/544 93.8%	86.32 (8.84)	3.2	812/892 91.0%	86.37 (9.26)	3.2	1052/1153 91.2%	86.23 (8.80)	3.1	413/451 91.6%	86.19 (8.62)	2.9
Adult Skills- most deprived quintile	92.3%	85.43 (8.51)	13/15 86.7%	86.87 (9.09)	8.1	44/50 88.0%	83.08 (8.26)	7.8	46/56 82.1%	83.54 (10.12)	7.5	106/108 98.1%	85.73 (7.18)	7.4	55/57 96.5%	88.42 (8.42)	7.1
Adult Skills- all other quintiles	91.7%	86.38 (8.93)	158/166 95.2%	87.97 (9.18)	6.0	497/533 93.2%	86.33 (8.90)	5.5	802/880 91.1%	86.33 (9.20)	5.4	1043/1147 90.9%	86.24 (8.83)	5.4	413/452 91.4%	86.14 (8.57)	5.3

Income- most deprived quintile	86.5%	82.46 (8.51)	19/21 90.5%	84.86 (8.66)	6.5	57/69 82.6%	81.30 (8.64)	7.8	83/103 80.6%	80.99 (9.87)	8.5	146/162 90.1%	83.36 (7.34)	8.7	52/58 89.7%	82.97 (8.48)	9.2
Income all other quintiles	92.5%	86.82 (8.82)	152/160 95.0%	88.28 (9.17)	6.2	484/514 94.2%	86.68 (8.74)	6.7	765/833 91.8%	86.81 (9.00)	6.8	1003/1093 91.8%	86.62 (8.81)	6.7	416/451 92.2%	86.84 (8.50)	6.5
Employment- most deprived quintile	88.2%	83.14 (8.66)	13/15 86.7%	85.40 (9.46)	6.3	56/67 83.6%	82.04 (9.64)	7.1	80/95 84.2%	82.09 (9.13)	7.5	119/130 91.5%	84.12 (7.88)	7.6	36/38 94.7%	83.58 (7.73)	8.2
Employment- all other quintiles	92.1%	86.65 (8.86)	158/166 95.2%	88.10 (9.13)	5.0	485/516 94.0%	86.57 (8.66)	5.2	768/841 91.3%	86.63 (9.18)	5.4	1030/1125 91.6%	86.44 (8.76)	5.4	432/471 91.7	86.62 (8.61)	5.6
Disability																	
Disability	88.7%	85.84 (9.32)	5/6 83.3%	88.00 (11.12)	5.9	22/23 95.7%	87.87 (8.56)	5.9	57/66 86.4%	85.56 (9.29)	6.2	64/71 90.1%	84.92 (9.24)	5.8	24/28 85.7%	86.68 (10.06)	6.3
No declared disability	92.1%	86.39 (8.85)	154/163 94.5%	87.74 (9.25)	5.8	488/525 93.0%	85.90 (8.83)	5.86	750/822 91.2%	86.38 (9.25)	6.0	1014/1107 91.6%	86.31 (8.66)	5.7	430/463 92.9%	86.55 (8.43)	5.5
Sexual Orientation																	
Heterosexual	92.1%	86.41 (8.91)	103/110 93.6%	87.25 (9.40)	5.9	349/374 93.3%	86.30 (9.03)	5.9	600/660 90.9%	86.24 (9.20)	6.0	868/941 92.2%	86.28 (8.66)	5.7	369/400 92.3%	86.79 (8.74)	5.6
LGBTQ+	93.1%	87.3%	3/3 100%	91.33 (5.13)	5.4	10/11 90.9%	86.27 (8.64)	5.4	12/13 92.3%	90.46 (9.29)	6.1	22/23 95.7%	87.39 (8.56)	5.7	7/8 87.5%	82.00 (6.93)	5.1
Religion																	
Religion	90.1%	85.38 (9.16)	64/70 91.4%	87.63 (10.30)	6.1	202/222 91.0%	85.49 (9.25)	5.9	378/424 89.2%	85.08 (9.38)	6.2	491/543 90.4%	85.08 (8.84)	5.8	206/230 89.6%	85.78 (9.03)	5.7
No religion	95.1%	88.09 (8.33)	39/39 100%	87.67 (7.77)	5.0	155/161 96.3%	87.64 (8.67)	5.7	225/238 94.5%	88.91 (8.20)	5.7	23/378 94.3%	87.96 (8.34)	5.4	159/167 95.2%	87.69 (8.26)	5.2

Appendix 15

Table 14- Study Two: Model 1- Predictors of AKT performance on first attempt on multivariate analysis with ethnicity adjusted as White or Non-White

Variable	Exp (B)	Lower	Upper	Sig
White	2.002	1.090	3.546	0.021
Primary Medical Qualification: Midlands	1.904	1.039	2.901	0.009
Primary Medical Qualification: North West	0.421	0.306	0.875	0.039
Primary Medical Qualification: North East	0.310	0.220	0.741	<0.001
LTFT	3.510	0.994	11.967	0.053
UCAT Quantitative Reasoning Score	1.002	1.001	1.006	<0.001
UCAT Verbal Reasoning Score	1.003	1.001	1.005	0.019
SJT score	1.009	1.004	1.014	0.071
EPM Decile	1.473	1.319	1.726	<0.001
Graduate on entry to medical school	0.291	0.198	0.551	<0.001
Medicine with a foundation year course	0.293	0.175	1.640	0.052
Traditional Medicine course	9.100	3.702	10.104	0.060

Table 15- Study Two: Model 2- Predictors of AKT performance on first attempt on multivariate analysis with ethnicity adjusted by level 1 ethnicity

Variable	**Exp (B)**	**Lower**	**Upper**	**Sig**
Primary Medical Qualification: Midlands	1.668	1.089	2.556	0.019
Primary Medical Qualification: North West	0.606	0.381	0.962	0.034
Primary Medical Qualification: North East	0.350	0.189	0.648	<0.001
LTFT	3.405	0.976	11.875	0.055
Most deprived quintile: CYP Deprivation	2.043	1.014	4.118	0.046
Most deprived quintile: Income Deprivation	0.293	0.152	0.564	<0.001
UCAT Quantitative Reasoning Score	1.004	1.002	1.007	<0.001
UCAT Verbal Reasoning Score	1.003	1.000	1.005	0.022
SJT score	1.006	1.000	1.012	0.065
EPM Decile	1.598	1.472	1.734	<0.001
Graduate on entry to medical school	0.301	0.203	0.446	<0.001
Medicine with a foundation year course	0.275	0.075	1.005	0.051
Traditional Medicine course	8.400	2.801	9.938	0.055
Most deprived quintile: Employment deprivation	0.468	0.335	0.654	<0.001

Table 16- Study Two: Model 3- Predictors of AKT performance on first attempt on multivariate analysis with ethnicity adjusted by level 2 ethnicity

Variable	Exp (B)	Lower	Upper	Sig
Primary Medical Qualification: Midlands	1.511	0.976	2.340	0.064
Primary Medical Qualification: North West	0.453	0.301	0.680	<0.001
Primary Medical Qualification: North East	0.376	0.144	0.981	0.046
LTFT	3.336	0.946	11.765	0.061
Most deprived quintile: CYP Deprivation	1.889	0.943	3.782	0.073
Most deprived quintile: Income Deprivation	0.271	0.141	0.523	<0.001

UCAT Quantitative Reasoning score	1.004	1.002	1.007	<0.001
UCAT Verbal Reasoning score	1.002	1.000	1.005	0.044
SJT score	1.006	1.000	1.012	0.044
EPM Decile	1.619	1.491	1.757	<0.001
Graduate on entry to medical school	0.307	0.207	0.457	<0.001
Medicine with a foundation year course	0.240	0.065	0.879	0.031
Traditional Medicine course	8.406	2.878	10.438	0.065
Most deprived quintile: Employment deprivation	0.522	0.325	0.838	0.007
Most deprived quintile: Adult Skills deprivation	0.293	0.165	0.522	<0.001

Table 17- Study Two: Model 4- Predictors of CSA performance on first attempt on multivariate analysis with ethnicity adjusted as White or Non-White

Variable	**Exp (B)**	**Lower**	**Upper**	**Sig**
Female	2.451	1.563	3.398	<0.001
White	2.354	1.643	3.501	<0.001
UCAT Decision Reasoning score	1.004	1.002	1.008	0.006
SJT score	1.006	1.002	1.013	0.071
EPM Decile	1.310	1.195	1.421	<0.001
Graduate on entry to medical school	0.610	0.455	0.891	0.051

Table 18- Study Two: Model 5- Predictors of CSA performance on first attempt on multivariate analysis with ethnicity adjusted by level 1 ethnicity

Variable	**Exp (B)**	**Lower**	**Upper**	**Sig**
Female	2.252	1.479	3.428	<0.001
State school	2.103	1.002	4.416	0.049
UCAT Bursary	0.361	0.194	0.670	0.001
UCAT Decision Reasoning score	1.004	1.001	1.007	0.005
SJT score	1.007	1.000	1.015	0.064
EPM Decile	1.275	1.165	1.395	<0.001
Graduate on entry to medical school	0.590	0.355	0.981	0.042
Most deprived quintile: Adult Skills deprivation	0.510	0.332	0.785	0.002

Table 19- Study Two: Model 6- Predictors of AKT performance on first attempt on multivariate analysis with ethnicity adjusted by level 2 ethnicity

Variable	**Exp (B)**	**Lower**	**Upper**	**Sig**
Female	2.452	1.593	3.776	<0.001
State school	1.553	0.977	2.467	0.062
UCAT Bursary	0.438	0.183	1.045	0.063
UCAT Decision Reasoning score	1.005	1.002	1.008	<0.001
SJT score	1.008	1.000	1.017	0.037
EPM Decile	1.285	1.173	1.408	<0.001
Graduate on entry to medical school	1.285	1.173	1.408	<0.001
Most deprived quintile: Adult Skills deprivation	0.204	0.082	0.511	<0.001
Most deprived quintile: Income Deprivation	0.207	0.084	0.507	<0.001
Most deprived quintile: Employment deprivation	0.181	0.047	0.694	0.013

Appendix 16

Table 20 – Study Three: Demographic Data 1- summarises descriptive demographic data of the study population which included trainees with an expected CCT date on or before 26/1/2022 who had accepted a GP Training post via ORIEL since the earliest time of GP Training records (2013). Data is provided for: a) all trainees with an expected CCT date on or before 26/1/22 (n=7481), b) trainees who completed their CCT by that date (n=4583, 61.3%) c) trainees who did not complete their CCT by that date (n=2898, 38.7%).

	Trainees with expected CCT date before 26th Jan 22 (n.b- 2 trainees with no arcp data (one completed CCT and one did not, both excluded from arcp analysis)			**Trainees who completed CCT by their expected date of 26th Jan 22 (n.b- 1 trainee with no arcp data so total for ARCP analysis is 4582)**			**Trainees who did not complete CCT by their expected date by 26th Jan 22 (n.b- 1 trainee with no arcp data so total for ARCP analysis is 2897)**		
	N (7481)	**Trainees with standard ARCP outcomes at every progression point (n=5314)**	**Trainees with 1 or more non standard ARCP outcome during training (n=2165)**	**N (4583)**	**Trainees with standard ARCP outcomes at every progression point (n=3077)**	**Trainees with 1 or more non standard ARCP outcome during training (n=1505)**	**N (2898)**	**Trainees with standard ARCP outcomes at every progression point (n=2236)**	**Trainees with 1 or more non standard ARCP outcome during training (n=660)**
Sex									
Male	2776 (37.1)	1852 (34.9)	923 (42.6)	1815 (39.6)	1136 (36.9)	678 (45)	961 (33.2)	716 (32)	245 (37.1)
Female	4705 (62.9)	3462 (65.1)	1242 (57.4)	2768 (60.4)	1941 (63.1)	827 (55)	1937 (66.8)	1521 (68)	415 (62.9)
Course type									
Foundation Course	64 (0.9)	48 (0.9)	16 (0.7)	36 (0.8)	29 (0.9)	7 (0.5)	28 (1)	19 (0.8)	9 (1.4)
Graduate Entry Medicine	1557 (20.8)	1094 (20.6)	462 (21.3)	923 (20.1)	589 (19.1)	333 (22.1)	634 (21.9)	505 (22.6)	129 (19.5)
Medicine with a Gateway Year	93 (1.2)	64 (1.2)	29 (1.3)	43 (0.9)	30 (1)	13 (0.9)	50 (1.7)	34 (1.5)	16 (2.4)
Medicine with a Preliminary Year	63 (0.8)	42 (0.8)	21 (1)	36 (0.8)	25 (0.8)	11 (0.7)	27 (0.9)	17 (0.8)	10 (1.5)
Standard Entry Medicine	5703 (76.2)	4066 (76.5)	1636 (75.6)	3544 (77.3)	2404 (78.1)	1104 (73.4)	2159 (74.5)	1662 (74.3)	496 (75.2)
Unknown/other	1								
Teaching style									
Traditional	180 (2.4)	139 (2.6)	41 (1.9)	91 (2)	67 (2.2)	24 (1.6)	89 (3.1)	72 (3.2)	17 (2.6)
Integrated	4421 (59.1)	3151 (59.3)	1269 (58.6)	2708 (59.1)	1837 (59.7)	871 (57.9)	1713 (59.1)	1314 (58.8)	398 (60.3)
Problem Based Learning	2283 (30.5)	1609 (30.3)	674 (31.1)	1431 (31.2)	942 (30.6)	489 (32.5)	852 (29.4)	667 (29.8)	185 (28)
Case Based Learning	596 (8)	415 (7.8)	181 (8.4)	352 (7.7)	231 (7.5)	121 (8)	244 (8.4)	184 (8.2)	60 (9.1)
Other									
Graduate entry									
Graduate on entry	2199 (29.4)	1519 (28.6)	680 (31.4)	1294 (28.2)	811 (26.4)	483 (32.1)	905 (31.2)	708 (31.7)	197 (29.8)
Not graduate entry	5270 (70.4)	3787 (71.3)	1481 (68.4)	3284 (71.7)	2262 (73.5)	1021 (67.8)	1996 (68.9)	1525 (68.2)	460 (69.7)
Not stated	12 (0.16)	8		5			7		3
School type									
Private	1724 (23)	1238 (23.3)	485 (22.4)	1054 (23)	718 (23.3)	335 (22.3)	670 (23.1)	520 (23.3)	150 (22.7)
State School (including grammar)	5260 (70.3)	3718 (70)	1541 (71.2)	3245 (70.8)	2166 (70.4)	1079 (71.7)	2015 (69.5)	1552 (69.4)	462 (70)
Unknown/ Other	497 (6.6)	358 (6.7)	139 (6.4)	284 (6.2)	193 (6.3)	91 (6)	213 (7.3)	165 (7.4)	48 (7.3)
Ethnicity									
White	4372 (58.4)	3157 (59.4)	1214 (56.1)	2657 (58)	1819 (59.1)	839 (55.7)	1715 (59.2)	1338 (59.8)	376 (57)
Not stated	286 (3.8)	196 (3.7)	90 (4.2)	155 (3.4)	96 (3.1)	59 (3.9)	131 (4.5)	100 (4.5)	31 (4.7)

Any other ethnic	121 (1.6)	85 (1.6)	36 (1.7)	67 (1.5)	49 (1.6)	18 (1.2)	54 (1.9)	36 (1.6)	18 (2.7)
Arab	61 (0.8)	45 (0.8)	16 (0.7)	31 (0.7)	21 (0.7)	10 (0.7)	30 (1)	24 (1.1)	6 (0.9)
Any other black	7 (0.1)	4 (0.1)	3 (0.1)	5 (0.1)	3 (0.1)	2 (0.1)	2 (0.1)	1 (0)	1 (0.2)
African	181 (2.4)	110 (2.1)	71 (3.3)	101 (2.2)	55 (1.8)	46 (3.1)	80 (2.8)	55 (2.5)	25 (3.8)
Caribbean	33 (0.4)	223 (4.2)	7 (0.3)	19 (0.4)	12 (0.4)	7 (0.5)	14 (0.5)	14 (0.6)	0 (0)
Any other Asian	329 (4.4)	223 (4.2)	106 (4.9)	197 (4.3)	125 (4.1)	72 (4.8)	132 (4.6)	98 (4.4)	34 (5.2)
Bangladeshi	112 (1.5)	74 (1.4)	38 (1.8)	69 (1.5)	42 (1.4)	27 (1.8)	43 (1.5)	32 (1.4)	11 (1.7)
Pakistani	517 (6.9)	376 (7.1)	141 (6.5)	343 (7.5)	236 (7.7)	107 (7.1)	174 (6)	140 (6.3)	34 (5.2)
Indian	896 (12)	632 (11.9)	263 (12.1)	613 (13.4)	420 (13.6)	192 (12.8)	283 (9.8)	212 (9.5)	71 (10.8)
Any other mixed group	87 (1.2)	59 (1.1)	28 (1.3)	45 (1)	29 (0.9)	16 (1.1)	42 (1.4)	30 (1.3)	12 (1.8)
White and Asian	125 (1.7)	76 (1.4)	49 (2.3)	79 (1.7)	44 (1.4)	35 (2.3)	46 (1.6)	32 (1.4)	14 (2.1)
White and Black African	19 (0.3)	14 (0.3)	5 (0.2)	16 (0.3)	11 (0.4)	5 (0.3)	3 (0.1)	3 (0.1)	0 (0)
White and Black Caribbean	22 (0.3)	13 (0.2)	9 (0.4)	13 (0.3)	6 (0.2)	7 (0.5)	9 (0.3)	7 (0.3)	2 (0.3)
Any other White	157 (2.1)	107 (2)	50 (2.3)	79 (1.7)	49 (1.6)	30 (2)	78 (2.7)	58 (2.6)	20 (3)
Irish	39 (0.5)	29 (0.5)	10 (0.5)	21 (0.5)	14 (0.5)	7 (0.5)	18 (0.6)	15 (0.7)	3 (0.5)
Chinese	117 (1.6)	88 (1.7)	29 (1.3)	73 (1.6)	46 (1.5)	27 (1.8)	44 (1.5)	42 (1.9)	2 (0.3)
Ethnicity									
Not stated	286 (3.8)	196 (3.7)	90 (4.2)	155 (3.4)	96 (3.1)	59 (3.9)	131 (4.5)	100 (4.5)	31 (4.7)
Any other ethnic group	182 (2.4)	130 (2.4)	52 (2.4)	98 (2.1)	70 (2.3)	28 (1.9)	84 (2.9)	60 (2.7)	24 (3.6)
Black or Black British	221 (3)	140 (2.6)	81 (3.7)	125 (2.7)	70 (2.3)	55 (3.7)	96 (3.3)	70 (3.1)	26 (3.9)
Asian or Asian British	1971 (26.3)	1393 (26.2)	577 (26.7)	1295 (28.3)	869 (28.2)	425 (28.2)	676 (23.3)	524 (23.4)	152 (23)
Mixed	253 (3.4)	162 (3)	91 (4.2)	153 (3.3)	90 (2.9)	63 (4.2)	100 (3.5)	72 (3.2)	28 (4.2)
White	4568 (61.1)	3293 (62.0)	1274 (58.8)	2757 (60.2)	1882 (61.2)	875 (58.1)	1811 (62.5)	1411 (63.1)	399 (60.5)
Sexual orientation									
Bisexual	35 (0.5)	26 (0.5)	9 (0.4)	15 (0.3)	10 (0.3)	5 (0.3)	20 (0.7)	16 (0.7)	4 (0.6)
Heterosexual/Straight	5199 (69.5)	3728 (70.2)	1469 (67.9)	3315 (72.3)	2262 (73.5)	1052 (69.9)	1884 (65)	1466 (65.6)	417 (63.2)
Lesbian/Gay	122 (1.6)	77 (1.4)	45 (2.1)	67 (1.5)	35 (1.1)	32 (2.1)	55 (1.9)	42 (1.9)	13 (2)
Other	11 (0.1)	9 (0.2)	2 (0.1)	5 (0.1)	4 (0.1)	1 (0.1)	6 (0.2)	5 (0.2)	1 (0.2)
Prefer not to say	823 (11)	578 (10.9)	245 (11.3)	474 (10.3)	312 (10.1)	162 (10.8)	349 (12)	266 (11.9)	83 (12.6)
Unknown	1291 (17.3)	896 (16.9)	395 (18.2)	707 (15.4)	454 (14.8)	253 (16.8)	584 (20.2)	442 (19.8)	142 (21.5)
Religion									
Buddhist	39 (0.5)	28 (0.5)	11 (0.5)	25 (0.5)	18 (0.6)	7 (0.5)	14 (0.5)	10 (0.4)	4 (0.6)
Christian	1730 (23.1)	1263 (23.8)	467 (21.6)	1079 (23.5)	758 (24.6)	321 (21.3)	651 (22.5)	505 (22.6)	146 (22.1)
Hindu	414 (5.5)	297 (5.6)	116 (5.4)	289 (6.3)	200 (6.5)	88 (5.8)	125 (4.3)	97 (4.3)	28 (4.2)
Jewish	45 (0.6)	28 (0.5)	17 (0.8)	25 (0.5)	11 (0.4)	14 (0.9)	20 (0.7)	17 (0.8)	3 (0.5)
Muslim	690 (9.2)	500 (9.4)	190 (8.8)	465 (10.1)	318 (10.3)	147 (9.8)	225 (7.8)	182 (8.1)	43 (6.5)

No religion	2225 (29.7)	1575 (29.6)	649 (30)	1354 (29.5)	896 (29.1)	458 (30.4)	871 (30.1)	679 (30.4)	191 (28.9)
Sikh	125 (1.7)	90 (1.7)	35 (1.6)	91 (2)	66 (2.1)	25 (1.7)	34 (1.2)	24 (1.1)	10 (1.5)
Other	82 (1.1)	58 (1.1)	24 (1.1)	47 (1)	30 (1)	17 (1.1)	35 (1.2)	28 (1.3)	7 (1.1)
Prefer not to say	840 (11.2)	579 (10.9)	261 (12.1)	501 (10.9)	326 (10.6)	175 (11.6)	339 (11.7)	253 (11.3)	86 (13)
Undisclosed	1291 (17.3)	896 (16.9)	395 (18.2)	707 (15.4)	454 (14.8)	253 (16.8)	584 (20.2)	442 (19.8)	142 (21.5)
Disability									
Declared disability	478 (6.4)	322 (6.1)	155 (7.2)	272 (5.9)	179 (5.8)	93 (6.2)	206 (7.1)	143 (6.4)	62 (9.4)
No disability declared	6466 (86.4)	4629 (87.1)	1836 (84.8)	4035 (88)	2726 (88.6)	1308 (86.9)	2431 (83.9)	1903 (85.1)	528 (80)
Prefer not to say	534 (7.1)	361 (6.8)	173 (8)	276 (6)	172 (5.6)	104 (6.9)	258 (8.9)	189 (8.5)	69 (10.5)
Not stated	3 (0.04)	2	1	0			3	2	1
Free School Meals									
Free School Meals	554 (7.4)	356 (6.7)	198 (9.1)	345 (7.5)	199 (6.5)	146 (9.7)	209 (7.2)	157 (7)	52 (7.9)
Not on Free School Meals	4816 (64.4)	3366 (63.3)	1449 (66.9)	3087 (67.4)	2019 (65.6)	1068 (71)	1729 (59.7)	1347 (60.2)	381 (57.7)
Unknown/Prefer Not to Say	2111								
Parent Degree									
Parent Degree	3541 (47.3)	2484 (46.7)	1056 (48.8)	2252 (49.1)	1474 (47.9)	778 (51.7)	1289 (44.5)	1010 (45.2)	278 (42.1)
No parent degree	2024 (27.1)	1376 (25.9)	648 (29.9)	1306 (28.5)	823 (26.7)	483 (32.1)	718 (24.8)	553 (24.7)	165 (25)
Unknown/Prefer Not to Say	1916								
Income Support									
Income Support	864 (11.5)	579 (10.9)	285 (13.2)	538 (11.7)	330 (10.7)	208 (13.8)	326 (11.2)	249 (11.1)	77 (11.7)
No Income Support	4269 (57.1)	2985 (56.2)	1283 (59.3)	2743 (59.9)	1790 (58.2)	953 (63.3)	1526 (52.7)	1185 (53)	330 (50)
Unknown/Prefer not to say	2348								
Deprivation									
Overall Index of Multiple Deprivation									
1ST Quintile (most deprived)	760 (10.2)	520 (9.8)	240 (11.1)	467 (10.2)	303 (9.8)	164 (10.9)	293 (10.1)	217 (9.7)	76 (11.5)
2nd Quintile	1084 (14.5)	747 (14.1)	337 (15.6)	636 (13.9)	416 (13.5)	220 (14.6)	448 (15.5)	331 (14.8)	117 (17.7)
3rd Quintile	1464 (19.6)	1060 (19.9)	404 (18.7)	897 (19.6)	609 (19.8)	288 (19.1)	567 (19.6)	451 (20.2)	116 (17.6)
4th Quintile	1774 (23.7)	1265 (23.8)	509 (23.5)	1126 (24.6)	762 (24.8)	364 (24.2)	648 (22.4)	503 (22.5)	145 (22)
5th Quintile (least deprived)	2385 (31.9)	1712 (32.2)	671 (31)	1449 (31.6)	980 (31.8)	468 (31.1)	936 (32.3)	732 (32.7)	203 (30.8)
Unknown									
Education Skills Deprivation Score									
1ST Quintile (most deprived)	476 (6.4)	325 (6.1)	151 (7)	295 (6.4)	194 (6.3)	101 (6.7)	181 (6.2)	131 (5.9)	50 (7.6)
2nd Quintile	787 (10.5)	543 (10.2)	244 (11.3)	477 (10.4)	318 (10.3)	159 (10.6)	310 (10.7)	225 (10.1)	85 (12.9)
3rd Quintile	1210 (16.2)	842 (15.8)	368 (17)	735 (16)	487 (15.8)	248 (16.5)	475 (16.4)	355 (15.9)	120 (18.2)
4th Quintile	1714 (22.9)	1234 (23.2)	480 (22.2)	1047 (22.8)	704 (22.9)	343 (22.8)	667 (23)	530 (23.7)	137 (20.8)
5th Quintile (least deprived)	3280 (43.8)	2360 (44.4)	918 (42.4)	2021 (44.1)	1367 (44.4)	653 (43.4)	1259 (43.4)	993 (44.4)	265 (40.2)
Unknown									
Children and Young People's Deprivation Score									
1ST Quintile (most deprived)	622 (8.3)	429 (8.1)	193 (8.9)	362 (7.9)	237 (7.7)	125 (8.3)	260 (9)	192 (8.6)	68 (10.3)

2nd Quintile	1007 (13.5)	714 (13.4)	293 (13.5)	593 (12.9)	402 (13.1)	191 (12.7)	414 (14.3)	312 (14)	102 (15.5)
3rd Quintile	1197 (16)	855 (16.1)	342 (15.8)	751 (16.4)	507 (16.5)	244 (16.2)	446 (15.4)	348 (15.6)	98 (14.8)
4th Quintile	1671 (22.3)	1193 (22.5)	478 (22.1)	1013 (22.1)	695 (22.6)	318 (21.1)	658 (22.7)	498 (22.3)	160 (24.2)
5th Quintile (least deprived)	2970 (39.7)	2113 (39.8)	855 (39.5)	1856 (40.5)	1229 (39.9)	626 (41.6)	1114 (38.4)	884 (39.5)	229 (34.7)
Unknown									
Adult Skills Deprivation Score									
1ST Quintile (most deprived)	639 (8.5)	440 (8.3)	299 (13.8)	397 (8.7)	267 (8.7)	130 (8.6)	242 (8.4)	173 (7.7)	69 (10.5)
2nd Quintile	892 (11.9)	645 (12.1)	247 (11.4)	540 (11.8)	369 (12)	171 (11.4)	352 (12.1)	276 (12.3)	76 (11.5)
3rd Quintile	1267 (16.9)	889 (16.7)	378 (17.5)	767 (16.7)	523 (17)	244 (16.2)	500 (17.3)	366 (16.4)	134 (20.3)
4th Quintile	1807 (24.2)	1309 (24.6)	498 (23)	1124 (24.5)	761 (24.7)	363 (24.1)	683 (23.6)	548 (24.5)	135 (20.5)
5th Quintile (least deprived)	2862 (38.3)	2021 (38)	839 (38.8)	1747 (38.1)	1150 (37.4)	596 (39.6)	1115 (38.5)	871 (39)	243 (36.8)
Unknown									
Barriers to Housing and Services Deprivation Score									
1ST Quintile (most deprived)	2015 (26.9)	1431 (26.9)	584 (27)	1219 (26.6)	794 (25.8)	425 (28.2)	796 (27.5)	637 (28.5)	159 (24.1)
2nd Quintile	1780 (23.8)	1245 (23.4)	535 (24.7)	1109 (24.2)	742 (24.1)	367 (24.4)	671 (23.2)	503 (22.5)	168 (25.5)
3rd Quintile	1388 (18.6)	996 (18.7)	391 (18.1)	845 (18.4)	586 (19)	258 (17.1)	543 (18.7)	410 (18.3)	133 (20.2)
4th Quintile	1219 (16.3)	880 (16.6)	338 (15.6)	739 (16.1)	507 (16.5)	232 (15.4)	480 (16.6)	373 (16.7)	106 (16.1)
5th Quintile (least deprived)	1065 (14.2)	752 (14.2)	313 (14.5)	663 (14.5)	441 (14.3)	222 (14.8)	402 (13.9)	311 (13.9)	91 (13.8)
Unknown									
Geographical Barriers Deprivation Score									
1ST Quintile (most deprived)	1968 (26.3)	1413 (26.6)	555 (25.6)	1244 (27.1)	844 (27.4)	400 (26.6)	724 (25)	569 (25.4)	155 (23.5)
2nd Quintile	1532 (20.5)	1084 (20.4)	447 (20.6)	923 (20.1)	619 (20.1)	303 (20.1)	609 (21)	465 (20.8)	144 (21.8)
3rd Quintile	1349 (18)	962 (18.1)	386 (17.8)	829 (18.1)	558 (18.1)	271 (18)	520 (17.9)	404 (18.1)	115 (17.4)
4th Quintile	1260 (16.8)	896 (16.9)	364 (16.8)	765 (16.7)	516 (16.8)	249 (16.5)	495 (17.1)	380 (17)	115 (17.4)
5th Quintile (least deprived)	1358 (18.2)	949 (17.9)	409 (18.9)	814 (17.8)	533 (17.3)	281 (18.7)	544 (18.8)	416 (18.6)	128 (19.4)
Unknown									
Wider Barriers to Housing and Services Deprivation Score									
1ST Quintile (most deprived)	1841 (24.6)	1277 (24)	564 (26.1)	1117 (24.4)	706 (22.9)	411 (27.3)	724 (25)	571 (25.5)	153 (23.2)
2nd Quintile	1253 (16.7)	899 (16.9)	354 (16.4)	778 (17)	542 (17.6)	236 (15.7)	475 (16.4)	357 (16)	118 (17.9)
3rd Quintile	1336 (17.9)	974 (18.3)	361 (16.7)	818 (17.8)	583 (18.9)	234 (15.5)	518 (17.9)	391 (17.5)	127 (19.2)
4th Quintile	1342 (17.9)	959 (18)	382 (17.6)	818 (17.8)	548 (17.8)	270 (17.9)	524 (18.1)	411 (18.4)	112 (17)
5th Quintile (least deprived)	1695 (22.7)	1195 (22.5)	500 (23.1)	1044 (22.8)	691 (22.5)	353 (23.5)	651 (22.5)	504 (22.5)	147 (22.3)
Unknown									
Living Environment Deprivation Score									
1ST Quintile (most deprived)	2010 (26.9)	1396 (26.3)	613 (28.3)	1217 (26.6)	773 (25.1)	443 (29.4)	793 (27.4)	623 (27.9)	170 (25.8)
2nd Quintile	1303 (17.4)	948 (17.8)	354 (16.4)	805 (17.6)	565 (18.4)	240 (15.9)	498 (17.2)	383 (17.1)	114 (17.3)
3rd Quintile	1406 (18.8)	987 (18.6)	419 (19.4)	854 (18.6)	568 (18.5)	286 (19)	552 (19)	419 (18.7)	133 (20.2)
4th Quintile	1344 (18)	960 (18.1)	384 (17.7)	831 (18.1)	572 (18.6)	259 (17.2)	513 (17.7)	388 (17.4)	125 (18.9)
5th Quintile (least deprived)	1404 (18.8)	1013 (19.1)	391 (18.1)	868 (18.9)	592 (19.2)	276 (18.3)	536 (18.5)	421 (18.8)	115 (17.4)
Unknown									

Indoor Deprivation Score									
1ST Quintile (most deprived)	1993 (26.6)	1389 (26.1)	603 (27.9)	1206 (26.3)	768 (25)	437 (29)	787 (27.2)	621 (27.8)	166 (25.2)
2nd Quintile	1312 (17.5)	937 (17.6)	274 (12.7)	816 (17.8)	562 (18.3)	254 (16.9)	496 (17.1)	375 (16.8)	120 (18.2)
3rd Quintile	1427 (19.1)	1013 (19.1)	414 (19.1)	857 (18.7)	578 (18.8)	279 (18.5)	570 (19.7)	435 (19.5)	135 (20.5)
4th Quintile	1324 (17.7)	946 (17.8)	378 (17.5)	814 (17.8)	559 (18.2)	255 (16.9)	510 (17.6)	387 (17.3)	123 (18.6)
5th Quintile (least deprived)	1411 (18.9)	1019 (19.2)	392 (18.1)	882 (19.2)	603 (19.6)	279 (18.5)	529 (18.3)	416 (18.6)	113 (17.1)
Unknown									
Outdoor Deprivation Score									
1ST Quintile (most deprived)	2055 (27.5)	1432 (26.9)	622 (28.7)	1243 (27.1)	797 (25.9)	445 (29.6)	812 (28)	635 (28.4)	177 (26.8)
2nd Quintile	1284 (17.2)	923 (17.4)	360 (16.6)	814 (17.8)	565 (18.4)	249 (16.5)	470 (16.2)	358 (16)	111 (16.8)
3rd Quintile	1381 (18.5)	987 (18.6)	394 (18.2)	829 (18.1)	562 (18.3)	267 (17.7)	552 (19)	425 (19)	127 (19.2)
4th Quintile	1355 (18.1)	967 (18.2)	388 (17.9)	831 (18.1)	564 (18.3)	267 (17.7)	524 (18.1)	403 (18)	121 (18.3)
5th Quintile (least deprived)	1392 (18.6)	995 (18.7)	397 (18.3)	858 (18.7)	582 (18.9)	276 (18.3)	534 (18.4)	413 (18.5)	121 (18.3)
Unknown									
Income Deprivation Score									
1ST Quintile (most deprived)	897 (12)	604 (11.4)	293 (13.5)	534 (11.7)	335 (10.9)	199 (13.2)	363 (12.5)	269 (12)	94 (14.2)
2nd Quintile	1032 (13.8)	733 (13.8)	299 (13.8)	617 (13.5)	429 (13.9)	188 (12.5)	415 (14.3)	304 (13.6)	111 (16.8)
3rd Quintile	1204 (16.1)	867 (16.3)	337 (15.6)	736 (16.1)	490 (15.9)	246 (16.3)	468 (16.1)	377 (16.9)	91 (13.8)
4th Quintile	1997 (26.7)	1402 (26.4)	595 (27.5)	1256 (27.4)	828 (26.9)	428 (28.4)	741 (25.6)	574 (25.7)	167 (25.3)
5th Quintile (least deprived)	2337 (31.2)	1698 (32)	637 (29.4)	1432 (31.2)	988 (32.1)	443 (29.4)	905 (31.2)	710 (31.8)	194 (29.4)
Unknown									
Employment Deprivation Score									
1ST Quintile (most deprived)	721 (9.6)	492 (9.3)	229 (10.6)	452 (9.9)	292 (9.5)	160 (10.6)	269 (9.3)	200 (8.9)	69 (10.5)
2nd Quintile	1108 (14.8)	779 (14.7)	329 (15.2)	643 (14)	434 (14.1)	209 (13.9)	465 (16)	345 (15.4)	120 (18.2)
3rd Quintile	1553 (20.8)	1110 (20.9)	443 (20.5)	958 (20.9)	645 (21)	313 (20.8)	595 (20.5)	465 (20.8)	130 (19.7)
4th Quintile	1859 (24.8)	1303 (24.5)	555 (25.6)	1174 (25.6)	772 (25.1)	402 (26.7)	685 (23.6)	531 (23.7)	153 (23.2)
5th Quintile (least deprived)	2226 (29.8)	1620 (30.5)	605 (27.9)	1348 (29.4)	927 (30.1)	420 (27.9)	878 (30.3)	693 (31)	185 (28)
Unknown									
Health and Disability Deprivation Score									
1ST Quintile (most deprived)	771 (10.3)	531 (10)	240 (11.1)	470 (10.3)	314 (10.2)	156 (10.4)	301 (10.4)	217 (9.7)	84 (12.7)
2nd Quintile	1099 (14.7)	780 (14.7)	319 (14.7)	634 (13.8)	418 (13.6)	216 (14.4)	465 (16)	362 (16.2)	103 (15.6)
3rd Quintile	1438 (19.2)	1025 (19.3)	413 (19.1)	887 (19.4)	609 (19.8)	278 (18.5)	551 (19)	416 (18.6)	135 (20.5)
4th Quintile	1764 (23.6)	1271 (23.9)	493 (22.8)	1107 (24.2)	754 (24.5)	354 (23.5)	657 (22.7)	517 (23.1)	139 (21.1)
5th Quintile (least deprived)	2393 (32)	1697 (31.9)	696 (32.1)	1475 (32.2)	975 (31.7)	500 (33.2)	918 (31.7)	722 (32.3)	196 (29.7)
Unknown									
Crime Deprivation Score									
1ST Quintile (most deprived)	1068 (14.3)	731 (13.8)	337 (15.6)	637 (13.9)	405 (13.2)	232 (15.4)	431 (14.9)	326 (14.6)	105 (15.9)
2nd Quintile	1284 (17.2)	915 (17.2)	369 (17)	796 (17.4)	540 (17.5)	256 (17)	488 (16.8)	375 (16.8)	113 (17.1)
3rd Quintile	1503 (20.1)	1076 (20.2)	427 (19.7)	922 (20.1)	628 (20.4)	293 (19.5)	582 (20.1)	448 (20)	134 (20.3)
4th Quintile	1740 (23.3)	1259 (23.7)	481 (22.2)	1056 (23)	730 (23.7)	326 (21.7)	684 (23.6)	529 (23.7)	155 (23.5)

5th Quintile (least deprived)	1870 (25)	1323 (24.9)	547 (25.3)	1164 (25.4)	767 (24.9)	397 (26.4)	707 (24.4)	556 (24.9)	150 (22.7)
Unknown									

Appendix 17

Table 21 – Study Three: Demographic Data 2- summarises descriptive demographic data trainees who completed their CCT timely within 1856 days of registration and trainees who completed CCT in more than 1856 days of registration

	Trainees who completed CCT by their expected date of 26th Jan 22 (N=4583)	**Trainees who completed CCT timely within 1856 days of registration (n=1777)**			**Trainees who completed CCT in more than 1856 days (n=2806) (n.b- 1 trainee with no arcp data so total for ARCP analysis is 2805)**		
		N (1777)	**Trainees with standard ARCP outcomes at every progression point (n=1205)**	**Trainees with 1 or more non standard ARCP outcome during training (n=572)**	**N (2806)**	**Trainees with standard ARCP outcomes at every progression point (n=1872)**	**Trainees with 1 or more non standard ARCP outcome during training (n=933)**
Sex							
Male	1815 (39.6)	812 (45.7)	511 (42.4)	301 (52.6)	1003 (35.7)	625 (33.4)	377 (40.4)
Female	2768 (60.4)	965 (54.3)	694 (57.6)	271 (47.4)	1803 (64.3)	1247 (66.6)	556 (59.6)
Course type							
Foundation Course	36 (0.8)	19 (1.1)	18 (1.5)	1 (0.2)	17 (0.6)	11 (0.6)	6 (0.6)
Graduate Entry Medicine	923 (20.1)	363 (20.4)	228 (18.9)	135 (23.6)	560 (20)	361 (19.3)	198 (21.2)
Medicine with a Gateway Year	43 (0.9)	12 (0.7)	9 (0.7)	3 (0.5)	31 (1.1)	21 (1.1)	10 (1.1)
Medicine with a Preliminary Year	36 (0.8)	12 (0.7)	7 (0.6)	5 (0.9)	24 (0.9)	18 (1)	6 (0.6)
Standard Entry Medicine	3544 (77.3)	1371 (77.2)	943 (78.3)	428 (74.8)	2173 (77.4)	1461 (78)	712 (76.3)
Unknown/other							
Teaching style							
Traditional	91 (2)	26 (1.5)	21 (1.7)	5 (0.9)	65 (2.3)	46 (2.5)	19 (2)
Integrated	2708 (59.1)	1049 (59)	717 (59.5)	332 (58)	1659 (59.1)	1120 (59.8)	539 (57.8)
Problem Based Learning	1431 (31.2)	580 (32.6)	386 (32)	194 (33.9)	851 (30.3)	556 (29.7)	295 (31.6)
Case Based Learning	352 (7.7)	122 (6.9)	81 (6.7)	41 (7.2)	230 (8.2)	150 (8)	80 (8.6)
Other							
Graduate entry							
Graduate on entry	1294 (28.2)	498 (28)	313 (26)	185 (32.3)	796 (28.4)	498 (26.6)	298 (31.9)
Not graduate entry	3284 (71.7)	1275 (71.8)	889 (73.8)	386 (67.5)	2009 (71.6)	1373 (73.3)	635 (68.1)
Not stated	5						
School type							
Private	1054 (23)	368 (20.7)	241 (20)	117 (20.5)	686 (24.4)	467 (24.9)	218 (23.4)
State School (including grammar)	3245 (70.8)	1290 (72.6)	869 (72.1)	421 (73.6)	1955 (69.7)	1297 (69.3)	658 (70.5)
Unknown/ Other	284 (6.2)	119 (6.7)	85 (7.1)	34 (5.9)	165 (5.9)	108 (5.8)	57 (6.1)
Ethnicity							
White	2657 (58)	953 (53.6)	658 (54.6)	295 (51.6)	1704 (60.7)	1161 (62)	543 (58.2)
Not stated	155 (3.4)	68 (3.8)	42 (3.5)	26 (4.5)	87 (3.1)	54 (2.9)	33 (3.5)
Any other ethnic	67 (1.5)	26 (1.5)	18 (1.5)	8 (1.4)	41 (1.5)	31 (1.7)	10 (1.1)
Arab	31 (0.7)	16 (0.9)	10 (0.8)	6 (1)	15 (0.5)	11 (0.6)	4 (0.4)
Any other black	5 (0.1)	1 (0.1)	1 (0.1)	0 (0)	4 (0.1)	2 (0.1)	2 (0.2)
African	101 (2.2)	37 (2.1)	23 (1.9)	14 (2.4)	64 (2.3)	32 (1.7)	32 (3.4)
Caribbean	19 (0.4)	5 (0.3)	4 (0.3)	1 (0.2)	14 (0.5)	(0)	(0)
Any other Asian	197 (4.3)	87 (4.9)	51 (4.2)	36 (6.3)	110 (3.9)	74 (4)	36 (3.9)
Bangladeshi	69 (1.5)	32 (1.8)	21 (1.7)	11 (1.9)	37 (1.3)	21 (1.1)	16 (1.7)
Pakistani	343 (7.5)	136 (7.7)	98 (8.1)	38 (6.6)	207 (7.4)	138 (7.4)	69 (7.4)

Indian	613 (13.4)	278 (15.6)	198 (16.4)	80 (14)	335 (11.9)	222 (11.9)	112 (12)
Any other mixed group	45 (1)	14 (0.8)	9 (0.7)	5 (0.9)	31 (1.1)	20 (1.1)	11 (1.2)
White and Asian	79 (1.7)	31 (1.7)	18 (1.5)	13 (2.3)	48 (1.7)	26 (1.4)	22 (2.4)
White and Black African	16 (0.3)	6 (0.3)	4 (0.3)	2 (0.3)	10 (0.4)	7 (0.4)	3 (0.3)
White and Black Caribbean	13 (0.3)	4 (0.2)	1 (0.1)	3 (0.5)	9 (0.3)	5 (0.3)	4 (0.4)
Any other White	79 (1.7)	35 (2)	21 (1.7)	14 (2.4)	44 (1.6)	28 (1.5)	16 (1.7)
Irish	21 (0.5)	9 (0.5)	6 (0.5)	3 (0.5)	12 (0.4)	8 (0.4)	4 (0.4)
Chinese	73 (1.6)	39 (2.2)	22 (1.8)	17 (3)	34 (1.2)	24 (1.3)	10 (1.1)
Ethnicity							
Not Stated	155 (3.4)	68 (3.8)	42 (3.5)	26 (4.5)	87 (3.1)	54 (2.9)	33 (3.5)
Any other ethnic group	98 (2.1)	42 (2.4)	28 (2.3)	14 (2.4)	56 (2)	42 (2.2)	14 (1.5)
Black or Black British	125 (2.7)	43 (2.4)	28 (2.3)	15 (2.6)	82 (2.9)	42 (2.2)	40 (4.3)
Asian or Asian British	1295 (28.3)	572 (32.2)	390 (32.4)	182 (31.8)	723 (25.8)	479 (25.6)	243 (26)
Mixed	153 (3.3)	55 (3.1)	32 (2.7)	23 (4)	98 (3.5)	58 (3.1)	40 (4.3)
White	2757 (60.2)	997 (56.1)	685 (56.8)	312 (54.5)	1760 (62.7)	1197 (63.9)	563 (60.3)
Sexual Orientation							
Bisexual	15 (0.3)	2 (0.1)	2 (0.2)	0 (0)	13 (0.5)	8 (0.4)	5 (0.5)
Heterosexual/Straight	3315 (72.3)	1225 (68.9)	861 (71.5)	364 (63.6)	2090 (74.5)	1401 (74.8)	688 (73.7)
Lesbian/Gay	67 (1.5)	28 (1.6)	12 (1)	16 (2.8)	39 (1.4)	23 (1.2)	16 (1.7)
Other	5 (0.1)	1 (0.1)	1 (0.1)	0 (0)	4 (0.1)	3 (0.2)	1 (0.1)
Prefer not to say	474 (10.3)	162 (9.1)	109 (9)	53 (9.3)	312 (11.1)	203 (10.8)	109 (11.7)
Unknown	707 (15.4)	359 (20.2)	220 (18.3)	139 (24.3)	348 (12.4)	234 (12.5)	114 (12.2)
Religion							
Buddhist	25 (0.5)	10 (0.6)	8 (0.7)	2 (0.3)	15 (0.5)	10 (0.5)	5 (0.5)
Christian	1079 (23.5)	351 (19.8)	247 (20.5)	104 (18.2)	733 (26.1)	511 (27.3)	217 (23.3)
Hindu	289 (6.3)	126 (7.1)	89 (7.4)	37 (6.5)	163 (5.8)	111 (5.9)	51 (5.5)
Jewish	25 (0.5)	7 (0.4)	1 (0.1)	6 (1)	18 (0.6)	10 (0.5)	8 (0.9)
Muslim	465 (10.1)	191 (10.7)	139 (11.5)	52 (9.1)	274 (9.8)	179 (9.6)	95 (10.2)
No religion	1354 (29.5)	492 (27.7)	330 (27.4)	162 (28.3)	862 (30.7)	566 (30.2)	296 (31.7)
Sikh	91 (2)	42 (2.4)	28 (2.3)	14 (2.4)	49 (1.7)	38 (2)	11 (1.2)
Other	47 (1)	17 (1)	14 (1.2)	3 (0.5)	30 (1.1)	16 (0.9)	14 (1.5)
Prefer not to say	501 (10.9)	182 (10.2)	129 (10.7)	53 (9.3)	319 (11.4)	197 (10.5)	122 (13.1)
Undisclosed	707 (15.4)	359 (20.2)	220 (18.3)	139 (24.3)	348 (12.4)	234 (12.5)	114 (12.2)
Disability							
Declared disability	272 (5.9)	72 (4.1)	51 (4.2)	21 (3.7)	200 (7.1)	128 (6.8)	72 (7.7)
No disability declared	4035 (88)	1607 (90.4)	1091 (90.5)	516 (90.2)	2428 (86.5)	1635 (87.3)	792 (84.9)
Prefer not to say	276 (6)	98 (5.5)	63 (5.2)	35 (6.1)	178 (6.3)	109 (5.8)	69 (7.4)
Not stated	0						
Free School Meals							
Free School Meals	554 (12.1)	121 (6.8)	70 (5.8)	51 (8.9)	224 (8)	129 (6.9)	95 (10.2)
Not on Free School Meals	4816 (105.1)	1144 (64.4)	730 (60.6)	414 (72.4)	1943 (69.2)	1289 (68.9)	654 (70.1)
Unknown/Prefer not to say	2111						
Parent degree							
Parent Degree	3541 (77.3)	801 (45.1)	315 (26.1)	286 (50)	1451 (51.7)	959 (51.2)	492 (52.7)
No parent degree	2024 (44.2)	519 (29.2)	322 (26.7)	197 (34.4)	787 (28)	501 (26.8)	286 (30.7)
Unknown/Prefer Not to Say	1916						
Income Support							
Income Support	864 (18.9)	201 (11.3)	131 (10.9)	70 (12.2)	337 (12)	199 (10.6)	719 (77.1)

No Income Support	4269 (93.1)	1019 (57.3)	647 (53.7)	372 (65)	1724 (61.4)	1143 (61.1)	581 (62.3)
Unknown/Prefe r not to say	2348						
Deprivation							
Overall Index of Multiple Deprivation							
1ST Quintile (most deprived)	467 (10.2)	208 (11.7)	140 (11.6)	68 (11.9)	259 (9.2)	163 (8.7)	96 (10.3)
2nd Quintile	636 (13.9)	274 (15.4)	189 (15.7)	85 (14.9)	362 (12.9)	227 (12.1)	135 (14.5)
3rd Quintile	897 (19.6)	338 (19)	227 (18.8)	111 (19.4)	559 (19.9)	382 (20.4)	177 (19)
4th Quintile	1126 (24.6)	413 (23.2)	288 (23.9)	125 (21.9)	713 (25.4)	474 (25.3)	239 (25.6)
5th Quintile (least deprived)	1449 (31.6)	541 (30.4)	358 (29.7)	183 (32)	908 (32.4)	622 (33.2)	285 (30.5)
Unknown							
Education Skills Deprivation Score							
1ST Quintile (most deprived)	295 (6.4)	136 (7.7)	102 (8.5)	36 (6.3)	157 (5.6)	92 (4.9)	65 (7)
2nd Quintile	477 (10.4)	201 (11.3)	133 (11)	68 (11.9)	276 (9.8)	185 (9.9)	91 (9.8)
3rd Quintile	735 (16)	299 (16.8)	195 (16.2)	104 (18.2)	436 (15.5)	292 (15.6)	144 (15.4)
4th Quintile	1047 (22.8)	417 (23.5)	280 (23.2)	137 (24)	630 (22.5)	424 (22.6)	206 (22.1)
5th Quintile (least deprived)	2021 (44.1)	719 (40.5)	492 (40.8)	227 (39.7)	1302 (46.4)	875 (46.7)	426 (45.7)
Unknown							
Children and Young People's Deprivation Score							
1ST Quintile (most deprived)	362 (7.9)	160 (9)	117 (9.7)	43 (7.5)	202 (7.2)	120 (6.4)	82 (8.8)
2nd Quintile	593 (12.9)	246 (13.8)	162 (13.4)	84 (14.7)	347 (12.4)	240 (12.8)	107 (11.5)
3rd Quintile	751 (16.4)	303 (17.1)	198 (16.4)	105 (18.4)	448 (16)	309 (16.5)	139 (14.9)
4th Quintile	1013 (22.1)	407 (22.9)	286 (23.7)	121 (21.2)	606 (21.6)	409 (21.8)	197 (21.1)
5th Quintile (least deprived)	1856 (40.5)	658 (37)	439 (36.4)	219 (38.3)	1198 (42.7)	790 (42.2)	407 (43.6)
Unknown							
Adult Skills Deprivation Score							
1ST Quintile (most deprived)	397 (8.7)	182 (10.2)	135 (11.2)	47 (8.2)	215 (7.7)	132 (7.1)	83 (8.9)
2nd Quintile	540 (11.8)	239 (13.4)	159 (13.2)	80 (14)	301 (10.7)	210 (11.2)	91 (9.8)
3rd Quintile	767 (16.7)	297 (16.7)	204 (16.9)	93 (16.3)	470 (16.7)	319 (17)	151 (16.2)
4th Quintile	1124 (24.5)	447 (25.2)	297 (24.6)	150 (26.2)	677 (24.1)	464 (24.8)	213 (22.8)
5th Quintile (least deprived)	1747 (38.1)	609 (34.3)	407 (33.8)	202 (35.3)	1138 (40.6)	743 (39.7)	394 (42.2)
Unknown							
Barriers to Housing and Services Deprivation Score							
1ST Quintile (most deprived)	1219 (26.6)	481 (27.1)	334 (27.7)	147 (25.7)	738 (26.3)	460 (24.6)	278 (29.8)
2nd Quintile	1109 (24.2)	440 (24.8)	293 (24.3)	147 (25.7)	669 (23.8)	449 (24)	220 (23.6)
3rd Quintile	845 (18.4)	334 (18.8)	237 (19.7)	97 (17)	511 (18.2)	349 (18.6)	161 (17.3)
4th Quintile	739 (16.1)	274 (15.4)	181 (15)	93 (16.3)	465 (16.6)	326 (17.4)	139 (14.9)
5th Quintile (least deprived)	663 (14.5)	245 (13.8)	157 (13)	88 (15.4)	418 (14.9)	284 (15.2)	134 (14.4)
Unknown							
Geographical Barriers Deprivation Score							
1ST Quintile (most deprived)	1244 (27.1)	508 (28.6)	354 (29.4)	154 (26.9)	736 (26.2)	490 (26.2)	246 (26.4)
2nd Quintile	923 (20.1)	364 (20.5)	242 (20.1)	122 (21.3)	559 (19.9)	377 (20.1)	181 (19.4)
3rd Quintile	829 (18.1)	305 (17.2)	205 (17)	100 (17.5)	524 (18.7)	353 (18.9)	171 (18.3)
4th Quintile	765 (16.7)	296 (16.7)	205 (17)	91 (15.9)	469 (16.7)	311 (16.6)	158 (16.9)
5th Quintile (least deprived)	814 (17.8)	301 (16.9)	196 (16.3)	105 (18.4)	513 (18.3)	337 (18)	176 (18.9)
Unknown							
Wider Barriers to Housing and Services Deprivation Score							
1ST Quintile (most deprived)	1117 (24.4)	437 (24.6)	286 (23.7)	151 (26.4)	680 (24.2)	420 (22.4)	260 (27.9)
2nd Quintile	778 (17)	308 (17.3)	218 (18.1)	90 (15.7)	470 (16.7)	324 (17.3)	146 (15.6)
3rd Quintile	818 (17.8)	313 (17.6)	220 (18.3)	93 (16.3)	505 (18)	363 (19.4)	141 (15.1)
4th Quintile	818 (17.8)	336 (18.9)	229 (19)	107 (18.7)	482 (17.2)	319 (17)	163 (17.5)
5th Quintile (least deprived)	1044 (22.8)	380 (21.4)	249 (20.7)	131 (22.9)	664 (23.7)	442 (23.6)	222 (23.8)
Unknown							

Living Environment Deprivation Score							
1ST Quintile (most deprived)	1217 (26.6)	460 (25.9)	298 (24.7)	162 (28.3)	757 (27)	475 (25.4)	281 (30.1)
2nd Quintile	805 (17.6)	347 (19.5)	250 (20.7)	97 (17)	458 (16.3)	315 (16.8)	143 (15.3)
3rd Quintile	854 (18.6)	314 (17.7)	200 (16.6)	114 (19.9)	540 (19.2)	368 (19.7)	172 (18.4)
4th Quintile	831 (18.1)	336 (18.9)	236 (19.6)	100 (17.5)	495 (17.6)	336 (17.9)	159 (17)
5th Quintile (least deprived)	868 (18.9)	317 (17.8)	218 (18.1)	99 (17.3)	551 (19.6)	374 (20)	177 (19)
Unknown							
Indoor Deprivation Score							
1ST Quintile (most deprived)	1206 (26.3)	455 (25.6)	297 (24.6)	158 (27.6)	751 (26.8)	471 (25.2)	279 (29.9)
2nd Quintile	816 (17.8)	351 (19.8)	245 (20.3)	106 (18.5)	465 (16.6)	317 (16.9)	148 (15.9)
3rd Quintile	857 (18.7)	317 (17.8)	208 (17.3)	109 (19.1)	540 (19.2)	370 (19.8)	170 (18.2)
4th Quintile	814 (17.8)	332 (18.7)	229 (19)	103 (18)	482 (17.2)	330 (17.6)	152 (16.3)
5th Quintile (least deprived)	882 (19.2)	319 (18)	223 (18.5)	96 (16.8)	563 (20.1)	380 (20.3)	183 (19.6)
Unknown							
Outdoor Deprivation Score							
1ST Quintile (most deprived)	1243 (27.1)	469 (26.4)	306 (25.4)	163 (28.5)	774 (27.6)	491 (26.2)	282 (30.2)
2nd Quintile	814 (17.8)	355 (20)	256 (21.2)	99 (17.3)	459 (16.4)	309 (16.5)	150 (16.1)
3rd Quintile	829 (18.1)	316 (17.8)	211 (17.5)	105 (18.4)	513 (18.3)	351 (18.8)	162 (17.4)
4th Quintile	831 (18.1)	333 (18.7)	226 (18.8)	107 (18.7)	498 (17.7)	338 (18.1)	160 (17.1)
5th Quintile (least deprived)	858 (18.7)	301 (16.9)	203 (16.8)	98 (17.1)	557 (19.9)	379 (20.2)	178 (19.1)
Unknown							
Income Deprivation Score							
1ST Quintile (most deprived)	534 (11.7)	234 (13.2)	156 (12.9)	78 (13.6)	300 (10.7)	179 (9.6)	121 (13)
2nd Quintile	617 (13.5)	256 (14.4)	181 (15)	75 (13.1)	361 (12.9)	248 (13.2)	113 (12.1)
3rd Quintile	736 (16.1)	296 (16.7)	198 (16.4)	98 (17.1)	440 (15.7)	292 (15.6)	148 (15.9)
4th Quintile	1256 (27.4)	452 (25.4)	300 (24.9)	152 (26.6)	804 (28.7)	528 (28.2)	276 (29.6)
5th Quintile (least deprived)	1432 (31.2)	536 (30.2)	367 (30.5)	169 (29.5)	895 (31.9)	621 (33.2)	274 (29.4)
Unknown							
Employment Deprivation Score							
1ST Quintile (most deprived)	452 (9.9)	205 (11.5)	133 (11)	72 (12.6)	247 (8.8)	159 (8.5)	88 (9.4)
2nd Quintile	643 (14)	272 (15.3)	187 (15.5)	85 (14.9)	371 (13.2)	247 (13.2)	124 (13.3)
3rd Quintile	958 (20.9)	372 (20.9)	253 (21)	119 (20.8)	586 (20.9)	392 (20.9)	194 (20.8)
4th Quintile	1174 (25.6)	435 (24.5)	292 (24.2)	143 (25)	739 (26.3)	480 (25.6)	259 (27.8)
5th Quintile (least deprived)	1348 (29.4)	490 (27.6)	337 (28)	153 (26.7)	858 (30.6)	590 (31.5)	267 (28.6)
Unknown							
Health and Disability Deprivation Score							
1ST Quintile (most deprived)	470 (10.3)	194 (10.9)	135 (11.2)	59 (10.3)	276 (9.8)	179 (9.6)	97 (10.4)
2nd Quintile	634 (13.8)	287 (16.2)	189 (15.7)	98 (17.1)	347 (12.4)	229 (12.2)	118 (12.6)
3rd Quintile	887 (19.4)	346 (19.5)	244 (20.2)	102 (17.8)	541 (19.3)	365 (19.5)	176 (18.9)
4th Quintile	1107 (24.2)	429 (24.1)	292 (24.2)	137 (24)	680 (24.2)	462 (24.7)	217 (23.3)
5th Quintile (least deprived)	1475 (32.2)	518 (29.2)	342 (28.4)	176 (30.8)	957 (34.1)	633 (33.8)	324 (34.7)
Unknown							
Crime Deprivation score							
1ST Quintile (most deprived)	637 (13.9)	262 (14.7)	162 (13.4)	100 (17.5)	375 (13.4)	243 (13)	132 (14.1)
2nd Quintile	796 (17.4)	314 (17.7)	222 (18.4)	92 (16.1)	482 (17.2)	318 (17)	164 (17.6)
3rd Quintile	922 (20.1)	360 (20.3)	256 (21.2)	104 (18.2)	562 (20)	372 (19.9)	189 (20.3)
4th Quintile	1056 (23)	396 (22.3)	271 (22.5)	125 (21.9)	660 (23.5)	459 (24.5)	201 (21.5)
5th Quintile (least deprived)	1164 (25.4)	442 (24.9)	291 (24.1)	151 (26.4)	722 (25.7)	476 (25.4)	246 (26.4)
Unknown							

Appendix 18

Table 22- Study Three: Odds of: a) Non-Standard/Developmental ARCP outcomes v Standard ARCP outcomes, b) CCT completion v not completing CCT within the study period, c) Timely CCT completion v non-timely CCT completion

	Non-Standard/Developmental ARCP Outcomes		**CCT completion**		**Timely CCT completion**	
	Odds Ratio	**P value**	**Odds Ratio**	**P value**	**Odds Ratio**	**P value**
Sex						
Female	0.720 (0.650-0.797)	<0.0001	0.757 (0.686 to 0.834)	0.0001	0.661 (0.586-0.746)	0.0001
Male	1.389 (1.254-1.539)	<0.0001	1.322 (1.199-1.457)	0.0001	1.513 (1.340-1.707)	0.0001
Course Type						
Graduate entry medicine	1.050 (0.928-1.187)	0.441	0.887 (0.791-0.995)	0.041	1.027 (0.886-1.192)	0.721
Standard entry medicine	0.953 (0.843-1.077)	0.441	1.127 (1.005-1.264)	0.041	0.973 (0.839-1.129)	0.721
Level 1 Ethnicity						
White	0.882 (0.793-0.979)	0.019	0.906 (0.824-0.997)	0.044	0.760 (0.673-0.857)	<0.0001
Asian or Asian British	1.071 (0.953-1.203)	0.251	1.258 (1.127-1.405)	<0.0001	1.397 (1.221-1.598)	<0.0001
Black or Black British	1.496 (1.129-1.981)	0.005	0.855 (0.651-1.123)	0.261	0.926 (0.635-1.350)	0.688
Mixed	1.452 (1.114-1.892)	0.006	1.005 (0.776-1.302)	0.970	0.991 (0.706-1.391)	0.957
Any other ethnic group	1.034 (0.745-1.435)	0.842	0.766 (0.569-1.032)	0.080	1.324 (0.881-1.990)	0.177
Level 2 Ethnicity						
White	0.964 (0.869-1.069)	0.483	0.920 (0.835-1.015)	0.095	0.751 (0.664-0.849)	<0.0001
Irish	0.897 (0.436-1.846)	0.767	0.753 (0.400-1.417)	0.379	1.341 (0.563-3.194)	0.508
Any other White Ethnic Group	1.215 (0.863-1.711)	0.264	0.654 (0.475-0.899)	0.009	1.422 (0.906-2.333)	0.126
Pakistani	0.975 (0.795-1.197)	0.810	1.27 (1.050-1.542)	0.014	1.175 (0.933-1.479)	0.171
Indian	1.082 (0.924-1.268)	0.328	1.398 (1.199-1.630)	0.0001	1.484 (1.242-1.772)	<0.0001
Bangladeshi	1.335 (0.898-1.986)	0.153	1.036 (0.704-1.523)	0.858	1.546 (0.957-2.498)	0.075
Chinese	0.857 (0.560-1.311)	0.476	1.071 (0.733-1.564)	0.723	2.051 (1.286-3.271)	0.003
Arab	0.925 (0.521-1.642)	0.789	0.667 (0.402-1.106)	0.116	1.907 (0.939-3.875)	0.074

Any other Asian Ethnic Group	1.236 (0.972-1.572)	0.084	0.963 (0.766-1.211)	0.749	1.414 (1.056-1.894)	0.020
African	1.679 (1.236-2.279)	0.001	0.815 (0.604-1.100)	0.181	1.034 (0.684-1.561)	0.875
Caribbean	0.082 (0.038-0.174)	<0.0001	0.876 (0.438-1.752)	0.708	0.639 (0.229-1.778)	0.391
Any other Black Ethnic group	1.950 (0.436-8.727)	0.382	1.614 (0.313-8.327)	0.568	0.447 (0.050-4.005)	0.472
White and Asian	1.677 (1.164-2.416)	0.006	1.109 (0.767-1.603)	0.584	1.155 (0.730-1.827)	0.538
White and Black African	0.929 (0.334-2.584)	0.887	3.443 (1.002-11.832)*	0.050*	1.073 (0.389-2.961)	0.892
White and Black Caribbean	1.800 (0.768-4.223)	0.176	0.932 (0.398-2.186)	0.872	0.795 (0.244-2.587)	0.703
Any other mixed group	1.234 (0.783-1.944)	0.364	0.692 (0.452-1.058)	0.089	0.808 (0.427-1.525)	0.510
Any other ethnic group	1.101 (0.742-1.635)	0.632	0.801 (0.557-1.152)	0.231	1.134 (0.689-1.865)	0.621
Socioeconomic status (most deprived quintile) v least deprived quintile						
IMD	1.178 (0.986-1.406)	0.070	1.03 (0.871-1.217)	0.733	1.348 (1.091-1.665)	0.006
LE	1.138 (0.979-1.322)	0.093	0.948 (0.824-1.090)	0.452	1.056 (0.882-1.265)	0.552
Indoor LE	1.129 (0.971-1.312)	0.116	0.919 (0.799-1.058)	0.239	1.069 (0.893-1.280)	0.466
Outdoor LE	1.089 (0.937-1.264)	0.266	0.953 (0.829-1.100)	0.500	1.121 (0.936-1.344)	0.215
Income	1.293 (1.095-1.528)	0.002	0.930 (0.795-1.088)	0.363	1.302 (1.064-1.593)	0.010
Employment	1.246 (1.038-1.496)	0.018	1.094 (0.920-1.301)	0.307	1.453 (1.171-1.803)	0.001
Health and Disability	1.102 (0.924-1.314)	0.280	0.972 (0.823-1.148)	0.736	1.299 (1.050-1.606)	0.016
Crime	1.115 (0.947-1.312)	0.191	0.898 (0.770-1.047)	0.169	1.141 (0.937-1.390)	0.189
Education	1.194 (0.971-1.470)	0.093	1.015 (0.833-1.238)	0.880	1.569 (1.225-2.008)	0.0004
CYP	1.112 (0.922-1.341)	0.268	0.836 (0.701-0.996)	0.045	1.442 (1.148-1.812)	0.002
Adult Skills	1.637 (1.384-1.935)	<0.0001	1.047 (0.878-1.249)	0.610	1.581 (1.269-1.972)	<0.0001
BHS	0.980 (0.833-1.154)	0.813	0.929 (0.797-1.082)	0.341	1.112 (0.915-1.352)	0.286
Geographical Barriers	0.911 (0.783-1.061)	0.231	1.148 (0.996-1.324)	0.056	1.176 (0.981-1.411)	0.080
wBHS	1.056 (0.914-1.219)	0.461	0.962 (0.840-1.102)	0.575	1.123 (0.943-1.337)	0.192
Socioeconomic status (most deprived quintile) v all other quintiles						
IMD	1.149 (0.978-1.351)	0.092	1.008 (0.864-1.176)	0.916	1.304 (1.075-1.581)	0.007

LE	1.109 (0.991-1.240)	0.071	0.959 (0.864-1.065)	0.437	0.945 (0.826-1.082)	0.414
Indoor LE	1.166 (1.041-1.305)	0.008	0.958 (0.862-1.064)	0.417	0.942 (0.822-1.078)	0.384
Outdoor LE	1.093 (0.978-1.221)	0.117	0.956 (0.861-1.060)	0.392	0.941 (0.823-1.076)	0.376
Income	1.221 (1.051-1.417)	0.009	0.921 (0.799-1.061)	0.255	1.266 (1.055-1.520)	0.011
Employment	1.159 (0.983-1.368)	0.080	1.069 (0.912-1.253)	0.410	1.351 (1.111-1.643)	0.003
Health and Disability	1.123 (0.956-1.320)	0.159	0.986 (0.846-1.149)	0.857	1.123 (0.925-1.364)	0.240
Crime	1.156 (1.005-1.330)	0.043	0.924 (0.810-1.054)	0.239	1.121 (0.945-1.329)	0.189
Education	1.151 (0.942-1.406)	0.168	1.032 (0.853-1.250)	0.744	1.400 (1.104-1.776)	0.006
CYP	1.114 (0.933-1.331)	0.232	0.870 (0.736-1.028)	0.101	1.275 (1.027-1.584)	0.028
Adult	1.685 (1.441-1.969)	<0.0001	1.041 (0.880-1.230)	0.641	1.375 (1.118-1.691)	0.003
BHS	1.002 (0.895-1.122)	0.968	0.956 (0.861-1.062)	0.404	1.040 (0.909-1.189)	0.568
Geographical Barriers	0.952 (0.849-1.067)	0.394	1.118 (1.006-1.244)	0.039	1.126 (0.986-1.286)	0.081
wBHS	1.114 (0.993-1.249)	0.066	0.967 (0.868-1.077)	0.545	1.019 (0.888-1.171)	0.784
Disability						
Declared disability	1.214 (0.995-1.481)	0.057	0.796 (0.659-0.960)	0.017	0.544 (0.413-0.717)	<0.0001
Sexual Orientation						
Heterosexual	0.788 (0.569-1.092)	0.153	1.638 (1.204-2.229)	0.002	1.059 (0.679-1.651)	0.801
Bisexual	0.879 (0.411-1.879)	0.738	0.426 (0.218-0.835)	0.013	0.262 (0.059-1.165)	0.079
Lesbian/Gay	1.483 (1.022-2.153)	0.038	0.692 (0.483-0.993)	0.046	1.225 (0.750-2.001)	0.418
Religion						
No religion	1.087 (0.963-1.228)	0.176	0.842 (0.752-0.943)	0.003	0.983 (0.852-1.135)	0.814
Christianity	0.897 (0.780-1.032)	0.130	1.066 (0.937-1.213)	0.331	0.839 (0.709-0.993)	0.041
Buddhism	0.953 (0.472-1.927)	0.894	1.149 (0.594-2.222)	0.680	1.168 (0.521-2.620)	0.706
Hinduism	0.948 (0.751-1.197)	0.653	1.487 (1.186-1.865)	0.0006	1.354 (1.047-1.752)	0.021
Judaism	1.473 (0.801-2.711)	0.213	0.804 (0.444-1.457)	0.472	0.681 (0.283-1.643)	0.393
Islam	0.922 (0.762-1.116)	0.404	1.329 (1.101-1.592)	0.002	1.221 (0.985-1.515)	0.069
Sikhism	0.944 (0.632-1.409)	0.777	1.722 (1.151-2.576)	0.008	1.502 (0.980-2.301)	0.062

Appendix 19

Table 23 - Study Three: Model 7- Predictors of non-standard ARCP outcomes level 1 ethnicity

Variable	Exp (B)	Lower	Upper	Sig
Female	0.782	0.655	0.932	0.006
Less than full time	1.562	1.061	2.301	0.024
UG training in London	0.720	0.584	0.888	0.002
UG training in the North West	0.579	0.432	0.776	<0.001
UG training in the North East	0.662	0.455	0.964	0.031
UG training in Scotland	1.543	0.962	2.474	0.072
PG trainee in Wales	3.231	1.798	5.805	<0.001
PG trainee in the Midlands	2.739	2.176	3.449	<0.001
PG trainee in the South East	1.722	1.290	2.298	<0.001
PG trainee in the South West	1.907	1.451	2.506	<0.001
Free School Meals	1.459	1.115	1.909	0.006
UCAT Quantitative Reasoning	1.001	1.000	1.002	0.049
UCAS Tariff	0.800	0.650	0.910	0.002
CYP most deprived quintile	0.787	0.650	0.952	0.014
EPM Decile	0.877	0.850	0.905	<0.001

Table 24 - Study Three: Model 8- Predictors of non-standard ARCP outcomes level 2 ethnicity

Variable	Exp (B)	Lower	Upper	Sig
Female	0.770	0.645	0.919	0.004
Less than full time trainee	1.574	1.068	2.321	0.022
UG training in London	0.737	0.597	0.909	0.004
UG training in the North West	0.595	0.443	0.798	<0.001
UG training in the North East	0.668	0.459	0.974	0.036
UG training in Scotland	1.510	0.941	2.424	0.088
PG trainee in Wales	3.127	1.738	5.626	<0.001
PG trainee in the Midlands	2.697	2.142	3.397	<0.001
PG trainee in the South East	1.738	1.301	2.321	<0.001
PG trainee in the South West	1.876	1.427	2.467	<0.001
Free school meals	1.544	1.176	2.027	0.002
UCAT Quantitative Reasoning	1.001	1.000	1.002	0.068
UCAS tariff	0.999	0.999	1.000	0.003
CYP most deprived quintile	0.780	0.644	0.944	0.011
EPM Decile	0.873	0.846	0.901	<0.001
Pakistani	0.519	0.358	0.752	<0.001

Table 25- Study Three: Model 9- Predictors of timely CCT completion level 1 ethnicity

Variable	Exp (B)	Lower	Upper	Sig
Female	0.800	0.655	0.977	0.029
Academic	0.745	0.650	0.954	0.043
Less than full time	0.312	0.151	0.642	0.002
South East	0.618	0.403	0.947	0.027
Scotland	0.532	0.272	1.041	0.065
PG Midlands	1.457	1.128	1.882	0.004
PG North East	1.295	0.968	1.732	0.081
PG East of England	1.778	1.244	2.541	0.002

Parental degree	0.778	0.632	0.959	0.019
UCAT Decision Analysis	1.002	1.001	1.003	0.002
UCAT Verbal Reasoning	1.004	1.002	1.005	0.027
Disability	0.583	0.382	0.891	0.013
Income most deprived quintile	1.467	1.175	1.830	<0.001
Employment deprivation most deprived quintile	1.384	0.974	1.965	0.070
CYP deprivation most deprived quintile	0.752	0.587	0.963	0.024
Medicine with a preliminary year	0.328	0.092	1.163	0.084
White	0.780	0.625	0.974	0.028

Table 26- Study Three: Model 10- Predictors of Timely CCT completion with level 2 ethnicity

Variable	**Exp (B)**	**Lower**	**Upper**	**Sig**
Female	0.804	0.658	0.982	0.033
Academic	0.650	0.550	0.713	0.021
Less than full time	0.313	0.152	0.644	0.002
South East	0.623	0.406	0.955	0.030
Scotland	0.535	0.274	1.048	0.068
PG Midlands	1.445	1.118	1.867	0.005
PG North east	1.296	0.969	1.734	0.081
PG East of England	1.763	1.233	2.522	0.002
Parental degree	0.776	0.630	0.956	0.017
UCAT Decision Analysis	1.002	1.001	1.003	0.002
UCAT Verbal Reasoning	1.007	1.004	1.009	0.034
Disability	0.582	0.381	0.888	00.012
Income most deprived quintile	1.476	1.183	1.842	<0.001
Employment deprivation most deprived quintile	1.362	0.958	1.935	0.085
CYP deprivation most deprived quintile	0.741	0.578	0.950	0.018
Medicine with a preliminary year	0.329	0.093	1.168	0.085
White	0.743	0.595	0.927	0.009