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UKMED Project P32
What factors predict doctors' successful completion of core training in medicine and anaesthetics and their subsequent decisions to pursue higher specialist training?

Project Report

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Contents

1 Executive Summary

The aim of the study was to identify factors that predict doctors' successful completion of core training in medicine and anaesthesia and their subsequent decisions to pursue higher specialty training in cognate medical specialties or anaesthesia respectively. We ran binary logistic regression models to predict six outcomes, which were whether or not a doctor:

(i) in core medical training (CMT) successfully completed that training,
(ii) who completed CMT applied to higher training in one of 25 cognate medical specialties[1],
(iii) who applied to higher training in one of the cognate medical specialties accepted a post
(iv) in core anaesthesia training successfully completed that training
(v) who completed core anaesthesia training applied to higher anaesthesia training,
(vi) who applied to higher anaesthesia training accepted a post

The models included a range of sociodemographic and educational background factors as potential predictors of these outcomes. Because of the extent of missing data on certain variables for doctors who had attended non-UK medical schools each model was run on two data sets: first, all doctors meeting the criteria in (i) to (vi) above and second, the subsample of those doctors who had attended medical school in the UK.

1.1 Successful completion of core medical training

The factors influencing doctors' successful completion of core medical training (CMT) included: level of entry to the study of medicine (graduate versus non-graduate), medical school attended, CMT Deanery where training took place, CMT Shortlisting score, CMT Interview score and whether a doctor's core medical training was part-time or full time.

For the whole sample of doctors, including those who attended non-UK medical schools

- The odds of successful completion for graduate entrants were 0.5 times the odds of non-graduate entrants.
- There was significant variation in the odds of successful completion among medical schools and among CMT deaneries where training took place.
- CMT Shortlisting score and CMT Interview score were positively associated with successful completion of core medical training.
- For a standard deviation increase in CMT Shortlisting score the odds of successful completion increased by 24.92%

[1] Acute Internal Medicine, Allergy, Audio Vestibular Medicine, Cardiology, Clinical Genetics, Clinical Neurophysiology, Clinical Pharmacology and Therapeutics, Combined Infection Training, Dermatology, Endocrinology and Diabetes Mellitus, Gastroenterology, Genito-urinary Medicine, Geriatric Medicine, Haematology, Infectious Diseases, Medical Oncology, Medical Ophthalmology, Neurology, Nuclear Medicine, Palliative Medicine, Rehabilitation Medicine, Renal Medicine, Respiratory Medicine, Rheumatology, Sports and Exercise Medicine

- For a standard deviation increase in CMT Interview score the odds of successful completion increased by 45.0%.
- Across all levels of CMT Shortlisting score and all levels of CMT Interview score, non-graduate entrants to medical school had a higher predicted probability of successful completion than graduate entrants.
- Across all levels of CMT Shortlisting score and all levels of CMT Interview score, non-graduate entrants to UK medical schools had the highest predicted probability of successful completion and graduate entrants to non-UK medical schools the lowest predicted probability of successful completion.
- The odds of successful completion for doctors whose core medical training was part-time were 0.2 times the odds of doctors who trained full=time.

For the subsample of doctors who attended UK medical schools

- The odds of successful completion for graduate entrants were 0.5 times the odds of non-graduate entrants.
- The odds of successful completion for BME doctors were 0.7 times those of white doctors.
- Doctors who at entry to medical school had lived in areas of the lowest rate of young persons' participation in Higher Education (POLAR 1) were more likely to successfully complete core medical training than doctors from areas of higher rates of young persons' participation in Higher Education (POLAR 2-5).
- There was significant variation in the odds of successful completion among medical schools and among CMT deaneries where training took place.
- The influence of medical degree entry level, ethnicity and POLAR on the probability of successful completion attenuated as CMT Shortlisting score increased and as CMT Interview score increased.
- The odds of successful completion for doctors whose core medical training was part-time were 0.2 times the odds of doctors who trained full=time.

1.2 Applied for higher-level medical specialty training

The factors influencing doctors' decision to apply for higher-level medical specialty training included: medical school attended, whether a not a doctor had intercalated at medical school, Foundation School Deanery attended, CMT Shortlisting score and CMT Interview score.

For the whole sample of doctors including those who attended non-UK medical schools

- There was significant variation in the odds of applied among medical schools and among foundation schools.
- The odds of having applied for doctors who had intercalated were 1.6 times the odds of doctors who had not intercalated.

For the subsample of doctors who attended UK medical schools

- There was significant variation in the odds of applied among medical schools and among foundation schools.
- The odds of having applied for doctors who had intercalated were 1.8 times the odds of doctors who had not intercalated.
- CMT Shortlisting score and CMT Interview score were negatively associated with the probability of having applied for higher-level medical specialty training.
- Even when adjusted by intercalation, the odds of having applied decreased as CMT Shortlisting score increased and as CMT Interview score increased.

1.3 Accepted higher-level medical specialty training post

For the whole sample of doctors, including those who attended non-UK medical schools and the subsample of doctors who attended UK medical schools

- None of the sociodemographic, educational and institutional background factors examined were predictive of having accepted a higher-level medical specialty training post.

1.4 Successfully completed core anaesthesia training

The factors influencing doctors' successful completion of core anaesthesia training included; gender, level of entry to the study of medicine (graduate versus non-graduate), medical school, Foundation School Deanery, anaesthesia HE Training Deanery, and interview score.

For the whole sample of doctors including those who attended non-UK medical schools

- The odds of successful completion for male doctors were 1.4 times the odds for female doctors.
- The odds of successful completion for graduate entrants were 0.5 times the odds for non-graduate entrants.
- There was significant variation in the odds of successful completion among medical schools, foundation schools and HE deaneries where training took place.
- Interview score was positively associated with successful completion and for a standard deviation increase in interview score the odds of successful completion increased by 48%.
- Across all levels of interview score, male non-graduate entrants to UK medical schools had the highest probability of successful completion, and female graduate entrants to non-UK medical schools the lowest probability of successful completion.
- Part-time training was not significantly associated with successful completion.

For the subsample of doctors who attended UK medical schools

- The odds of successful completion for male doctors was 1.4 times the odds for female doctors.

- The odds of successful completion for graduate entrants to medical school were 0.5 times the odds of non-graduate entrants.
- There was significant variation in the odds of successful completion among foundation schools and HE deaneries where training took place.
- Interview score was positively associated with successful completion and for a standard deviation increase in interview the odds of successful completion increased by 54%.
- Male, non-graduate entrants to medical school had the highest probability of successful completion and female graduate entrants the lowest probability of successful completion.
- Part-time training was not significantly associated with successful completion.

1.5 Applied higher-level anaesthesia specialty training

The only factor influencing doctors' decision to apply for higher-level anaesthesia specialty training was HE Training Deanery attended.

- The odds of having applied for higher-level anaesthesia specialty training varied by the HE Training Deanery attended.

1.6 Accepted higher-level anaesthesia specialty training post

For the whole sample of doctors, including those who attended non-UK medical schools, and the subsample of doctors who attended UK medical schools

- None of the sociodemographic, educational and institutional background factors examined were predictive of having accepted a higher-level anaesthesia specialty training post.

1.7 Conclusions

There is a significant amount of attrition of the numbers of doctors who enter core training in medicine or anaesthesia, with those completing training and subsequently applying for higher level training posts in those specialties.

Common educational factors which predicted completion of core training in both medicine and anaesthesia were; graduate versus non-graduate entry to medical school, medical school attended and training Deanery attended. Part-time training was associated with lower odds of completing training for medicine but not anaesthesia.

There were differences in the socio-demographic factors associated with completion of training for medicine and anaesthesia. In core medical training BME doctors were 0.7 times as likely as white doctors to complete training, but doctors who at entry to medical school had lived in POLAR 1 were more likely to complete core training. For anaesthesia, the only socio-demographic factor associated with completion of core training was gender.

Selection processes to core training in medicine and anaesthesia work well in predicting those trainees that will complete the core training programme with strong associations between interview score and likelihood of successful completion of training in medicine and anaesthetics. Although shortlisting and interview scores predicted successful completion of core medical training, these scores had an inverse relationship with the odds of applying to higher training in medicine.

For trainees who had completed core medical training, those who had intercalated during medical school were more likely to apply and there were significant associations between medical school and foundation school attended. For anaesthesia, the only factor associated with the odds of applying for ST3 posts after completion of core training, was the HE training deanery attended. For those applicants who were offered posts to higher training in medicine and anaesthetics, none of the socio-demographic or educational factors investigated were associated with decisions to accept these posts.

2 Introduction

Core training programmes for medicine and anaesthesia have high fill rates for CT1 entry compared to other specialties. However, these specialties suffer from below optimal conversion rates between core and higher specialty training posts.[1] As a result, there are many unfilled posts at entry to higher (ST3 level) specialty training in medicine and anaesthetics. The Centre for Workforce Intelligence (CfWI) has identified an urgent need to increase the number of ST3 posts, and to model the way in which the output from core and Acute Care Common Stem (ACCS) training posts flows into higher specialty training.[2,3] Research is required to understand the extent of attrition between core training and specialty training posts in these specialties, and factors that predict successful appointment to higher specialty training.

The main aim of our study is to identify factors that predict doctors' successful completion of core training in medicine and anaesthesia and their subsequent decisions to pursue higher specialty training. Previous work has investigated trainees' perceptions regarding the weighting of individual and job-related factors influencing choice and selection to specialty training posts, but there is limited longitudinal research investigating factors which predict successful completion of training.[4] A large longitudinal prospective study, identified that previous academic attainment predicts undergraduate attainment in pre-clinical and clinical years of a medical degree, but sociodemographic factors are also important predictors of future clinical performance.[5]

The UKMED database provides a unique opportunity to investigate the contribution of a number of sociodemographic and educational background factors that predict successful completion of core training in medicine and anaesthesia, and successful progression to higher specialty training.

3 Methods

3.1 Data, study population and variables

The anonymised data for this study were provided by the UKMED Development Group and accessed remotely by the authors via the Health Informatics Centre Safe Haven at Dundee University (https://www.dundee.ac.uk/hic/hicsafehaven/). The UKMED Data Dictionary (http://www.ukmed.ac.uk/documents/UKMED_data_dictionary.pdf) describes the available data. Within the available data the earliest training year in which doctors had entered core training posts was 2012-13 and the latest training year for which specialty application and ARCP outcome data was available was 2016-17. To allow for natural variation in the time taken to complete core training we therefore restricted our analyses to doctors who had accepted core training posts during the years 2012 to 2014. The four samples used in our analyses were as follows.

1. Core medical training sample: 3720 doctors who had accepted a training post that commenced in the years 2012 to 2014.
2. Higher-level medical specialty training sample: the 2633 doctors in Sample 1 who successfully completed their training.
3. Core anaesthesia training sample: 1577 doctors who had accepted a training post that commenced in the years 2012 to 2014.[2]
4. Higher-level anaesthesia specialty training sample: 858 of the doctors who had accepted a core training post that commenced in the years 2013 or 2014 (but not 2012) and who had successfully completed their training. We excluded the 2012 starters because of missing data on applications to higher-level anaesthesia training prior to 2015.

3.1.1 Outcomes

For doctors who had participated in core medical training and doctors who had participated in core anaesthesia training we investigated the following binary outcomes:

1. Whether or not the doctor successfully completed core training
2. Whether or not doctors who had successfully completed core medical training subsequently applied for higher-level medical specialty training
3. Whether or not doctors who had successfully completed core medical training and subsequently applied for higher-level medical specialty training accepted a post
4. Whether or not doctors who had successfully completed core anaesthesia training subsequently applied for higher-level anaesthesia specialty training
5. Whether or not doctors who had successfully completed core anaesthesia training and subsequently applied for higher-level anaesthesia specialty training accepted a post

We investigated the above outcomes in respect of samples (a) all doctors, and (b) only doctors who had attended UK medical schools.

3.1.2 Independent variables

Independent variables included a range of background factors: personal, family, academic, medical school and foundation school attended, and HE deanery where higher specialty training took place (see Table 1 and

[2] Including those doctors on the three-year Acute Care Common Stem (ACCS) Anaesthesia pathway.

Table 2 for frequencies and missing values for the samples of doctors who participated in core medical training and core anaesthesia training respectively).

We used the higher-level ethnicity indicator BME (*Asian or Asian British, Black or Black British, Mixed, Other Ethnic Group* versus *White, Other white background*) rather than the more granular 5-category classification of ethnicity that was also provided in the UKMED data set. We used BME due to the small cell sizes encountered when ethnicity and other multinomial categorical variables were analysed in the same regression models. For similar reasons we dichotomised three further variables into a yes/no format: disability, 'UK educated' and EPM score. 'UK educated' indicated doctors who had completed their pre-medical school education, including secondary school and any undergraduate degrees, in the UK. EPM outcomes in the data set were recorded for some as decile scores (34 to 43) and for others as quartiles, thus we recoded EPM outcomes as top two quarters (EPM decile scores 39 to 43) versus bottom two quarters (EPM decile scores 34 to 38).

3.2 Statistical Analysis

Univariate analyses were carried out to identify missing, unexpected and outlying values and to assess the data for normality of distribution. Given the extent of missing values on some of the observations used in this study and the consequent potential for biased estimates, we had to confront the issue of whether to impute values or not. Two approaches are commonly used by researchers: either the list-wise deletion method, which omits cases with missing values and conducts multivariable analysis only on cases with a complete set of values on the variables in a model, or the use of imputation methods to create a synthetic 'complete' data set by allocating values on missing observations.[6] However, it is widely accepted that methods of imputation make assumptions about data which are often violated and that imputation may therefore lead to biased estimates of unpredictable direction.[7,8] Opinions are divided in the research community as to the best approach to dealing with missing values and researchers are faced with a choice between bias from list-wise deletion and bias from imputation. We have taken the former option.

Bivariate tests of association (Fisher's Exact Test, Pearson's chi-squared test and univariate logistic regression as appropriate) between each potential predictor and the outcome of interest (specialty application) were used to inform the construction of multivariable logistic regression models. List-wise deletion excluded cases in which there were missing values for any of the variables in the regression model. Variables that were non-significant in bivariate analyses or which were non-significant in multivariable models and caused substantial reduction in the size of the analysis sample were removed from the models. This strategy was aimed at determining the most parsimonious models.

Model goodness of fit was assessed using the Hosmer-Lemeshow test with a p-value greater than 0.05 taken to indicate acceptable fit. [9] The significance of the effect of individual predictor variables was assessed using a z-test (Wald Test computed as a chi-squared test) with a p-value less than 0.05 taken to indicate statistical significance.[10] The quality of model classification (sensitivity and specificity of predicted outcomes) was assessed using receiver operating characteristic (ROC) diagnostics.[11] The adequacy of model sample size was assessed using the formula N = 10 x k/p, where p is the proportion of negative or positive cases (whichever smallest) in the population and k the number of independent variables, to indicate the minimum number of cases required.[12]

Some interaction effects of particular interest were examined and, finally the modelling results interpreted in relation to the aims of the study. Methods of interpretation were based on predicted probabilities. Typologies, based on profiles of values for the independent variables in a model enabled insight into which configuration of variables were substantively important in influencing the outcome. We used Stata version 15 for all analyses.

4 Results: Successfully completed core medical training

4.1 Descriptive statistics

Overall, 71% (2633/3720) of doctors in the sample successfully completed their core medical training. Rates of successful completion varied by medical school (57% to 86% for UK medical schools and 46% for non-UK medical schools; Table 3), by Foundation School Deanery (56% to 86%; Table 3) and by HE Deanery where the training took place (59% to 97%; Table 4).

4.2 Bivariate analyses

Bivariate tests of association revealed statistically significant associations between the outcome ‘successfully completed core medical training’ and many of the independent variables (Table 1, final column).

Significant variables were included in exploratory multivariable logistic regression models. However, due to the level of missing values on sociodemographic and educational background variables collected on entry to medical school, and variables measuring performance at medical school in respect of those who had not studied at UK medical schools (see Table 1), these variables were excluded from model 1 due to their effect on sample size.

4.3 Model 1a: Successfully completed core medical training (all doctors)

The analytic sample (n=3296) comprised doctors who had participated in core medical training of which 376 were graduates on entry to medical school and 245 had studied at a non-UK medical school. Predictors included in the final model were: Graduate on Entry, Medical School, Foundation School Deanery, HE Training Deanery, CMT Short Listing score CMT Interview score and Part-time core medical training.

A Hosmer-Lemeshow test confirmed adequate model fit and Wald tests that Graduate on Entry, Medical School, HE Training Deanery, CMT Short Listing score, CMT Interview score and

Part-time core medical training each had a significant effect on the outcome successfully completed core medical training, whilst Foundation School Deanery was non-significant (Table 5).

4.3.1 Odds Ratios

The odds of successful completion of core medical training for Graduate entrants to medical degree programmes were 0.55 times the odds for non-graduate entrants (Table 6). Variation among medical schools was clearly illustrated when the predicted probabilities of successful completion of core medical training were plotted (Figure 1). The odds of successful completion of core medical training for those who trained part-time were 0.21 times those who trained full-time. Compared to non-UK medical schools (reference category) the odds of successful completion were significantly greater for doctors who had studied at 7 (Table 6) of the UK medical schools (odds ratios ranging from 2.3 to 6.7). However, there was no significant difference in the odds of successful completion between non-UK medical schools and the remaining UK medical schools (Table 6).

Variance among HE deaneries where training took place was clearly illustrated when the predicted probabilities of successful completion of core medical training were plotted (Figure 2). Compared to HE Thames Valley (reference category) the odds of successful completion were significantly lower for all other deaneries (Table 6).

For a standard deviation increase in CMT short-listing score (SD=11.2 points) the odds of successful completion of core medical training increased by 24.9%, and for a standard deviation increase in CMT interview score (SD=5.7 points) the odds of successful completion of core medical training increased by 45.0%.

When contrasted by UK versus non-UK medical school, by graduate and non-graduate entry, adjusted by CMT Short-listing score there were clear differentials in the predicted probability of successful completion of core medical training (Figure 3). Across all levels of CMT Short-listing score non-graduate entrants to UK medical schools had the highest probability of success and graduate entrants to non-UK medical schools the lowest probability of success. Interestingly there was little difference between graduate entrants to UK medical schools and non-graduate entrants to non-UK medical schools (Figure 3).

When contrasted by UK versus non-UK medical school, by graduate and non-graduate entry, adjusted by CMT Interview score there were clear differentials in the predicted probability of successful completion of core medical training (Figure 4). Across all levels of interview score non-graduate entrants to UK medical schools had the highest probability of success and graduate entrants to non-UK medical schools the lowest probability of success. Once again there was little difference between graduate entrants to UK medical schools and non-graduate entrants to non-UK medical schools (Figure 4).

4.3.2 Typologies

The mean predicted probability (scale of 0 to 1) of successful completion of core medical training for doctors at UK and non-UK medical schools was 0.77, (Standard Deviation = 0.16, Table 5, Model 1a). However, holding all other predictors in the model at their mean, the predicted probability for a doctor who had been a graduate entrant to a non-UK medical school was 0.37, and that for a non-graduate entrant to a non-UK medical school was 0.53. In contrast, the predicted probability of their counterpart graduate and non-graduate entrants to UK medical schools was 0.73 and 0.84 respectively (Table 7).

4.4 Model 1b: Successfully completed core medical training (excludes doctors who attended non-UK medical schools).

The analytic sample (n=2709) comprised doctors who had attended and obtained their Primary Medical Qualification at a UK medical school. Predictors included in the final model were: Part-time core medical training, POLAR, Disability, BME, Intercalated, Graduate Entry, Medical School attended, Foundation School Deanery, HE Training Deanery, CMT Short Listing score and CMT Interview score.

A Hosmer-Lemeshow test confirmed adequate model fit and Wald tests that Part-time core medical training, POLAR, BME, Graduate Entry, Medical School attended, HE Training Deanery, CMT Short Listing score and CMT Interview score each had a significant effect on the outcome successfully completed core medical training, whilst Intercalation and Foundation School Deanery attended were non-significant (Table 5).

4.4.1 Odds Ratios

The odds of successful completion of core medical training for Graduate entrants to medical degree programmes were 0.48 times those for non-graduate entrants (

Table 8). The odds of successful completion of core medical training for those who trained part-time were 0.18 times those who trained full-time (Table 8).The odds of successful completion of core medical training for POLAR quintile 2, 3, 4 and 5 were respectively 0.52, 0.46, 0.40 and 0.62 times the odds for doctors from POLAR 1 background (area of lowest rate of HE participation) (

Table 8). The odds of BME doctors were 0.71 times those for white doctors (

Table 8).

For each standard deviation in CMT Short-listing score (SD=10.98) the odds of successful completion of core medical training increased by 24.5%. For each standard deviation in CMT Interview score (SD=5.4) the odds increased by 39%.

Variation among medical schools was clearly illustrated when the predicted probabilities of successful completion of core medical training were plotted (Figure 5) as was variation among HE deaneries where training took place (Figure 6).

Compared to Warwick medical school (reference category) the odds of successful completion of core medical training were significantly lower for 24 medical schools (odds ratios ranging from 0.13 to 0.23), and non-significant for the remainder UK medical schools (

Table 8).

Compared to HE Thames Valley (reference category) the odds of successful completion were significantly different and lower (0.09 to 0.22) for seven other deaneries where training took place and non-significant for all others (

Table 8).

4.4.2 Typologies

The mean predicted probability (scale of 0 to 1) of successful completion of core medical training for doctors who attended UK medical schools was 0.79, (Standard Deviation = 0.16, Table 5, Model 1b). However, holding all other predictors in the model at their mean, the predicted probability for a white doctor from a POLAR quintile 1 (area of lowest rate of HE participation) who had been a non-graduate entrant was 0.92, compared to 0.71 for a BME doctor from a POLAR quintile 5 (area of highest rate of HE participation) who had been a graduate entrant to medical school (Table 9). However, the influence of medical degree entry level (graduate versus non-graduate) ethnicity (BME versus white) and POLAR quintile diminished as CMT Shortlisting score (Figure 7) increased and as CMT Interview score increased (Figure 8).

5 Results: Higher-level medical specialty training

5.1 Descriptive statistics

72% (2633/3720) of doctors who were accepted for core medical training (CMT) from years 2012 to 2014, successfully completed CMT. The sample (n=2633), included 133 doctors who had attended and obtained their Primary Medical Qualification (PMQ) at non-UK medical schools (see

Table 10 for frequencies and missing values on sociodemographic and educational background variables).

5.2 Bivariate analyses

Bivariate tests of association between each outcome and a range of sociodemographic/educational background variables (see

Table 10, end column). Statistically significant predictors were included in exploratory regression models and the most parsimonious final model reported.

5.3 Model 2a: Applied higher-level medical specialty training (all doctors)

68% (1803/2663) of doctors who had successfully completed their core medical training applied to higher-level training in medical specialties. Rates of application varied by medical school attended (48% to 100% for UK medical schools and 76% for non-UK medical schools, Table 11), by Foundation School Deanery (53% to 81%) and by HE Deanery where the CMT training took place (62% to 83%, Table 12).

Predictors included in the final model were: Gender, Graduate on Entry, Intercalated, Medical School, Foundation School Deanery, and HE Training Deanery.

A Hosmer-Lemeshow test confirmed adequate model fit and Wald tests that Intercalated, Medical School, and Foundation School Deanery each had a significant effect on the outcome, applied for higher-level medical specialty training, whilst Gender, Graduate on Entry, and HE Training Deanery were non-significant (

Table 13).

5.3.1 Odds Ratios

Variance among medical schools was clearly illustrated when the predicted probabilities of having applied for higher-level medical specialty training were plotted (Figure 9). Compared to non-UK medical schools (reference category), the odds for doctors who had attended nine of the thirty-three UK medical schools were significantly lower, and the odds for the remainder non-significant, Lancaster apart, where all doctors applied (Table 14).

Variance among Foundation Schools was clearly illustrated when the predicted probabilities of having applied for higher-level medical specialty training were plotted (Figure 10). Compared to Black Country/Shropshire Foundation School Deanery (reference category) the odds were significantly lower at ten foundation schools. The odds of having applied for higher-level medical specialty training for doctors who had intercalated at medical school were 1.6 times the odds of doctors who had not intercalated (Table 14).

In summary, the odds of having applied for higher-level medical specialty training varied by medical school and foundation school attended, doctors who had intercalated at medical school were less likely than doctors who had not intercalated. Whilst doctors who had studied at non-UK medical schools were more likely to apply than doctors who had studied at a small number of UK medical schools, in the main there was no significant difference between the two groups.

5.4 Model 2b: Applied to higher-level medical specialty training (excludes doctors who attended non-UK medical schools)

Predictors included in the final model were: Gender, Entry Status, Intercalated, Medical School, Foundation School Deanery, HE Training Deanery, CMT Shortlisting score and CMT Interview score.

A Hosmer-Lemeshow test confirmed adequate model fit and Wald tests that Intercalated, Medical School, Foundation School Deanery, CMT Shortlisting score and CMT Interview score each had a significant effect on the outcome, applied for higher-level medical specialty training, whilst Gender, Entry Status, and HE Training Deanery were non-significant (

Table 13).

5.4.1 Odds Ratios

Variation among UK medical schools and Foundation School Deaneries remained the same as reported for model 2a (see Table 14, Figure 9 and Figure 10). The odds of having applied for higher-level medical specialty training for doctors who had intercalated at medical school were 1.8 times the odds for doctors who had not intercalated (OR=1.79, 95% confidence interval 1.3247 to 2.4199, p<0.001). However, the odds decreased by -13% for a standard deviation (SD=10.76) increase in CMT Shortlisting increased (OR=0.98, 0.9762 to 0.9983) and by -10% for a standard deviation (SD=5.07) increase in CMT Interview score (OR=0.97, 0.9614 to 0.9988) (Figure 11).

In summary, the odds of having applied for higher-level medical specialty training varied by medical school and foundation school attended, doctors who had intercalated at medical school were less likely than doctors who had not intercalated, however, for both groups, as CMT Shortlisting score and CMT Interview score increased the likelihood of application decreased.

5.5 Model 3a: Accepted higher-level medical specialty training post (all doctors)

None of the variables listed in

Table 10 were either univariately or multivariately significantly associated with the outcome ‘accepted a higher-level medical specialty post.

5.6 Model 3b: Accepted higher medical specialty training post (excludes doctors who attended non-UK medical schools)

None of the variables listed in

Table 10 were either univariately or multivariately significantly associated with the outcome ‘accepted a higher-level medical specialty post.

6 Results: Successfully completed core anaesthesia training

6.1 Descriptive statistics

Independent variables included a range of background factors: personal, family, academic, medical school and foundation school attended, and HE deanery where higher specialty training took place (see

Table 2 for frequencies and missing values).

Overall, 78% (1226/1577) of doctors in the sample successfully completed their anaesthesia training. Rates of successful completion varied by medical school attended (53% to 100% for UK medical schools and 56% for non-UK medical schools,

Table 15). Rates of successful completion varied by Foundation School Deanery (61% to 95%,

Table 15) and by HE Deanery where the training took place (67% to 100%, Table 16).

6.2 Bivariate analyses

Bivariate tests of association revealed statistically significant associations between the outcome ‘successfully completed anaesthesia training’ and many of the independent variables (

Table 2, final column).

Significant variables were included in exploratory multivariable logistic regression models. However, due to the level of missing values on sociodemographic and educational background variables collected on entry to medical school, and variables measuring performance at medical school in respect of those who had not studied at UK medical schools (see

Table 2), these variables were excluded from model 4a due to their effect on sample size.

6.3 Model 4a: Successfully completed core anaesthesia training (all doctors).

The analytic sample (n=1464) comprised doctors who had participated in core anaesthetic training of which 272 were graduates on entry to medical school and 38 had studied at a non-UK medical school. Predictors included in the final, most parsimonious, model were: Gender, Graduate Entry, Medical School attended, Foundation School Deanery, Anaesthetics Training Deanery and anaesthetics training Interview score. The predictor Part-time anaesthesia training was non-significant and excluded from the final model.

A Hosmer-Lemeshow test confirmed adequate model fit and Wald tests that Gender, Graduate Entry, Medical School, Foundation School, HE Training Deanery, and Interview score each had a significant effect on the outcome successfully completed core anaesthesia training (Table 17).

6.3.1 Odds Ratios

The odds of successful completion of anaesthesia training for male doctors was 1.4 times those for female doctors, and the odds for doctors who had been graduate entrants to medical degree programmes were 0.48 times the odds for non-graduate entrants (Table 18). Variation among medical schools was clearly illustrated when the predicted probabilities of successful completion of anaesthesia training were plotted (Figure 12). Compared to non-UK medical schools (reference category) the odds of successful completion were significantly greater for doctors who had studied at 10 (highlighted, Table 18) UK medical schools (odds ratios ranging from 3.4 to 8.4). However, there was no significant difference in the odds of successful completion between non-UK medical schools and the remaining UK medical schools (Table 18).

Variance among foundation schools was clearly illustrated when the predicted probabilities of successful completion of anaesthesia training were plotted (Figure 13). Compared to North Yorkshire East (reference category) the odds of successful completion were significantly lower for five foundation schools and for both UK and non-UK medical school graduates with missing values on foundation school status.

Variance among HE deaneries where training took place was clearly illustrated when the predicted probabilities of successful completion of anaesthesia training were plotted (Figure 14). Compared to London South (reference category) the odds of successful completion were significantly lower for all other deaneries, London NCE and London NW apart, which were non-significant (Table 18).

For a standard deviation increase in interview score (SD=22.5 points) the odds of successful completion of core anaesthesia training increased by 48.0%.

When contrasted by UK versus non-UK medical school, by gender, graduate and non-graduate entry, and adjusted by interview score there were clear differentials in the predicted probability of successful completion of anaesthesia training (Figure 15). Across all levels of interview score male non-graduate entrants to UK medical schools had the highest probability of success and female graduate entrants to non-UK medical schools the lowest (Figure 15).

6.3.2 Typologies

The mean predicted probability (scale of 0 to 1) of successful completion of core anaesthesia training was 0.78 (SD = 0.15, Table 17, Model 4a). However, holding all other predictors in the model at their mean, the respective predicted probabilities for female and male doctors who had been graduate entrants to non UK medical schools were 0.36 and 0.44. The respective probabilities for female and male non-graduate entrants to non UK medical schools were 0.54 and 0.62. In contrast, the probabilities for female and male doctors who had been graduate entrants to UK medical schools were 0.69 and 0.75, and 0.82 and 0.86 for non-graduate entrants to UK medical schools (Table 19).

6.4 Model 4b: Successfully completed core anaesthesia specialty training (excludes doctors who attended non-UK medical schools)

The analytic sample (n=2718) comprised doctors who had obtained their Primary Medical Qualification at a UK medical school. Predictors included in the final model were: Gender, BME, Entry Status, Intercalated, Medical School attended, Foundation School Deanery, HE Training Deanery, and Anaesthesia Training Interview score. The predictor Part-time anaesthesia training was non-significant and excluded from the final model.

A Hosmer-Lemeshow test confirmed adequate model fit and Wald tests that Gender, Entry Status, Foundation School Deanery, HE Training Deanery, and Anaesthesia Training Interview score each had a significant effect on the outcome successfully completed anaesthesia training, whilst BME, Intercalated and Medical School attended were non-significant (Table 17).

6.4.1 Odds Ratios

The odds of male doctors having successfully completed anaesthesia training were 1.4 times those of female doctors (Table 20). The odds for graduate entrants to Standard Entry medical degree programmes were 0.54 times those of non-graduate entrants to Standard Entry Programmes ((Table 20).The odds of those on Graduate Entry Programmes were 0.32 times those of non-graduate entrants to Standard Entry Programmes ((Table 20).

For each standard deviation in anaesthesia training Interview score (SD=22.4) the odds of successful completion of anaesthesia training increased by 54%.

Variance among Foundation Schools was clearly illustrated when the predicted probabilities of successful completion of anaesthesia training were plotted (Figure 16) as was variance among HE Deaneries where training took place (Figure 17).

Compared to North Central Thames Foundation School (reference category) the odds of successful completion of anaesthesia training were not significantly different for all other foundation schools, Black Country Shropshire apart ((Table 20).

Compared to HE Thames Valley (reference category) the odds of successful completion of anaesthesia training were significantly lower at 12 HE Deaneries (odds ratios ranging from 0.10 to 0.23) but not significantly different at HE London NCE or HE London NW (Table 20).

6.4.2 Typologies

The mean predicted probability (scale of 0 to 1) of successful completion of anaesthesia training for doctors who obtained their Primary Medical Qualification in the UK was 0.79, (Standard Deviation = 0.14, Table 17, Model 4b). However, holding all other predictors in the model at the mean, the predicted probability for a male, non-graduate entrant to a Standard Entry Programme was 0.88, compared to 0.62 for a female doctor who had been a graduate entrant on a Graduate Entry Programme (Table 21). Non-graduate entrants to Standard Entry Programmes were more likely than graduate entrants to Standard Entry Programmes, both were more likely than those on Graduate Entry Programmes, and across all entry statuses, male doctors were more likely than female doctors (Table 21).However, irrespective of entry status and gender, the probability of successful completion of anaesthesia training increased as Interview score increased (Figure 18).

7 Results: Higher-level anaesthesia specialty training

7.1 Descriptive statistics

The sample comprised 858 doctors, including 14 who had attended non-UK medical schools, and who had been accepted on to the programme during the years 2013 and 2014

Independent variables included a range of background factors: personal, family, academic, medical school and foundation school attended and HE deanery where higher specialty training took place (see Table 22 for frequencies and missing values).

7.2 Bivariate analyses

Bivariate tests of association revealed statistically significant associations between the outcome ‘applied for higher-level anaesthesia specialty training and a number of the independent variables (Table 22, final column). Significant variables were included in exploratory multivariable logistic regression models. However, due to the level of missing values on sociodemographic and educational background variables collected on entry to medical school, and variables measuring performance at medical school, particularly in respect of those who had not studied at UK medical schools (see Table 22), these variables were excluded due to their adverse effect on sample size.

Predictors included in an exploratory model were: Disability, UKPMQ, Medical School, Foundation School Deanery, and Anaesthesia HE Training Deanery. However, as all 14 doctors who had studied at non-UK medical schools had applied (i.e. predicted the outcome perfectly) these cases were automatically dropped from the analytic sample. Thus, the final, and only model reported is model 5b, based on the sample of doctors who attended UK medical schools. Only Foundation School Deanery, and Anaesthesia HE Training Deanery were significant and included in the final model.

7.3 Model 5a: Applied higher-level anaesthesia specialty training (all doctors)

As noted above there was no variation in application amongst the small number of non-UK-trained doctors and so the only model reported is model 5b, based on the sample of doctors who attended UK medical schools.

7.4 Model 5b: Applied higher-level anaesthesia specialty training (excludes doctors who attended non-UK medical schools)

A Hosmer-Lemeshow test confirmed adequate model fit and Wald tests that Anaesthesia HE Training Deanery had a significant effect on the outcome, applied for higher-level anaesthesia specialty training, whilst Foundation School Deanery was non-significant (Table 23).

74% (636/858) of doctors who had successfully completed their core anaesthesia training applied to higher-level anaesthesia training.

Rates of application varied by medical school attended (36% to 100% for UK medical schools and 100% for non-UK medical schools and by Foundation School Deanery (53% to 92%, Table 24) and by HE Deanery where the training took place (56% to 94%, Table 25).

7.4.1 Odds Ratios

Variance among Anaesthesia HE Training Deanery was clearly illustrated when the predicted probabilities of having applied for higher-level medical specialty training were plotted (Figure 19).Compared to HE South West Deanery (reference category), the odds of applied ranged from no difference at HE East Midlands to 11 times greater at Northern Ireland MTDA (26).

In summary, the odds of having applied for higher-level anaesthesia specialty training varied by Anaesthesia HE Training Deanery attended.

7.5 Model 6a: Accepted a higher-level anaesthesia specialty training post (all doctors)

7.6 Model 6b: Accepted a higher-level anaesthesia specialty training post (excludes doctors who attended non-UK medical schools)

In respect of both the above models, none of the factors measuring doctors' sociodemographic and educational background of interest (Table 22) were associated with the outcome accepted a higher-level anaesthesia specialty training post.

8 Tables

Table 1: Sociodemographic and educational background descriptive statistics of the UKMED sample of doctors who accepted core medical training posts during the years 2012 to 2014 (n=3720). Results of bivariate tests of association with the outcome successfully completed core medical training (Pearson's Chi squared test, logistic regression as appropriate) with associated statistics and significance. For a full list of UKMED data types, descriptions and sources please refer to the UKMED Data Dictionary available at http://www.ukmed.ac.uk/documents/UKMED_data_dictionary.pdf

Factor	Category	N doctors	% of sample	% Completed	Bivariate Association
Gender	Female	2136	57.42	72.05	n/s
	Male	1584	42.58	70.96	
		3720	100.0		
Age on entry to medical school	<=20 years	2846	76.51	75.72	χ^2 (2) = 131.67 p<0.001
	>20 years	579	15.56	64.08	
	Not stated/missing	137	5.14	46.44	
		3720	100.0		
Black and Minority Ethnic (BME) status	BME	1058	28.44	71.08	χ^2 (2) = 108.33 p<0.001
	White	2329	62.61	75.23	
	Not stated/missing	333	8.95	47.75	
		3720	100.0		
SEC (NS-SEC 1-7) Socioeconomic class of the parent if under 21 years of age.	Higher managerial & professional	1426	38.33	78.96	χ^2 (7) = 83.94 p<0.001
	Lower managerial & professional	710	19.09	70.85	
	Intermediate occupations	283	7.61	71.02	
	Small employer own account	116	3.12	75.00	
	Lower supervisory & technical	63	1.69	66.67	
	Semi-routine occupations	161	4.33	64.60	
	Routine occupations	41	1.10	68.29	
	Not stated/missing	920	24.73	62.17	
		3720	100.0		
Index of Multiple Deprivation (IMD) a quintile ranking of IMD zone within country of UK students' domicile	Quintile 1	1078	28.98	76.72	χ^2 (5) = 56.29 P<0.001
	Quintile 2	729	19.60	74.76	
	Quintile 3	523	14.06	74.76	
	Quintile 4	309	8.31	67.96	
	Quintile 5	1833	4.92	68.31	
	Not stated/missing	898	24.14	62.92	
		3720	100.0		
POLAR2 (quintile classification of areas for young persons' participation rates in higher education based on students' UK postcode	Quintile 1	126	3.39	81.75	χ^2 (5) = 71.24 P<0.001
	Quintile 2	259	6.96	71.04	
	Quintile 3	441	11.85	70.07	
	Quintile 4	731	19.65	70.59	
	Quintile 5	1525	40.99	76.72	
	Not stated/missing	638	17.15	59.72	
		3720	100.0		
Disability	Disabled	24	0.65	45.83	χ^2 (2) = 114.97 P<0.001
	No disability	3379	90.83	74.10	
	Not stated/missing	317	8.52	46.69	
		3720	100.0		
UK educated 1= Yes: completed <u>both</u> secondary education & undergraduate	1	2683	72.12	75.51	χ^2 (4) = 91.42 P<0.001
	2	3	0.08	33.33	
	3	293	7.88	70.31	
	4	2	0.05	100.00	
	Not stated/missing	739	19.87	57.92	

Factor	Category	N doctors	% of sample	% Completed	Bivariate Association
medical degree in the UK 2=No: completed secondary education in the UK and undergraduate medical degree outside UK 3= No: completed secondary education outside the UK and undergraduate medical degree in UK 4= No: completed both secondary education and undergraduate medical degree outside UK		3720	100.0		
UK secondary school education Recode of UK educated (1&2=1, 3&4=0)	Yes	2686	72.20	75.47	χ^2 (2) = 87.93 P<0.001
	No	295	7.93	70.51	
	Not stated/missing	739	19.87	57.92	
		3720	100.0		
Secondary school type attended	Privately funded	1032	27.74	76.68	χ^2 (2) = 90.25 P<0.001
	State funded	2102	56.51	72.26	
	Not stated/missing	586	15.75	56.66	
		3720	100.0		
Income support Whether the doctor's household received Income Support at any point during their school years	Yes	300	8.06	69.00	χ^2 (2) = 75.85 P<0.001
	No	2097	56.37	77.11	
	Not stated/missing	1323	35.56	63.42	
		3720	100.0		
Free school meals Whether doctor had free school meals	Yes	1182	4.89	70.33	χ^2 (2) = 66.12 P<0.001
	No	2326	62.53	76.10	
	Not stated/missing	1212	32.58	63.12	
		3720	100.0		
Parent Degree Whether the doctor's parent(s) or guardian (s) completed a university degree course or equivalent.	Yes	1825	49.06	78.14	χ^2 (2) = 91.94 P<0.001
	No	763	20.51	70.38	
	Not stated/missing	1132	30.43	61.84	
		3720	100.0		
Graduate On Entry	Graduate	438	11.37	65.98	χ^2 (1) = 7.67 P<0.001
	Non-graduate	3282	88.23	72.33	
	Not stated/missing	-	-		
		3720	100.0		
Programme Derived from COURSE_TYPE 1= Standard Entry Programme	Standard Entry Programme	3051	82.02	74.21	χ^2 (5) = 98.50 p<0.001
	Graduate Entry Programme	261	7.02	72.80	
	Foundation Course	8	0.02	50.00	
	Medicine With a Gateway (Preliminary) Year	28	0.75	67.86	
	Science Top-up Programme	11	0.03	0.00	
	Not stated/missing	371	9.97	50.13	

Factor	Category	N doctors	% of sample	% Completed	Bivariate Association
2=Graduate Entry Programme 3= Medicine With Gateway/Preliminary Year Programme		3720	100.0		
Medical school Entry Status	Non-graduate entrant to Standard Entry Programme	2868	77.10	75.24	χ^2 (3) = 110.85 p<0.001
	Graduate entrant to Standard Entry Programme	183	4.92	57.92	
	Entrant to Graduate Entry Programme	245	6.59	71.84	
	Not stated/missing	424	11.40	52.59	
		3720	100.0		
Age at entry to medical	Age<21 years	2846	76.51	75.72	χ^2 (2) = 131.67 p<0.001
	Age>=21 years	579	15.56	64.08	
	Not stated/missing	295	7.93	46.44	
		3720	100.0		
Parent(s) had higher education qualifications	Yes	257	6.91		n/s
	No	95	2.55		
	Not stated/missing	3368	90.54		
		3720	100.0		
IDACI quintile	1	480	12.90	69.17	χ^2 (5) = 59.00 P<0.001
	2	501	13.47	76.05	
	3	492	13.23	75.61	
	4	483	12.98	75.98	
	5	500	13.44	79.00	
	Not stated/missing	1264	33.98	64.56	
		3720	100.00		
First medical school	See Table 2 for details				χ^2 (33) = 213.07 P<0.001
	Not stated/missing				
		3720	100.0		
Foundation School Deanery	See Table 2 for details				χ^2 (29) = 148.65 P<0.001
	Not stated/missing				
		3720	100.0		
Health Education Training Deanery	See Table 3 for details				χ^2 (16) = 642.29 P<0.001
	Not stated/missing				
		3720	100.0		
Intercalated	Yes	635	17.077	75.91	χ^2 (1) = 7.02 P<0.001
	No	3085	82.93	70.70	
	Not stated/missing	-			
		3720	100.0		
Educational Performance Measure quartile band	1	131	3.52	61.83	χ^2 (4) = 26.83 P<0.001
	2	147	3.95	71.43	
	3	201	5.40	80.60	
	4	212	5.70	82.08	
	Not stated/missing	3029	81.42	70.68	
		3720	100.0		
UK Primary Medical Qualification	Yes	3429	92.18	73.78	χ^2 (1) = 103.97 P<0.001
	No	291	7.82	45.70	
	Not stated/missing	-	-		
		3720	100.0		
Part-time core medical training	Yes	110	2.96	44.55	χ^2 (2) = 783.96 P<0.001
	No	3343	89.87	78.19	
	Not stated/missing	267	7.18	0	

Factor	Category	N doctors	% of sample	% Completed	Bivariate Association
		3720	100.0		
Continuous variables			Mean (SD)	Min - Max	Regression
Total UCAS tariff for all HESA Tariff included qualifications		n=2785	476.17 (95.39)	20 to 900	B = .002 P<0.001
UKCAT Total score		n=372	2512.17 (232.86)	1760 - 3130	B = .002 P<0.01
Age on entry to medical school		n= 3425	19.21 (2.5)	17 to 40	B = -.10 P<0.001
CMT Shortlisting score		n=3698	25.09 (11.09)	2 to 92	B = .04 P<0.001
CMT Interview score		n=3707	49.31 (6.57)	16 to 147	B = .07 P<0.001

Table 2: Sociodemographic and educational background descriptive statistics of the UKMED sample of doctors who accepted core anaesthesia training posts during the years 2012 to 2014 (n=1577). Results of bivariate tests of association with the outcome successfully completed core anaesthesia training (Pearson's Chi squared test, logistic regression as appropriate) with associated statistics and significance. For a full list of UKMED data types, descriptions and sources please refer to the UKMED Data Dictionary available at http://www.ukmed.ac.uk/documents/UKMED_data_dictionary.pdf

Factor	Category	N doctors	% of sample	% Completed	Bivariate Association
Gender	Female	767	48.64	76.01	n/s
	Male	810	51.36	79.38	
		1577	100.00		
Age on entry to medical school	<=20 years	1153	73.11	80.14	x^2 (2) = 19.68 p<0.001
	>20 years	385	24.41	73.73	
	Not stated/missing	39	2.47	56.41	
		1577	100.00		
Black and Minority Ethnic (BME) status	BME	331	20.99	74.92	x^2 (2) = 12.58 p<0.002
	White	1203	76.28	79.22	
	Not stated/missing	43	2.73	58.13	
		1577	100.00		
SEC (NS-SEC 1-7) Socioeconomic class of the parent if under 21 years of age.	Higher managerial & professional	602	38.17	79.57	n/s
	Lower managerial & professional	350	22.19	79.14	
	Intermediate occupations	140	8.88	78.57	
	Small employer own account	41	2.60	82.93	
	Lower supervisory & technical	30	1.90	83.33	
	Semi-routine occupations	78	4.95	79.49	
	Routine occupations	22	1.40	68.18	
	Not stated/missing	314	19.91	71.34	
		1577	100.00		
Index of Multiple Deprivation (IMD) a quintile ranking of IMD zone within country of UK students' domicile	Quintile 1	516	32.72	81.01	x^2 (5) = 14.26 P<0.01
	Quintile 2	359	22.76	77.72	
	Quintile 3	238	15.09	77.31	
	Quintile 4	143	9.07	82.52	
	Quintile 5	67	4.25	70.15	
	Not stated/missing	254	16.11	70.87	
		1577	100.00		
POLAR2 (quintile classification of areas for young persons' participation rates in higher education based on students' UK postcode	Quintile 1	56	3.55	80.36	x^2 (5) = 15.82 P<0.01
	Quintile 2	121	7.67	79.34	
	Quintile 3	220	13.95	81.36	
	Quintile 4	330	20.93	73.94	
	Quintile 5	732	46.42	79.78	
	Not stated/missing	118	7.48	66.10	
		1577	100.00		
Disability	Disabled	15	0.95	73.33	x^2 (3) = 13.04 P<0.001
	No disability	1513	95.94	78.59	
	Not stated/missing	49	3.11	53.06	
		1577	100.00		
UK educated 1= Yes: completed both secondary education & undergraduate medical degree in the UK	1	1223	77.55	79.72	x^2 (3) = 13.37 P<0.004
	2	66	4.19	69.70	
	3	22	0.13	100.00	
	Not stated/missing	286	18.14	70.98	
		1577	100.00		

Factor	Category	N doctors	% of sample	% Completed	Bivariate Association
2=No: completed secondary education <u>outside</u> the UK and undergraduate medical degree <u>in</u> UK 3= No: completed both secondary education and undergraduate medical degree <u>outside</u> UK					
UK secondary school education Recode of UK educated (1=1Yes 2&3 =No)	Yes	1223	77.55	79.72	$^x2$ (2) = 12.34 P<0.002
	No	68	4.31	70.59	
	Not stated/missing	286	18.14	70.98	
Secondary school type attended	Privately funded	1012	64.17	77.87	n/s
	State funded	437	27.71	79.63	
	Not stated/missing	128	8.12	70.31	
		1577	100.00		
Income support Whether the doctor's household received Income Support at any point during their school years	Yes	140	8.88	70.00	$^x2$ (2) = 19.59 P<0.001
	No	954	60.49	81.45	
	Not stated/missing	483	30.63	72.67	
		1577	100.00		
Free school meals Whether doctor had free school meals	Yes	96	6.09	67.71	$^x2$ (2) = 20.46 P<0.001
	No	1045	66.27	81.05	
	Not stated/missing	434	27.65	72.02	
		1577	100.00		
Parent Degree Whether the doctor's parent(s) or guardian (s) completed a university degree course or equivalent.	Yes	798	50.60	81.45	$^x2$ (2) = 15.76 P<0.001
	No	391	24.79	76.47	
	Not stated/missing	388	24.60	71.39	
		1577	100.00		
Graduate On Entry	Graduate	295	18.71	73.56	n/s
	Non-graduate	1282	881.29	78.71	
	Not stated/missing	1577	100.00		
Programme Derived from COURSE_TYPE 1= Standard Entry Programme 2=Graduate Entry Programme 3= Foundation Course 4= Medicine With Gateway/Preliminary Year Programme	Standard Entry Programme	1278	81.04	79.26	$^x2$ (4) = 19.34 p<0.001
	Graduate Entry Programme	185	11.73	74.59	
	Foundation Course	7	0.44	71.43	
	Medicine With a Gateway (Preliminary) Year	22	1.40	86.36	
	Not stated/missing	85	5.39	60.00	
		1577	100.00		
Medical school Entry Status	Non-graduate entrant to Standard Entry Programme	1164	73.81	79.81	$^x2$ (3) = 13.75 p<0.003

Factor	Category	N doctors	% of sample	% Completed	Bivariate Association
	Graduate entrant to Standard Entry Programme	114	7.23	73.68	
	Entrant to Graduate Entry Programme	169	10.72	74.56	
	Not stated/missing	130	8.24	66.92	
		1577	100.00		
Parent(s) had higher education qualifications	Yes	128	8.12	83.59	
	No	38	2.41	78.95	
	Not stated/missing	1411	89.47	77.18	n/s
		1577	100.00		
IDACI quintile	1	229	14.52	77.73	
	2	241	15.28	80.91	
	3	225	14.27	77.78	
	4	247	15.56	79.35	
	5	236	14.97	81.78	n/s
	Not stated/missing	399	25.30	72.43	
		1577	100.00		
First medical school	See Table 2 for details				$^x2$ (33) = 68.22 P<0.001
	Not stated/missing				
Foundation School Deanery	See Table 2 for details				$^x2$ (26) = 37.96 p= 0.061
	Not stated/missing				
Health Education Training Deanery	See Table 3 for details				$^x2$ (16) = 56.41 p<0.001
	Not stated/missing				
Intercalated	Yes	293	18.58	78.50	
	No	1284	81.42	77.57	n/s
	Not stated/missing	-	-	-	
		1577	100.00		
Educational Performance Measure quartile band	1	44	2.79	54.55	
	2	54	3.42	81.48	
	3	79	5.01	86.08	$^x2$ (4) = 25.43 p<0.001
	4	92	5.83	89.13	
	Not stated/missing	1308	82.94		
		1577	100.00		
UK Primary Medical Qualification	Yes	1542	97.78	78.27	
	No	35	2.22	54.29	$^x2$ (1) = 11.38 p<0.001
	Not stated/missing				
		1577	100.00		
Part-time anaesthesia training	Yes	54	3.42	66.67	
	No	1505	95.05	78.88	$^x2$ (2) = 47.73 p<0.001
	Not stated/missing	17	1.08	11.76	
		1577	100.00		
Continuous variables			Mean (SD)	Min - Max	Regression
Total UCAS tariff for all HESA Tariff included qualifications		n=1161	470.4 (104.2)	60-890	B = 0.0028 P<0.001
UKCAT Total score		n=190, 88% missing values			
Age on entry to medical school		n=1538	19.8yrs (3.27)	17 to 43yrs	B = -0.0521 P<0.001
Anaesthesia Training Shortlisting score		n=12, 99.3% missing values			
Anaesthesia Training Interview score		n=1575	150.38 (22.60)	223 to 267	B = .0105 P<0.001

Table 3: Percentage of doctors with successful completion of core medical training by medical school and foundation school attended.

Medical School	N doctors	% Successfully Completed CMT	Foundation School Deanery	N doctors	% Successfully Completed CMT
Aberdeen	65	72.31	Black Country/Shropshire	44	72.73
Barts	110	60.91	Coventry and Warwickshire	53	71.70
Birmingham	161	79.50	East Anglian	119	73.95
Brighton	50	72.00	Leicestershire, North	66	63.64
Bristol	114	71.05	Mersey	162	69.14
Cambridge	198	86.36	North Central Thames	211	86.26
Cardiff	144	81.94	North East Thames	151	75.50
Dundee	42	61.90	North West Thames	163	85.28
Durham	42	64.29	North Western	227	67.84
Edinburgh	113	78.76	North Yorkshire East	72	61.11
Glasgow	101	74.26	Northern	193	63.21
Hull York	48	62.50	Northern Ireland	149	61.07
Imperial	201	86.07	Oxford	101	80.20
Keele	31	67.74	Peninsula	69	56.52
King's	150	66.00	Scotland	245	72.24
Lancaster	7	71.43	Severn	112	70.54
Leeds	89	69.66	South Thames	368	74.73
Leicester	98	60.20	South Yorkshire	95	73.68
Liverpool	173	72.25	Trent	121	80.99
Manchester	177	68.93	Wales	139	76.98
Newcastle	135	73.33	Wessex	134	76.12
Norwich	55	67.27	West Midlands Central	84	83.33
Nottingham	139	76.98	West Midlands North	49	59.18
Oxford	126	85.71	West Midlands South	25	68.00
Peninsula	63	68.25	West Yorkshire	93	63.44
Queen's	142	61.27	**UK PMQ/ no UK FS**	367	70.30
Sheffield	115	72.17	**Non-UK PMQ / no UK FS**	108	40.74
Southampton	104	68.27			
St Andrews	49	57.14			
St George's	84	71.43			
Swansea	17	70.59			
UCL	204	82.84			
Warwick	78	78.21			
***Non-UK medical school**	295	46.44			
All	3720	71.59	All	3720	71.59

Table 4: Percentage of doctors with successful completion of core medical training by HE Deanery where training took place.

CMT Deanery	N trainees	% Successfully Completed CMT
HE East Midlands	174	77.59
HE East England	236	74.58
HE Kent, Surrey & Sussex	214	64.95
HE London NC & E	260	90.00
HE London NW	208	93.75
HE London S	249	89.16
HE North East	138	73.19
HE North West	431	70.30
HE South West	229	78.17
HE Thames Valley	99	96.97
HE Wessex	144	77.78
HE West Midlands	225	78.22
HE York & Humber	293	59.39
NHSE Scotland	194	81.96
Northern Ireland MTDA	153	62.75
Multiple (+ London n=9)	75	85.33
Missing	398	25.63
All	3720	71.59

Table 5: Binary logistic regression Model 1a and Model 1b of the outcome successfully completed core medical training, significance of predictors (chi-squared statistic and p-value from likelihood ratio test, and model statistics. Blank cells denote variable not included in a model, n/s denotes non-significance.

		Model 1a		Model 1b	
Predictor	df	X^2	P-value	X^2	P-value
POLAR	4			15.96	0.001
Disability	1			n/s	n/s
BME	1			7.33	0.007
UCAS Tariff score	1				
Graduate Entry	1	19.24	0.0000	16.61	0.000
First Medical School	33	53.06	0.0149	45.41	0.0441
Foundation School	29	n/s	n/s	n/s	n/s
CMT_Deanery	21	59.82	0.0000	50.95	0.0000
CMT Short Listing Score	1	13.72	0.0000	11.80	0.001
CMT Interview Score	1	46.91	0.0000	33.36	0.0000
Part-time core medical training	1	45.22	0.0000	38.45	0.0000

Model statistics	Model 1a	Model 1b
Minimum required sample size	445	502
Actual sample size	3296	2709
Mean probability Standard Deviation 95% CI	0.7752 0.16 0.76 – 0.79	0.8007 0.16 0.79 to 0.81
Hosmer-Lemeshow test	X^2 (10) = 7.21, p>0.05	X2 (10) = 9.47, p>0.05
Area under ROC curve	0.76	0.77

Table 6: Odds ratios (OR) and associated statistics for binary logistic regression of the outcome successful completion of core medical training' (Model 1a, n = 3296).

Predictor	OR	S.E.	z	P-value	95% CI	
Part-time training	0.2060	0.0484	-6.72	0.0000	0.1300	0.3265
Graduate on entry	0.5460	0.0859	-3.85	0.0000	0.4011	0.7432
First Medical school (Reference group: non-UK medical schools)						
Aberdeen	2.0099	0.8529	1.65	0.1000	0.8750	4.6171
Barts	0.8765	0.3020	-0.38	0.7020	0.4461	1.7221
Birmingham	2.6794	0.9188	2.87	0.0040	1.3682	5.2471
Brighton and Sussex	1.8299	0.8056	1.37	0.1700	0.7721	4.3369
Bristol	1.2948	0.4193	0.8	0.4250	0.6863	2.4427
Cambridge	2.8685	0.9898	3.05	0.0020	1.4586	5.6413
Cardiff	3.4042	1.5412	2.71	0.0070	1.4016	8.2677
Dundee	1.0627	0.4720	0.14	0.8910	0.4450	2.5381
Durham	1.4061	0.5900	0.81	0.4170	0.6178	3.2001
Edinburgh	2.4356	0.9122	2.38	0.0170	1.1690	5.0746
Glasgow	1.8565	0.7137	1.61	0.1080	0.8739	3.9437
Hull York	1.2525	0.4934	0.57	0.5680	0.5788	2.7106
Imperial	2.3357	0.7836	2.53	0.0110	1.2102	4.5078
Keele	2.7524	1.5163	1.84	0.0660	0.9349	8.1029
King's	1.2621	0.3734	0.79	0.4310	0.7067	2.2539
Lancaster	2.1188	1.8812	0.85	0.3980	0.3718	12.0738
Leeds	1.6495	0.5829	1.42	0.1570	0.8252	3.2972
Leicester	1.2185	0.4163	0.58	0.5630	0.6238	2.3804
Liverpool	1.6032	0.4583	1.65	0.0990	0.9155	2.8075
Manchester	1.6420	0.4790	1.7	0.0890	0.9269	2.9087
Newcastle	2.9652	1.0607	3.04	0.0020	1.4709	5.9777
Norwich	1.6378	0.6728	1.2	0.2300	0.7321	3.6639
Nottingham	1.7365	0.5946	1.61	0.1070	0.8876	3.3975
Oxford	3.2186	1.4024	2.68	0.0070	1.3702	7.5607
Peninsula	1.7071	0.7157	1.28	0.2020	0.7506	3.8824
Queen's	1.1809	0.4775	0.41	0.6810	0.5346	2.6086
Sheffield	1.8939	0.6606	1.83	0.0670	0.9559	3.7521
Southampton	1.3789	0.4733	0.94	0.3490	0.7036	2.7022
St Andrews	1.4978	0.6692	0.9	0.3660	0.6240	3.5955
St George's	1.6994	0.6086	1.48	0.1390	0.8423	3.4287
Swansea	4.6281	5.1465	1.38	0.1680	0.5234	40.9208
UCL	1.8677	0.5953	1.96	0.0500	1.0000	3.4882
Warwick	6.7423	3.6435	3.53	0.0000	2.3379	19.4445
CMT Deanery (Reference group : HE Thames Valley)						
HE East Midlands	0.1933	0.1308	-2.43	0.0150	0.0513	0.7283
HE East England	0.1248	0.0810	-3.21	0.0010	0.0350	0.4452
HE Kent, Surrey,Sussex	0.0647	0.0420	-4.22	0.0000	0.0182	0.2306
HE London NC&E	0.2104	0.1396	-2.35	0.0190	0.0573	0.7725
HE London NW	0.2494	0.1719	-2.01	0.0440	0.0646	0.9630
HE London S	0.1962	0.1292	-2.47	0.0130	0.0540	0.7134
HE North East	0.1194	0.0825	-3.08	0.0020	0.0308	0.4622
HE North West	0.1212	0.0789	-3.24	0.0010	0.0338	0.4344
HE South West	0.1634	0.1073	-2.76	0.0060	0.0451	0.5916
HE Wessex	0.1406	0.0972	-2.84	0.0050	0.0363	0.5448
HE West Midland	0.2103	0.1404	-2.34	0.0200	0.0568	0.7781
HE York Humber	0.0804	0.0525	-3.86	0.0000	0.0224	0.2892

NHSE Scotland	0.1841	0.1280	-2.43	0.0150	0.0471	0.7193
Northern Ireland MTDA	0.1399	0.1132	-2.43	0.0150	0.0286	0.6830
Multiple	0.1727	0.1228	-2.47	0.0130	0.0429	0.6957
CMT Short Listing Score	1.0231	0.0055	4.24	0.0000	1.0124	1.0340
CMT Interview Score	1.0703	0.0104	7.02	0.0000	1.0502	1.0907

Table 7:Typologies, derived from logistic regression Model 1a, of predicted probability of the outcome 'successfully completed core medical training' computed for combinations of values on the predictors graduate on entry and UK medical school, holding all other predictors in the model at their means (n= 3305, mean predicted probability = 0.7730).

Entry status	UK medical school	Predicted probability	95% CI	
Non- graduate entrant	Yes	0.84	0.83	0.86
	No	0.53	0.47	0.60
Graduate entrant	Yes	0.73	0.68	0.79
	No	0.37	0.28	0.46

Table 8: Odds ratios (OR) and associated statistics for binary logistic regression of the outcome successful completion of core medical training' (Model 1b, n = 2709).

Predictor	OR	S.E.	z	P-value	95% CI	
Part-time training	0.1810	0.0497	-6.20	0.0000	0.1048	0.3097
POLAR (Reference group q1)						
q2	0.5160	0.1767	-1.93	0.0430	0.2637	1.0096
q3	0.4658	0.1514	-2.35	0.0190	0.2463	0.8809
q4	0.4032	0.1267	-2.89	0.0040	0.2178	0.7463
q5	0.6163	0.1898	-2.57	0.0160	0.3370	0.8670
Disability	0.4756	0.2555	-1.38	0.1670	0.1659	1.3632
BME	0.7140	0.0946	-2.54	0.0110	0.5508	0.9257
Graduate on entry	0.4868	0.0860	-4.08	0.0000	0.3444	0.6882
Intercalated	1.1004	0.1897	0.56	0.5790	0.7848	1.5428
First Medical school (Reference group: Warwick medical school)						
Aberdeen	0.1866	0.1368	-2.29	0.0220	0.0444	0.7850
Barts	0.0982	0.0637	-3.58	0.0000	0.0275	0.3500
Birmingham	0.2506	0.1584	-2.19	0.0290	0.0726	0.8647
Brighton and Sussex	0.2130	0.1489	-2.21	0.0270	0.0541	0.8386
Bristol	0.1529	0.0961	-2.99	0.0030	0.0446	0.5238
Cambridge	0.3092	0.1992	-1.82	0.0680	0.0875	1.0929
Cardiff	0.4558	0.3249	-1.10	0.2700	0.1127	1.8429
Dundee	0.0910	0.0676	-3.23	0.0010	0.0212	0.3901
Durham	0.1432	0.1027	-2.71	0.0070	0.0352	0.5837
Edinburgh	0.2010	0.1369	-2.36	0.0180	0.0529	0.7635
Glasgow	0.1852	0.1277	-2.44	0.0140	0.0479	0.7157
Hull York	0.1627	0.1126	-2.62	0.0090	0.0419	0.6320
Imperial	0.3002	0.1908	-1.89	0.0580	0.0864	1.0431
Keele	0.3698	0.3141	-1.17	0.2410	0.0700	1.9538
King's	0.1117	0.0687	-3.56	0.0000	0.0335	0.3728
Lancaster	0.1653	0.1713	-1.74	0.0820	0.0217	1.2606
Leeds	0.1346	0.0895	-3.01	0.0030	0.0366	0.4957
Leicester	0.1206	0.0773	-3.30	0.0010	0.0343	0.4238
Liverpool	0.2019	0.1252	-2.58	0.0100	0.0599	0.6807
Manchester	0.1816	0.1127	-2.75	0.0060	0.0539	0.6126
Newcastle	0.4560	0.3106	-1.15	0.2490	0.1200	1.7329
Norwich	0.2340	0.1622	-2.10	0.0360	0.0602	0.9102
Nottingham	0.1966	0.1253	-2.55	0.0110	0.0564	0.6856
Oxford	0.4689	0.3359	-1.06	0.2900	0.1152	1.9088
Peninsula	0.1740	0.1197	-2.54	0.0110	0.0452	0.6699
Queen's	0.1191	0.0852	-2.97	0.0030	0.0293	0.4839
Sheffield	0.1938	0.1279	-2.49	0.0130	0.0532	0.7061
Southampton	0.1501	0.0952	-2.99	0.0030	0.0433	0.5206
St Andrews	0.1866	0.1387	-2.26	0.0240	0.0435	0.8011
St George's	0.1766	0.1127	-2.72	0.0070	0.0506	0.6167
Swansea	0.4334	0.5256	-0.69	0.4910	0.0402	4.6681
UCL	0.1765	0.1106	-2.77	0.0060	0.0517	0.6030
CMT Deanery (Reference group: HE Thames Valley)						
HE East Midlands	0.3424	0.2517	-1.46	0.1500	0.0810	1.4464
HE East England	0.1355	0.0909	-2.98	0.0030	0.0364	0.5043
HE Kent, Surrey,Sussex	0.0877	0.0581	-3.67	0.0000	0.0239	0.3214
HE London NC&E	0.2555	0.1737	-2.01	0.0450	0.0674	0.9682
HE London NW	0.2750	0.1937	-1.83	0.0670	0.0691	1.0934

HE London S	0.2638	0.1779	-1.98	0.0480	0.0704	0.9891
HE North East	0.1663	0.1207	-2.47	0.0130	0.0401	0.6899
HE North West	0.1265	0.0851	-3.07	0.0020	0.0339	0.4728
HE South West	0.2308	0.1555	-2.18	0.0300	0.0616	0.8643
HE Wessex	0.1974	0.1422	-2.25	0.0240	0.0481	0.8102
HE West Midland	0.3496	0.2473	-1.49	0.1370	0.0874	1.3986
HE York Humber	0.1002	0.0682	-3.38	0.0010	0.0264	0.3803
NHSE Scotland	0.3541	0.2675	-1.37	0.1690	0.0806	1.5564
Northern Ireland MTDA	0.2124	0.1811	-1.82	0.0690	0.0399	1.1297
Multiple	0.2632	0.1988	-1.77	0.0770	0.0599	1.1564
CMT Short Listing Score	1.0227	0.0067	3.44	0.0010	1.0097	1.0358
CMT Interview Score	1.0670	0.0120	5.78	0.0000	1.0438	1.0908

Table 9: Typologies, derived from logistic regression Model 1b, of predicted probability of the outcome 'successfully completed core medical training' computed for combinations of values on the predictors graduate on entry, BME and POLAR quintile 1 versus POLAR quintile 5 holding all other predictors in the model at their means (n= 2718, mean predicted probability = 0.79).

POLAR	Ethnicity	Entry level	Probability	95% Confidence Interval	
Quintile 1	BME	Graduate	0.79	069	0.90
		Non-graduate	0.89	0.84	0.95
	White	Graduate	0.85	0.76	0.93
		Non-graduate	0.92	0.88	0.96
Quintile 5	BME	Graduate	0.71	0.63	0.79
		Non-graduate	0.84	0.81	0.87
	White	Graduate	0.78	0.72	0.83
		Non-graduate	0.88	0.86	0.90

Table 10: Sociodemographic and educational background descriptive statistics of the UKMED sample of doctors who accepted core medical training during the years 2012 to 2014, and subsequently successfully completed their core medical training. Results of bivariate tests of association with the outcome 'applied for higher-level medical specialty training' (Pearson's Chi squared test, logistic regression as appropriate) with associated statistics and significance. For a full list of UKMED data types, descriptions and sources please refer to the UKMED Data Dictionary available at http://www.ukmed.ac.uk/documents/UKMED_data_dictionary.pdf

Factor	Category	N doctors	% of sample	% Applied higher-level medical specialty training	Bivariate Association
Gender	Female	1539	57.79	57.63	n/s
	Male	1124	42.24	42.37	
		2663	100.00		
Age on entry to medical school	<=20 years	2155	80.92	80..98	n/s
	>20 years	371	13.93	13.26	
	Not stated/missing	137	5.14	5.77	
		2663	100.00		
Black and Minority Ethnic (BME) status	BME	752	28.24	28.90	n/s
	White	1752	65.79	64.73	
	Not stated/missing	159	5.97	6.38	
		2663	100.0		
SEC (NS-SEC 1-7) Socioeconomic class of the parent if under 21 years of age.	Higher managerial & professional	1126	42.28	41.65	n/s
	Lower managerial & professional	503	18.89	19.36	
	Intermediate occupations	201	7.55	6.49	
	Small employer own account	87	3.27	3.27	
	Lower supervisory & technical	42	1.58	1.50	
	Semi-routine occupations	104	3.91	3.94	
	Routine occupations	28	1.05	1.16	
	Not stated/missing	572	21.48	22.63	
		2663	100.00		
Index of Multiple Deprivation (IMD) a quintile ranking of IMD zone within country of UK students' domicile	Quintile 1	827	31.06	30.56	n/s
	Quintile 2	545	20.47	20.30	
	Quintile 3	391	14.68	13.70	
	Quintile 4	210	9..89	7.99	
	Quintile 5	125	4.69	4.88	
	Not stated/missing	565	21.22	22.57	
		2663	100.00		
POLAR2 (quintile classification of areas for young persons' participation rates in higher education based on students' UK postcode	Quintile 1	103	3.87	3.88	n/s
	Quintile 2	184	6.91	6.27	
	Quintile 3	309	11.60	11.48	
	Quintile 4	516	19.38	19.30	
	Quintile 5	1170	43.94	44.15	
	Not stated/missing	381	14.31	14.92	
		2663	100.00		
Disability	Disabled	11	0.41	0.44	n/s
	No disability	2504	94.03	93.57	
	Not stated/missing	148	5.56	5.99	
		2663	100.0		
UK educated 1= Yes: completed <u>both</u> secondary education & undergraduate medical degree in the UK 2=No: completed secondary education in	1	2026	76.08	73.77	$^{x}2$ (4) = 31.82 P<0.001
	2	1	0.04	0.00	
	3	206	7.74	7.43	
	4	2	0.08	0.06	
	Not stated/missing	428	16.07	18.75	
		2663	100.00		

Factor	Category	N doctors	% of sample	% Applied higher-level medical specialty training	Bivariate Association
the UK and undergraduate medical degree outside UK 3= No: completed secondary education outside the UK and undergraduate medical degree in UK 4= No: completed both secondary education and undergraduate medical degree outside UK					
UK secondary school education Recode of UK educated (1&2=1, 3&4=0)	Yes	2027	76.12	73.77	$^{x}2$ (2) = 29.65 P<0.001
	No	208	7.81	7.49	
	Not stated/missing	428	16.07	18.75	
		2663	100.00		
Secondary school type attended	Privately funded	812	30.49	30.12	n/s
	State funded	1519	57.04	56.91	
	Not stated/missing	332	12.47	12.98	
		2663	100.0		
Income support Whether the doctor's household received Income Support at any point during their school years	Yes	207	7.77	8.26	$^{x}2$ (2) = 12.59 P<0.001
	No	1617	60.72	58.40	
	Not stated/missing	839	331.51	33.33	
		2663	100.00		
Free school meals Whether doctor had free school meals	Yes	128	4.81	5.16	$^{x}2$ (2) = 17.31 P<0.001
	No	1770	66.47	63.84	
	Not stated/missing	768	28.73	31.00	
		2663	100.0		
Parent Degree Whether the doctor's parent(s) or guardian (s) completed a university degree course or equivalent.	Yes	1426	53.55	52.08	$^{x}2$ (2) = 15.08 P<0.001
	No	537	20.17	19.36	
	Not stated/missing	7000	26.29	28.56	
		2663	100.00		
Graduate On Entry	Graduate	289	10.85	100.04	n/s
	Non-graduate	2374	89.15	89.96	
	Not stated/missing				
		2663	100.00		
Programme Derived from COURSE_TYPE 1= Standard Entry Programme 2=Graduate Entry Programme 3= Medicine With Gateway/Preliminary Year Programme	Standard Entry Programme	2264	85.02	84.91	n/s
	Graduate Entry Programme	190	7.13	6.82	
	Foundation Course	4	0.15	0.22	
	Medicine With a Gateway (Preliminary) Year	19	0.71	0.50	
	Science Top-up Programme	-	-	-	
	Not stated/missing	186	6.89	7.54	
		2663	100.00		
Medical school Entry Status	Non-graduate entrant to Standard Entry Programme	2158	81.044	81.53	n/s

Factor	Category	N doctors	% of sample	% Applied higher-level medical specialty training	Bivariate Association
	Graduate entrant to Standard Entry Programme	106	3.98	3.38	
	Entrant to Graduate Entry Programme	176	6.61	6.43	
	Not stated/missing	223	8.37	8.65	
		2663	100.00		
Age at entry to medical	Age<21 years	2155	80.92	80.98	$^{x}2$ (2) = 6.05 p<0.05
	Age>=21 years	371	13.93	13.26	
	Not stated/missing	137	5.14	5.77	
		2663	100.00		
Parent(s) had higher education qualifications	Yes	191	7.17	8.49	$^{x}2$ (2) = 15.70 P<0.001
	No	70	2.63	2.83	
	Not stated/missing	2402	90.20	86.69	
		2663	100.00		
IDACI quintile	1	332	12.47	112.81	$^{x}2$ (5) = 12.58 P<0.05
	2	381	14.31	13.03	
	3	372	13.97	13.59	
	4	367	13.78	14.09	
	5	395	14.83	14.36	
	Not stated/missing	816	30.64	32.11	
		2663	100.00		
First medical school	See Table 2 for details				n/s
	Not stated/missing				
		2663	100.00		
Foundation School Deanery	See Table 2 for details				$^{x}2$ (26) = 64.30 P<0.001
	Not stated/missing				
		2663	100.00		
Health Education Training Deanery	See Table 3 for details				$^{x}2$ (16) = 64.30 P<0.01
	Not stated/missing				
		2663	100.00		
Intercalated	Yes	482	18.10	19.52	$^{x}2$ (1) = 7.63 P<0.01
	No	2181	81.90	80.48	
	Not stated/missing	-			
		2663	100.00		
Educational Performance Measure Quartile	34	81	3.04	3.88	$^{x}2$ (4) = 38.58 P<0.001
	36	105	3.94	4.71	
	38	162	6.08	6.77	
	40	174	6.53	7.38	
	Not stated/missing	2141	80.40	77.26	
UK Primary Medical Qualification	Yes	2530	95.01	94.45	n/s
	No	133	4.99	5.55	
	Not stated/missing				
		2663	100.00		
Continuous variables			Mean (SD)	Min - Max	Regression
Total UCAS tariff for all HESA Tariff included qualifications		n=2102	481 (90.48)	20 to 900	n/s
UKCAT Total score		n=275	2534.17 (227.26)	1760 - 3130	n/s
Age on entry to medical school		n=2526	19.04 (2.3)	17 to 40	n/s
CMT Shortlisting score		n= 2653	26.45	4 to 64	n/s

Factor	Category	N doctors	% of sample	% Applied higher-level medical specialty training	Bivariate Association
			(10.86)		
CMT Interview score		n=2662	49.99 (6.26)	16 to 147	n/s

Table 11: Percentage of doctors who applied for higher-level medical specialty training by medical school and foundation school attended.

Medical School	N Doctors	% Applied	Foundation School Deanery	N doctors	% Applied
Aberdeen	47	78.72	Black Country/Shropshire	32	78.13
Barts	67	76.12	Coventry and Warwickshire	38	52.63
Birmingham	128	61.72	East Anglian	88	68.18
Brighton	36	69.44	Leicestershire, North	42	69.05
Bristol	81	64.20	Mersey	112	72.32
Cambridge	171	64.33	North Central Thames	182	67.03
Cardiff	118	72.03	North East Thames	114	71.05
Dundee	26	61.54	North West Thames	139	67.63
Durham	27	66.67	North Western	154	68.83
Edinburgh	89	68.54	North Yorkshire East	44	63.64
Glasgow	75	72.00	Northern	122	68.85
Hull York	30	70.00	Northern Ireland	91	62.64
Imperial	173	71.68	Oxford	81	64.20
Keele	21	47.62	Peninsula	39	58.97
King's	99	65.66	Scotland	177	80.79
Lancaster	5	100.00	Severn	79	72.15
Leeds	62	70.97	South Thames	275	68.73
Leicester	59	61.02	South Yorkshire	70	77.14
Liverpool	125	66.40	Trent	98	72.45
Manchester	122	62.30	Wales	107	72.90
Newcastle	99	69.70	Wessex	102	63.73
Norwich	37	72.97	West Midlands Central	70	64.29
Nottingham	107	71.03	West Midlands North	29	58.62
Oxford	108	55.56	West Midlands South	17	70.59
Peninsula	43	79.07	West Yorkshire	59	76.27
Queen's	87	66.67	**UK PMQ/ no UK FS**	258	51.94
Sheffield	83	75.90	**Non-UK PMQ / no UK FS**	44	70.45
Southampton	71	59.15			
St Andrews	28	75.00			
St George's	60	71.67			
Swansea	12	75.00			
UCL	169	63.91			
Warwick	61	60.66			
***Non-UK medical school**	137	75.91			
All	2663	67.71	All	2663	67.71

Table 12: Percentage of doctors who applied for higher-level medical specialty training by HE Deanery where core medical training took place.

CMT Deanery	N students	% Applied
HE East Midlands	135	65.93
HE East England	176	65.34
HE Kent, Surrey & Sussex	139	62.59
HE London NC & E	234	66.24
HE London NW	195	65.13
HE London S	222	72.52
HE North East	101	62.38
HE North West	303	67.66
HE South West	179	65.92
HE Thames Valley	96	64.58
HE Wessex	112	62.50
HE West Midlands	176	62.50
HE York & Humber	174	75.29
NHSE Scotland	159	83.02
Northern Ireland MTDA	96	64.58
Multiple (+ London n=9)	64	68.75
Missing	102	70.59
All	2663	67.71

Table 13: Binary logistic regression Model 2a and Model 2b of the outcome 'applied for higher-level medical specialty training', significance of predictors (chi-squared statistic and p-value from likelihood ratio test, and model statistics. Blank cells denote variable not included in a model, n/s denotes non-significance.

		Model 2a		Model 2b (excludes doctors with a non-UK PMQ)	
Predictor	df	X^2	P-value	X^2	P-value
Gender	1	n/s		n/s	
Intercalated	1	10.73	0.0011	14.36	0.0002
Graduate on Entry	1	n/s			
Entry Status				n/s	
Medical School	33	49.83	0.0232	49.54	0.0186
Foundation School	26	50.56	0.0027	49.00	0.0028
CMT Deanery	15	n/s		n/s	
CMT Shortlisting score				5.13	0.0236
CMT Interview score				4.35	0.0347
Model statistics					
Minimum required sample size	216			246	
Actual sample size	2556			2339	
Mean probability Standard Deviation 95% CI	0.6753 0.11 0.6576 – 0.6929			0.6746 0.11 0.6562 to 0.6930	
Hosmer-Lemeshow test	X^2 (8) = 6.39, p>0.05			X2 (8) = 6.72, p>0.05	
Area under ROC curve	0.64			0.65	

Table 14: Odds ratios (OR) and associated statistics for binary logistic regression of the outcome 'applied for higher-level medical specialty training' (Model 2a, n = 2556).

Predictor	OR	S.E.	z	P-value	95% CI	
Intercalated	1.5995	0.22294	3.28	0.001	1.2075	2.1186
Medical School (reference category = non-UK medical schools						
Aberdeen	0.5956	0.2937	-1.05	0.2930	0.2266	1.5656
Barts	0.8448	0.3611	-0.39	0.6930	0.3656	1.9523
Birmingham	0.3636	0.1342	-2.74	0.0060	0.1763	0.7496
Brighton	0.7609	0.3656	-0.57	0.5700	0.2967	1.9515
Bristol	0.5601	0.2081	-1.56	0.1190	0.2704	1.1603
Cambridge	0.5328	0.1717	-1.95	0.0510	0.2832	1.0021
Cardiff	0.8501	0.3571	-0.39	0.6990	0.3732	1.9367
Dundee	0.2313	0.1279	-2.65	0.0080	0.0783	0.6837
Durham	0.7335	0.3809	-0.6	0.5510	0.2651	2.0298
Edinburgh	0.3273	0.1280	-2.86	0.0040	0.1520	0.7045
Glasgow	0.2433	0.1099	-3.13	0.0020	0.1004	0.5895
Hull York	0.6558	0.3265	-0.85	0.3970	0.2472	1.7398
Imperial	0.8352	0.2797	-0.54	0.5910	0.4332	1.6102
Keele	0.2368	0.1300	-2.62	0.0090	0.0808	0.6943
King's	0.4611	0.1685	-2.12	0.0340	0.2252	0.9439
Lancaster	Omitted all positive outcomes					
Leeds	0.4925	0.2084	-1.67	0.0940	0.2149	1.1287
Leicester	0.4497	0.1878	-1.91	0.0560	0.1984	1.0195

Predictor	OR	S.E.	z	P-value	95% CI	
Liverpool	0.5485	0.1905	-1.73	0.0840	0.2778	1.0833
Manchester	0.4178	0.1456	-2.5	0.0120	0.2111	0.8272
Newcastle	0.8282	0.3112	-0.5	0.6160	0.3966	1.7297
Norwich	0.8808	0.4259	-0.26	0.7930	0.3414	2.2722
Nottingham	0.7548	0.2851	-0.74	0.4560	0.3600	1.5824
Oxford	0.3772	0.1314	-2.8	0.0050	0.1906	0.7464
Peninsula	1.5910	0.8341	0.89	0.3760	0.5694	4.4453
Queen's	0.6283	0.3163	-0.92	0.3560	0.2342	1.6855
Sheffield	0.7193	0.3026	-0.78	0.4340	0.3154	1.6406
Southampton	0.5095	0.2024	-1.7	0.0900	0.2339	1.1100
St Andrews	0.5912	0.3201	-0.97	0.3320	0.2046	1.7084
St George's	0.7576	0.3163	-0.66	0.5060	0.3342	1.7174
Swansea	0.9824	0.8716	-0.02	0.9840	0.1726	5.5910
UCL	0.3888	0.1332	-2.76	0.0060	0.1987	0.7608
Warwick	0.6838	0.3126	-0.83	0.4060	0.2791	1.6753
Foundation School Deanery (reference category = Black Country/Shropshire FS)						
Coventry and Warwickshire	0.2494	0.1512	-2.29	0.0220	0.0760	0.8183
East Anglian	0.3367	0.1893	-1.94	0.0530	0.1119	1.0133
Leicestershire, North	0.5063	0.3228	-1.07	0.2860	0.1452	1.7663
Mersey	0.4042	0.2268	-1.61	0.1060	0.1346	1.2138
North Central Thames	0.3547	0.1865	-1.97	0.0490	0.1265	0.9940
North East Thames	0.3207	0.1743	-2.09	0.0360	0.1105	0.9307
North West Thames	0.2826	0.1509	-2.37	0.0180	0.0992	0.8048
North Western	0.3777	0.2031	-1.81	0.0700	0.1316	1.0838
North Yorkshire East	0.2130	0.1283	-2.57	0.0100	0.0654	0.6938
Northern	0.3479	0.1973	-1.86	0.0630	0.1145	1.0572
Northern Ireland	0.1064	0.0853	-2.79	0.0050	0.0221	0.5125
Oxford	0.3211	0.1813	-2.01	0.0440	0.1062	0.9709
Peninsula	0.1502	0.0939	-3.03	0.0020	0.0441	0.5112
Scotland	0.5570	0.3276	-0.99	0.3200	0.1758	1.7642
Severn	0.3764	0.2119	-1.74	0.0830	0.1249	1.1346
South Thames	0.3301	0.1703	-2.15	0.0320	0.1201	0.9075
South Yorkshire	0.3733	0.2298	-1.6	0.1090	0.1117	1.2474
Trent	0.4582	0.2602	-1.37	0.1690	0.1505	1.3945
Wales	0.3506	0.2231	-1.65	0.1000	0.1007	1.2202
Wessex	0.2833	0.1621	-2.2	0.0270	0.0923	0.8693
West Midlands Central	0.4753	0.2398	-1.47	0.1400	0.1768	1.2776
West Midlands North	0.4241	0.2570	-1.42	0.1570	0.1293	1.3911
West Midlands South	0.6022	0.4189	-0.73	0.4660	0.1540	2.3542
West Yorkshire	0.4111	0.2499	-1.46	0.1440	0.1249	1.3532
UK PMQ/ no UK FS	0.1622	0.0821	-3.59	0.0000	0.0601	0.4374
Non-UK PMQ / no UK FS	0.2832	0.1853	-1.93	0.0540	0.0785	1.0212

Table 15: Percentage of doctors with successful completion of core anaesthesia training by medical school and foundation school attended.

Medical School	N doctors	% Successfully Completed Anaesthesia Training	Foundation School Deanery	N doctors	% Successfully Completed Anaesthesia Training
Aberdeen	32	71.88	Black Country/Shropshire	23	60.87
Barts	70	68.57	Coventry and Warwickshire	19	84.21
Birmingham	96	85.42	East Anglian	54	75.93
Brighton	17	52.94	Leicestershire, North	25	80.00
Bristol	51	86.27	Mersey	70	78.57
Cambridge	58	87.93	North Central Thames	51	82.35
Cardiff	61	83.61	North East Thames	69	75.36
Dundee	29	68.97	North West Thames	49	79.59
Durham	26	76.92	North Western	88	79.55
Edinburgh	38	78.95	North Yorkshire East	17	94.12
Glasgow	45	60.00	Northern	65	89.23
Hull York	12	91.67	Northern Ireland	35	77.14
Imperial	59	84.75	Oxford	44	77.27
Keele	30	66.67	Peninsula	36	83.33
King's	82	78.05	Scotland	93	73.12
Lancaster	2	100.00	Severn	43	81.4
Leeds	62	74.19	South Thames	159	79.87
Leicester	44	72.73	South Yorkshire	23	86.96
Liverpool	83	84.34	Trent	51	74.51
Manchester	48	77.08	Wales	35	80.00
Newcastle	44	81.82	Wessex	14	85.71
Norwich	21	57.14	West Midlands Central	19	94.74
Nottingham	84	82.14	West Midlands North	71	80.28
Oxford	53	84.91	West Midlands South	45	80.00
Peninsula	36	75.00	West Yorkshire	56	82.14
Queen's	37	70.27	**UK PMQ/ no UK FS**	306	71.57
Sheffield	47	85.11	**Non-UK PMQ / no UK FS**	17	47.06
Southampton	45	73.33			
St Andrews	36	72.22			
St George's	69	85.51			
Swansea	17	58.82			
UCL	63	77.78			
Warwick	41	85.37			
***Non-UK medical school**	39	56.41			
All	1577	77.74	All	1577	77.74

Table 16: Percentage of doctors who successful completed core anaesthesia training by HE Deanery where training took place.

Deanery	N students	% Successfully completed anaesthesia training
HE East Midlands	64	68.75
HE East England	126	74.60
HE Kent, Surrey & Sussex	135	68.15
HE London NC & E	120	87.50
HE London NW	63	90.48
HE London S	81	92.59
HE North East	73	78.08
HE North West	201	76.62
HE South West	130	84.62
HE Thames Valley	35	71.43
HE Wessex	38	78.95
HE West Midlands	133	81.95
HE York & Humber	110	81.82
NHSE Scotland	109	68.81
Northern Ireland MTDA	449	67.35
Multiple HEs	5	100.00
Missing	105	67.62
All	1577	77.74

Table 17: Binary logistic regression Model 4a and Model 4b of the outcome 'successfully completed core anaesthesia training', significance of predictors (chi-squared statistic and p-value from likelihood ratio test, and model statistics. Blank cells denote variable not included in a model, n/s denotes non-significance.

		Model 4a		Model 4b	
Predictor	df	X^2	P-value	X^2	P-value
Entry Status	2			18.22	0.0001
Intercalated	1				n/s
BME	1				n/s
Graduate Entry	1	13.80	0.0002		
Gender	1	5.29	0.0215	5.48	0.0193
First Medical School	32	49.90	0.0228		n/s
Foundation School	26	52.40	0.0016	42.97	0.0141
HE Deanery	14	41.37	0.0002	41.52	0.0000
Anaesthesia Interview Score	1	13.89	0.0002	14.42	0.0000
Model statistics					
Minimum required sample size	415			389	
Actual sample size	1464			1338	
Mean probability Standard Deviation 95% CI	0.7835 0.1475 0.7639 to 0.8032			0.7945 0.1452 0.7742 to 0.8147	
Hosmer-Lemeshow test	X^2 (8) = 9.56, p>0.05			X2 (8) = 17.82, p>0.05	
Area under ROC curve	0.7305			0.7334	

Table 18: Odds ratios (OR) and associated statistics for binary logistic regression of the outcome 'applied for higher-level anaesthesia specialty training' (Model 4a, n = 1464).

Predictor	OR	S.E.	z	P-value	95% CI	
Gender	1.3817	0.19	2.30	0.0210	1.0489	1.8202
Graduate on entry	0.48	0.09	-3.72	0.0000	0.3265	0.7074
First Medical school (Reference group: non-UK medical schools)						
Aberdeen	2.4114	1.6632	1.2800	0.2020	0.6240	9.3188
Barts	2.0329	1.2045	1.2000	0.2310	0.6365	6.4929
Birmingham	3.7823	2.3899	2.1100	0.0350	1.0963	13.0496
Brighton and Sussex	1.0341	0.7753	0.0400	0.9640	0.2379	4.4955
Bristol	4.3969	2.9250	2.2300	0.0260	1.1937	16.1959
Cambridge	5.6481	3.9702	2.4600	0.0140	1.4242	22.3997
Cardiff	2.1805	1.8489	0.9200	0.3580	0.4138	11.4901
Dundee	1.6773	1.1746	0.7400	0.4600	0.4251	6.6174
Durham	1.5332	1.0898	0.6000	0.5480	0.3807	6.1750
Edinburgh	3.3772	2.2719	1.8100	0.0700	0.9035	12.6236
Glasgow	1.2196	0.7886	0.3100	0.7590	0.3434	4.3311
Hull York	4.9479	5.9782	1.3200	0.1860	0.4634	52.8290
Imperial	3.7903	2.4896	2.0300	0.0420	1.0461	13.7331
Keele	1.9960	1.4030	0.9800	0.3250	0.5034	7.9152
King's	3.4611	2.0677	2.0800	0.0380	1.0732	11.1618
Lancaster	Omitted as all positive outcomes					
Leeds	1.5427	0.9567	0.7000	0.4840	0.4576	5.2016
Leicester	2.2890	1.6224	1.1700	0.2430	0.5706	9.1826
Liverpool	6.2874	3.8731	2.9800	0.0030	1.8799	21.0291
Manchester	2.5464	1.6684	1.4300	0.1540	0.7050	9.1967
Newcastle	3.3315	2.2414	1.7900	0.0740	0.8912	12.4545
Norwich	0.9646	0.6910	-0.0500	0.9600	0.2369	3.9279
Nottingham	4.6377	2.8832	2.4700	0.0140	1.3712	15.6853
Oxford	3.0550	2.0118	1.7000	0.0900	0.8403	11.1061
Peninsula	1.2995	0.8832	0.3900	0.7000	0.3429	4.9241
Queen's	2.6995	2.1487	1.2500	0.2120	0.5672	12.8469
Sheffield	4.2788	3.0408	2.0500	0.0410	1.0627	17.2284
Southampton	1.8797	1.2667	0.9400	0.3490	0.5018	7.0421
St Andrews	1.9827	1.3174	1.0300	0.3030	0.5391	7.2917
St George's	6.0623	3.8656	2.8300	0.0050	1.7373	21.1544
Swansea	0.5781	0.5285	-0.6000	0.5490	0.0963	3.4694
UCL	1.6975	1.0212	0.8800	0.3790	0.5221	5.5190
Warwick	8.4134	6.4112	2.7900	0.0050	1.8895	37.4635
Foundation School (Reference Group: North Yorkshire East Coast)						
Black Country/Shropshire	0.0454	0.0568	-2.4700	0.0130	0.0039	0.5269
Coventry and Warwickshire	0.0805	0.1101	-1.8400	0.0650	0.0055	1.1730
East Anglian	0.1218	0.1429	-1.8000	0.0730	0.0122	1.2130
Leicestershire, Northamptonshire	0.2558	0.3342	-1.0400	0.2970	0.0198	3.3108
Mersey	0.0796	0.0942	-2.1400	0.0320	0.0078	0.8098
North Central Thames	0.1008	0.1189	-1.9500	0.0520	0.0100	1.0163
North East Thames	0.0812	0.0945	-2.1600	0.0310	0.0083	0.7946
North West Thames	0.0662	0.0791	-2.2700	0.0230	0.0064	0.6890
North Western	0.1463	0.1692	-1.6600	0.0970	0.0152	1.4119
Northern Foundation	0.5734	0.7006	-0.4600	0.6490	0.0523	6.2879
Northern Ireland	0.3518	0.4462	-0.8200	0.4100	0.0293	4.2258

Predictor	OR	S.E.	z	P-value	95% CI	
Oxford	0.0755	0.0895	-2.1800	0.0290	0.0074	0.7705
Peninsula	0.1172	0.1436	-1.7500	0.0800	0.0106	1.2947
Scotland	0.2201	0.2580	-1.2900	0.1970	0.0221	2.1895
Severn	0.1107	0.1330	-1.8300	0.0670	0.0105	1.1666
South Thames	0.1131	0.1280	-1.9300	0.0540	0.0123	1.0401
South Yorkshire	0.1803	0.2344	-1.3200	0.1880	0.0141	2.3035
Trent	0.1384	0.1665	-1.6400	0.1000	0.0131	1.4629
Wales	0.4542	0.6282	-0.5700	0.5680	0.0302	6.8315
Wessex	0.1948	0.2380	-1.3400	0.1810	0.0178	2.1349
W.Midlands Central	0.1031	0.1274	-1.8400	0.0660	0.0091	1.1623
W.Midlands North	0.1868	0.2650	-1.1800	0.2370	0.0116	3.0107
W.Midlands South	0.2823	0.4423	-0.8100	0.4200	0.0131	6.0898
West Yorkshire	0.2162	0.2497	-1.3300	0.1850	0.0225	2.0788
UKPMQ & missing FS	0.0606	0.0674	-2.5200	0.0120	0.0069	0.5361
non-UKPMQ & missing FS	0.0924	0.1170	-1.8800	0.0600	0.0077	1.1064
HE Deanery (Reference group : LONDON South)						
HE East Midlands	0.1212	0.0754	-3.3900	0.0010	0.0358	0.4101
HE East England	0.2744	0.1428	-2.4800	0.0130	0.0989	0.7610
HE Kent,Surrey,Sussex	0.1695	0.0821	-3.6600	0.0000	0.0656	0.4382
HE London NC&E	0.5629	0.3020	-1.0700	0.2840	0.1966	1.6112
HE London NW	0.6856	0.4335	-0.6000	0.5510	0.1985	2.3677
HE North East	0.1609	0.0999	-2.9400	0.0030	0.0477	0.5432
HE North West	0.2346	0.1240	-2.7400	0.0060	0.0833	0.6609
HE South West	0.2798	0.1523	-2.3400	0.0190	0.0962	0.8132
HE Thames Valley	0.1861	0.1157	-2.7000	0.0070	0.0550	0.6293
HE Wessex	0.1296	0.0864	-3.0600	0.0020	0.0351	0.4789
HE West Midland	0.2985	0.1711	-2.1100	0.0350	0.0970	0.9180
HE York Humber	0.2559	0.1512	-2.3100	0.0210	0.0804	0.8146
NHSE Scotalnd	0.0728	0.0443	-4.3100	0.0000	0.0221	0.2398
Northern Ireland MTDA	0.1030	0.0781	-3.0000	0.0030	0.0233	0.4551
Multiple	Omitted as all positive outcomes					
Anaesthesia Interview Score	1.0176	0.004	3.73	0.0000	1.0083	1.0270

Table 19: Typologies derived from logistic regression model 4a, of the predicted probability of the outcome 'successful completion of anaesthesia training' computed for combinations of values on the predictors gender, graduate on entry and whether attended a UK medical school or not, holding all other predictors in the model at their means (n=1464) mean predicted probability = 0.7835).

UK medical school	Entry status	Gender	Predicted probability	95% CI	
NO	Non- graduate	Male	0.62	0.45	0.78
		Female	0.54	0.37	0.71
	Graduate	Male	00.44	0.24	0.63
		Female	0.36	0.18	0.54
YES	Non- graduate	Male	0.86	0.84	0.89
		Female	0.82	0.79	0.85
	Graduate	Male	0.75	0.69	0.82
		Female	0.69	0.61	0.76

Table 20: Odds ratios (OR) and associated statistics for binary logistic regression of the outcome 'successful completion of anaesthesia training' (Model 4b, n = 1338).

Predictor	OR	S.E.	z	P-value	95% CI	
Gender	1.4161	0.2138	2.3000	0.0210	1.0534	1.9037
Entry Status (reference group: non-graduate entrants to Standard Entry Programmes (SEP)						
Graduate entrants SEP	0.5351	0.1443	-2.3200	0.0200	0.3154	0.9079
Graduate Programmes	0.3241	0.0966	-3.7800	0.0000	0.1807	0.5812
Foundation School (Reference group : North Central Thames)						
Black Country/Shropshire	0.0736	0.0932	-2.0600	0.0390	0.0061	0.8819
Coventry and Warwickshire	0.1149	0.1590	-1.5600	0.1180	0.0076	1.7300
East Anglian	0.1846	0.2232	-1.4000	0.1620	0.0173	1.9736
Leicestershire, Northamptonshire	0.3679	0.4926	-0.7500	0.4550	0.0267	5.0736
Mersey	0.0991	0.1207	-1.9000	0.0580	0.0091	1.0780
North East Thames	0.1647	0.1978	-1.5000	0.1330	0.0156	1.7348
North West Thames	0.1051	0.1244	-1.9000	0.0570	0.0103	1.0693
North Western	0.0934	0.1137	-1.9500	0.0520	0.0086	1.0160
Northern Foundation	0.2130	0.2534	-1.3000	0.1940	0.0207	2.1929
Northern Ireland	0.8348	1.0616	-0.1400	0.8870	0.0691	10.0922
Oxford	0.4490	0.5801	-0.6200	0.5350	0.0357	5.6486
Peninsula	0.0921	0.1114	-1.9700	0.0490	0.0086	0.9861
Scotland	0.2867	0.3681	-0.9700	0.3310	0.0231	3.5515
Severn	0.2909	0.3470	-1.0400	0.3010	0.0281	3.0135
South Thames	0.2078	0.2582	-1.2600	0.2060	0.0182	2.3723
South Yorkshire	0.1447	0.1670	-1.6800	0.0940	0.0151	1.3890
Trent	0.2534	0.3341	-1.0400	0.2980	0.0191	3.3578
Wales	0.2159	0.2675	-1.2400	0.2160	0.0190	2.4473
Wessex	0.4785	0.6698	-0.5300	0.5990	0.0308	7.4375
W.Midlands Central	0.2164	0.2716	-1.2200	0.2230	0.0185	2.5317
W.Midlands North	0.1788	0.2272	-1.3500	0.1750	0.0148	2.1570
W.Midlands South	0.2364	0.3408	-1.0000	0.3170	0.0140	3.9888
West Yorkshire	0.4462	0.7095	-0.5100	0.6120	0.0198	10.0686
UKPMQ & missing FS	0.2844	0.3361	-1.0600	0.2870	0.0281	2.8829
HE Deanery (Reference group : HE Thames Valley)						
HE East Midlands	0.0928	0.0667	-3.3100	0.0010	0.0227	0.3799
HE East England	0.2180	0.1343	-2.4700	0.0130	0.0652	0.7290
HE Kent, Surrey, Sussex	0.1197	0.0682	-3.7200	0.0000	0.0391	0.3659
HE London NC&E	0.4156	0.2578	-1.4200	0.1570	0.1232	1.4016
HE London NW	0.4729	0.3455	-1.0300	0.3050	0.1130	1.9796
HE London S	0.1571	0.1136	-2.5600	0.0100	0.0381	0.6479
HE North East	0.1668	0.1041	-2.8700	0.0040	0.0491	0.5671
HE North West	0.1774	0.1122	-2.7400	0.0060	0.0514	0.6125
HE South West	0.1399	0.1019	-2.7000	0.0070	0.0335	0.5835
HE Wessex	0.0743	0.0552	-3.5000	0.0000	0.0173	0.3189
HE West Midland	0.2323	0.1536	-2.2100	0.0270	0.0635	0.8490
HE York Humber	0.1800	0.1228	-2.5100	0.0120	0.0472	0.6858
NHSE Scotland	0.0456	0.0315	-4.4700	0.0000	0.0117	0.1767
Northern Ireland MTDA	0.0587	0.0489	-3.4100	0.0010	0.0115	0.3001
Multiple	Omitted as all positive outcomes					
Interview Score	1.0195	0.0053	3.7300	0.0000	1.0092	1.0299

Table 21: Typologies derived from logistic regression model 4b, of the predicted probability of the outcome 'successful completion of anaesthesia training' computed for combinations of values on the predictors gender, and entry status, holding all other predictors in the model at their means (n=1338) mean predicted probability = 0.79).

Gender	Entry Status	Probability	95% Confidence Interval	
Female	Non-graduate Standard Entry Programme	0.83	0.80	0.87
	Graduate Standard Entry Programme	0.73	0.63	0.83
	Graduate Entry Programme	0.62	0.49	0.75
Male	Non-graduate Standard Entry Programme	0.88	0.85	0.90
	Graduate Standard Entry Programme	0.79	0.71	0.88
	Graduate Entry Programme	0.70	0.58	0.81

Table 22: Sociodemographic and educational background descriptive statistics of the UKMED sample of doctors who had successfully completed their core anaesthesia training (n=858) and who had been accepted on to the programme during the years 2013 and 2014. Results of bivariate tests of association with the outcome 'applied for higher-level anaesthesia specialty training' (Pearson's Chi squared test, logistic regression as appropriate) with associated statistics and significance. For a full list of UKMED data types, descriptions and sources refer to the UKMED Data Dictionary available at http://www.ukmed.ac.uk/documents/UKMED_data_dictionary.pdf

Factor	Category	N doctors	% of sample	% Applied higher-level training medical specialty	Bivariate Association
Gender	Female	412	48.02	72.09	n/s
	Male	446	51.98	76.01	
		858	100.00		
Age on entry to medical school	<=20 years	649	75.64	73.81	n/s
	>20 years	195	22.73	73.33	
	Not stated/missing	14	1.63	100.00	
		858	100.00		
Black and Minority Ethnic (BME) status	BME	166	19.35	73.77	n/s
	White	676	78.79	75.30	
	Not stated/missing	16	1.86	93.75	
		858	100.00		
SEC (NS-SEC 1-7) Socioeconomic class of the parent if under 21 years of age.	Higher managerial & professional	344	40.09	74.42	n/s
	Lower managerial & professional	196	22.84	73.47	
	Intermediate occupations	76	8.86	73.68	
	Small employer own account	24	2.80	79.17	
	Lower supervisory & technical	14	1.63	71.43	
	Semi-routine occupations	43	5.01	65.12	
	Routine occupations	12	1.40	66.67	
	Not stated/missing	149	17.37	77.18	
		858	100.00		
Index of Multiple Deprivation (IMD) a quintile ranking of	Quintile 1	286	33.33	74.83	n/s
	Quintile 2	192	22.38	80.73	
	Quintile 3	124	14.45	69.35	

Factor	Category	N doctors	% of sample	% Applied higher-level training medical specialty	Bivariate Association
IMD zone within country of UK students' domicile	Quintile 4	85	9.91	75.29	
	Quintile 5	32	3.73	75.00	
	Not stated/missing	139	16.20	66.91	
		858	100.00		
POLAR2 (quintile classification of areas for young persons' participation rates in higher education based on students' UK postcode	Quintile 1	29	3.38	75.86	n/s
	Quintile 2	68	7.93	75.00	
	Quintile 3	118	13.75	69.49	
	Quintile 4	165	19.23	75.76	
	Quintile 5	419	48.83	74.70	
	Not stated/missing	59	6.88	72.88	
		858	100.00		
Disability	Disabled	8	0.93	62..50	χ^2 (2) = 6.57 P<0.05
	No disability	833	97.09	73.71	
	Not stated/missing	17	1.98	100.00	
		858	100.00		
UK educated 1= Yes: completed both secondary education & undergraduate medical degree in the UK 2=No: completed secondary education in the UK and undergraduate medical degree outside UK 3= No: completed secondary education outside the UK and undergraduate medical degree in UK 4= No: completed both secondary education and undergraduate medical degree outside UK	1	636	74.13	72.48	χ^2 (2) = 6.04 P<0.05
	2	38	4.43	68.42	
	3				
	4				
	Not stated/missing	184	21.45	80.98	
		858	100.00		
UK secondary school education Recode of UK educated (1&2=1, 3&4=0)	Yes	636	74.13	72.48	χ^2 (2) = 6.04 P<0.05
	No	38	4.43	68.42	
	Not stated/missing	184	21.45	80.98	
		858	100.00		
Secondary school type attended	Privately funded	244	28.44	77.46	n/s
	State funded	542	63.17	72.69	
	Not stated/missing	72	8.39	73.61	
		858	100.00		
Income support Whether the doctor's household received	Yes	64	7.46	70.31	χ^2 (2) = 7.04 P<0.05
	No	508	59.21	71.46	
	Not stated/missing	286	33.33	79.72	

Factor	Category	N doctors	% of sample	% Applied higher-level training medical specialty	Bivariate Association
Income Support at any point during their school years		858	100.00		
Free school meals Whether doctor had free school meals	Yes	33	3.85	75.76	n/s
	No	557	64.92	71.99	
	Not stated/missing	268	31.24	78.36	
		858	100.00		
Parent Degree Whether the doctor's parent(s) or guardian (s) completed a university degree course or equivalent.	Yes	432	50.335	71.30	n/s
	No	186	21.68	73.66	
	Not stated/missing	240	27.93	79.58	
		858	100.00		
Graduate On Entry	Graduate	158	18.41	73.42	n/s
	Non-graduate	700	81.59	74.29	
	Not stated/missing				
		858	100.00		
Programme Derived from COURSE_TYPE 1= Standard Entry Programme 2=Graduate Entry Programme 3= Medicine With Gateway/Preliminary Year Programme	Standard Entry Programme	717	83.57	73.50	n/s
	Graduate Entry Programme	99	11.54	75.76	
	Foundation Course	2	00.23	50.00	
	Medicine With a Gateway (Preliminary) Year	11	1.28	72.73	
	Science Top-up Programme				
	Not stated/missing	29	3.38	86.21	
		858	100.00		
Medical school Entry Status	Non-graduate entrant to Standard Entry Programme	656	76.46	74.09	n/s
	Graduate entrant to Standard Entry Programme	61	7.11	67.21	
	Entrant to Graduate Entry Programme	92	10.72	78.26	
	Not stated/missing	49	5.71	75.51	
		858	100.0		
Age at entry to medical	Age<21 years	649	75.64	73.81	n/s
	Age>=21 years	195	22.73	73.33	
	Not stated/missing	14	1.63	100.00	
Parent(s) had higher education qualifications	Yes	107	112.47	71.03	n/s
	No	30	3.50	60.00	
	Not stated/missing	721	84.03	75.17	
		858	100.00		
IDACI quintile	1	119	13.87	70.59	n/s
	2	128	14.92	76.56	
	3	124	14.45	75.81	
	4	126	14.69	74.60	
	5	1141	16.43	75.18	
	Not stated/missing	220	25.64	72.73	
		858	100.00		
First medical school	See Table 2 for details				$^{x}2$ (33) = 53.68
	Not stated/missing				

Factor	Category	N doctors	% of sample	% Applied higher-level training medical specialty	Bivariate Association
					P<0.05
Foundation School Deanery	See Table 2 for details				χ^2 (26) = 40.36 P<0.05
	Not stated/missing				
Health Education Training Deanery	See Table 3 for details				χ^2 (16) = 42.59 P<0.001
	Not stated/missing				
Intercalated	Yes	161	18.76	70.81	n/s
	No	697	81.24	74.89	
	Not stated/missing				
		858	100.00		
Educational Performance Measure Quartile	34	24	2.80	46.67	χ^2 (4) = 29.73 P<0.001
	36	43	5.01	55.81	
	38	68	7.93	72.06	
	40	82	9.56	64.63	
	Not stated/missing	641	74.71	78.00	
		858	100.00		
UK Primary Medical Qualification	Yes	844	98.37	73.70	χ^2 (1) = 4.98 P<0.05
	No	14	1.63	100.00	
	Not stated/missing				
		858	100.00		
Continuous variables			Mean (SD)	Min - Max	Regression
Total UCAS tariff for all HESA Tariff included qualifications		n=641	479 103.66)	60 to 890	n/s
UKCAT Total score		n=149	2559.27 (226.53)	1790 - 3170	n/s
Age on entry to medical school		n=844	19.67 (3.12)	17 to 43	n/s
Anaesthesia Shortlisting score		missing			
Anaesthesia Interview score		n= 857	150.93 (21.09)	101 to 251	n/s

Table 23: Binary logistic regression Model 5b of the outcome 'applied for higher-level anaesthesia specialty training', significance of predictors (chi-squared statistic and p-value from likelihood ratio test, and model statistics. Blank cells denote variable not included in a model, n/s denotes non-significance.

		Model 5b	
Predictor	df	X^2	P-value
Foundation School Deanery	25		n/s
Anaesthesia Deanery	15	31.90	0.0067
Minimum required sample size	76		
Actual sample size	801		
Mean probability Standard Deviation 95% CI	0.7398 0.15 0.7111 – 0.7685		
Area under ROC curve	0.69		

Table 24: Percentage of doctors who applied or higher-level anaesthesia specialty training by medical school and foundation school attended.

Medical School	N Doctors	% Applied	Foundation School Deanery	N doctors	% Applied
Aberdeen	22	77.27	Black Country/Shropshire	10	70.00
Barts	36	72.22	Coventry and Warwickshire	9	88.89
Birmingham	56	75.00	East Anglian	24	70.83
Brighton	6	50.00	Leicestershire, North	11	90.91
Bristol	33	60.61	Mersey	39	84.62
Cambridge	34	82.35	North Central Thames	32	78.13
Cardiff	33	81.82	North East Thames	43	76.74
Dundee	16	75.00	North West Thames	30	76.67
Durham	11	36.36	North Western	54	70.37
Edinburgh	25	68.00	North Yorkshire East	12	75.00
Glasgow	23	65.22	Northern	43	53.49
Hull York	6	66.67	Northern Ireland	25	92.00
Imperial	39	82.05	Oxford	24	62.50
Keele	14	57.14	Peninsula	21	76.19
King's	42	83.33	Scotland	60	73.33
Lancaster	2	100.00	Severn	28	64.29
Leeds	33	69.70	South Thames	97	77.32
Leicester	17	64.71	South Yorkshire	19	63.16
Liverpool	44	86.36	Trent	26	80.77
Manchester	28	60.71	Wales	19	73.68
Newcastle	24	58.33	Wessex	7	71.43
Norwich	11	81.82	West Midlands Central	17	52.94
Nottingham	45	73.33	West Midlands North	42	69.05
Oxford	30	70.00	West Midlands South	29	65.52
Peninsula	15	60.00	West Yorkshire	33	63.64
Queen's	24	87.50	**UK PMQ/ no UK FS**	100	85.00
Sheffield	30	80.00	**Non-UK PMQ / no UK FS**	4	100.00
Southampton	24	54.17			
St Andrews	19	73.68			
St George's	39	82.05			
Swansea	7	57.14			
UCL	32	81.25			
Warwick	24	87.50			
***Non-UK medical school**	14	100.00			
All	858	74.13	All	858	74.13

Table 25: Percentage of doctors who applied or higher-level anaesthesia specialty training by HE deanery where training took place.

Anaesthesia Deanery	N students	% Applied
HE East Midlands	**29**	**72.41**
HE East England	**67**	**82.09**
HE Kent, Surrey & Sussex	**54**	**79.63**
HE London NC & E	**74**	**83.78**
HE London NW	**37**	**62.16**
HE London S	**50**	**78.00**
HE North East	**38**	**60.53**
HE North West	**104**	**80.77**
HE South West	**70**	**55.71**
HE Thames Valley	**17**	**82.35**
HE Wessex	**21**	**85.71**
HE West Midlands	**76**	**72.37**
HE York & Humber	**68**	**61.76**
NHSE Scotland	**75**	**72.00**
Northern Ireland MTDA	**32**	**93.75**
Multiple (+ London n=9)	**3**	**66.67**
Missing	**43**	**74.42**
All	**858**	**74.13**

Table 26: Odds ratios (OR) and associated statistics for binary logistic regression of the outcome 'applied for higher-level anaesthesia specialty training' (Model 5b, n = 801).

Predictor	OR	S.E.	z	P-value	95% CI	
HE Anaesthesia Deanery (reference category = HE South West)						
HE East Midlands	1.0496	0.7809	0.0700	0.9480	0.2442	4.5116
HE East England	6.6886	3.3618	3.7800	0.0000	2.4975	17.9129
HE Kent, Surrey & Sussex	3.8900	1.9407	2.7200	0.0060	1.4631	10.3423
HE London NC & E	5.6285	2.7638	3.5200	0.0000	2.1499	14.7356
HE London NW	1.6237	0.7939	0.9900	0.3220	0.6228	4.2334
HE London S	3.5783	1.7915	2.5500	0.0110	1.3413	9.5463
HE North East	2.9114	1.8124	1.7200	0.0860	0.8594	9.8625
HE North West	4.0419	2.1031	2.6800	0.0070	1.4578	11.2068
HE Thames Valley	7.0028	5.2601	2.5900	0.0100	1.6066	30.5243
HE Wessex	6.5452	5.0277	2.4500	0.0140	1.4524	29.4969
HE West Midlands	2.9047	1.4134	2.1900	0.0280	1.1192	7.5385
HE York & Humber	1.5824	0.7993	0.9100	0.3640	0.5880	4.2587
NHSE Scotland	1.9108	1.0655	1.1600	0.2460	0.6405	5.7001
Northern Ireland MTDA	11.8841	17.5093	1.6800	0.0930	0.6620	213.3400
Multiple (+ London n=9)	3.8177	5.0594	1.0100	0.3120	0.2843	51.2687

9 Figures

Figure 1: Predicted probability of the outcome 'successfully completed core medical training' contrasted by medical school attended derived from Model 1a. Mean predicted probability = 0.77 (dashed horizontal line).

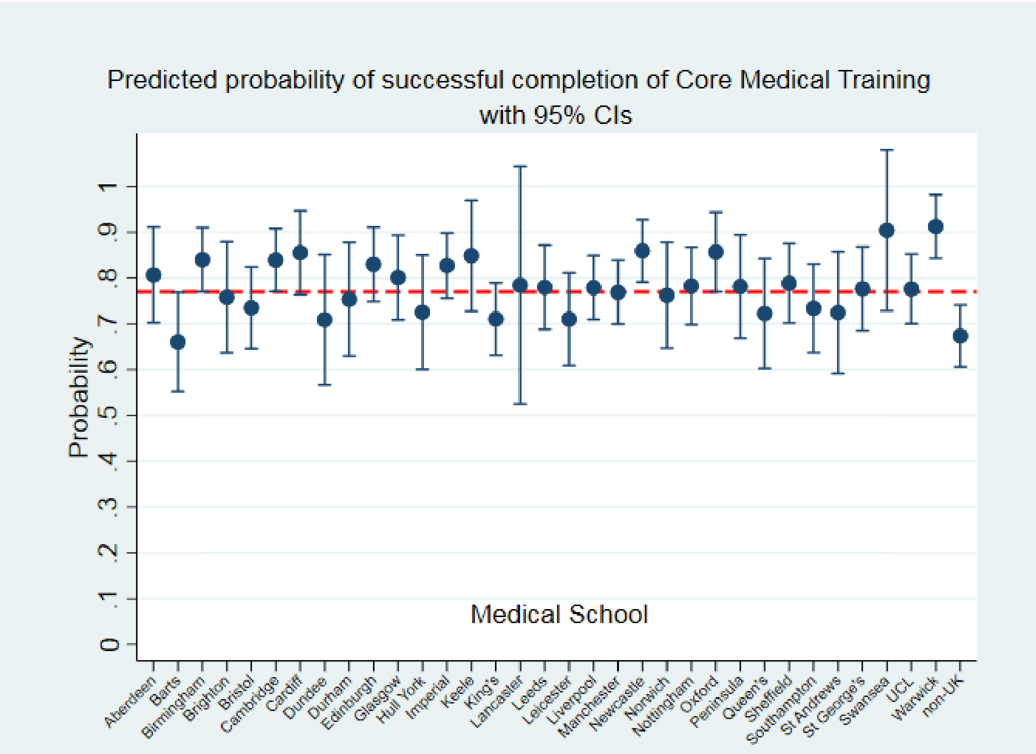


Figure 2: Predicted probability of the outcome 'successfully completed core medical training' contrasted by HE Deanery where training took place derived from Model 1a. Mean predicted probability = 0.77 (dashed horizontal line).

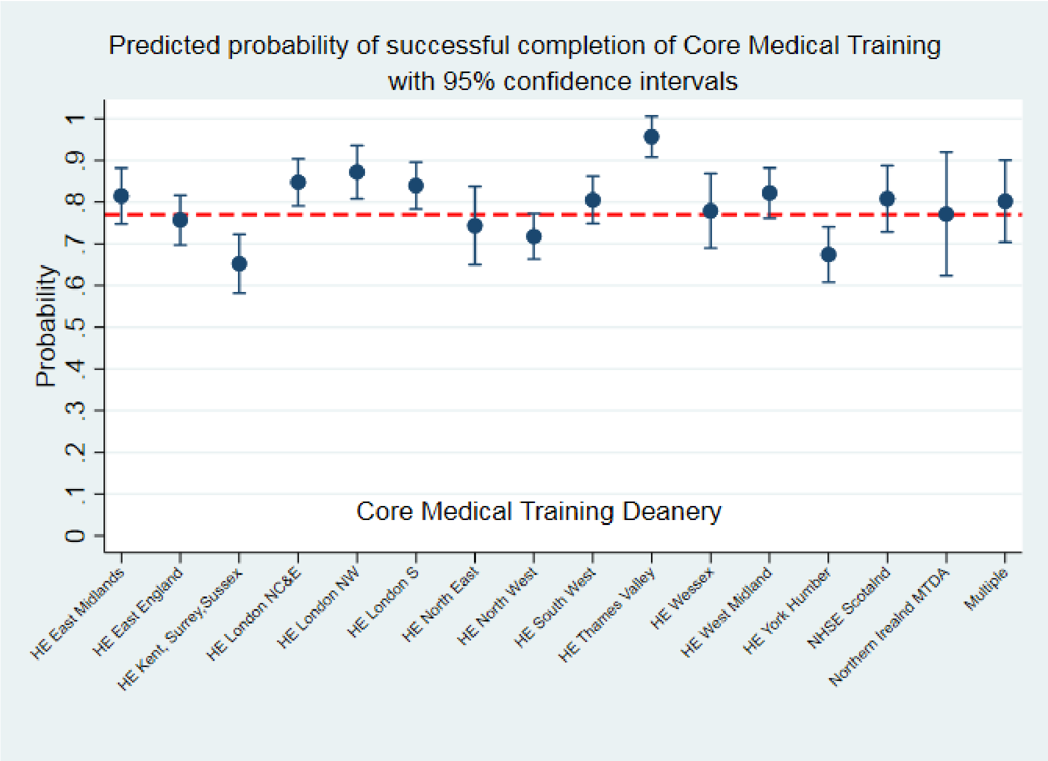


Figure 3: Predicted probability of the outcome 'successful completion of core medical training' contrasted by UK versus non-UK medical school, by graduate and non-graduate entry, adjusted by core medical training short-listing score , derived from Model 1a.

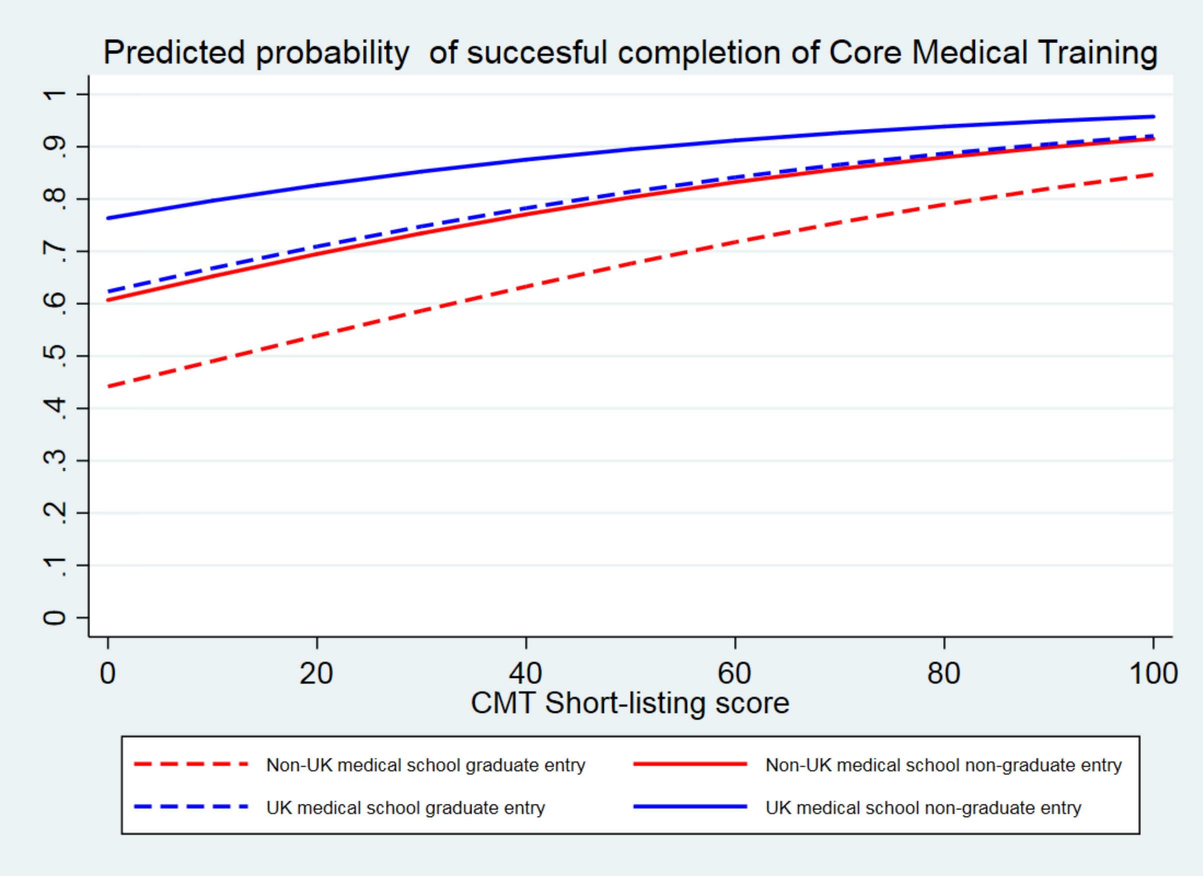


Figure 4: Predicted probability of the outcome 'successful completion of core medical training' contrasted by UK versus non-UK medical school, by graduate and non-graduate entry, adjusted by core medical training interview score , derived from Model 1a.

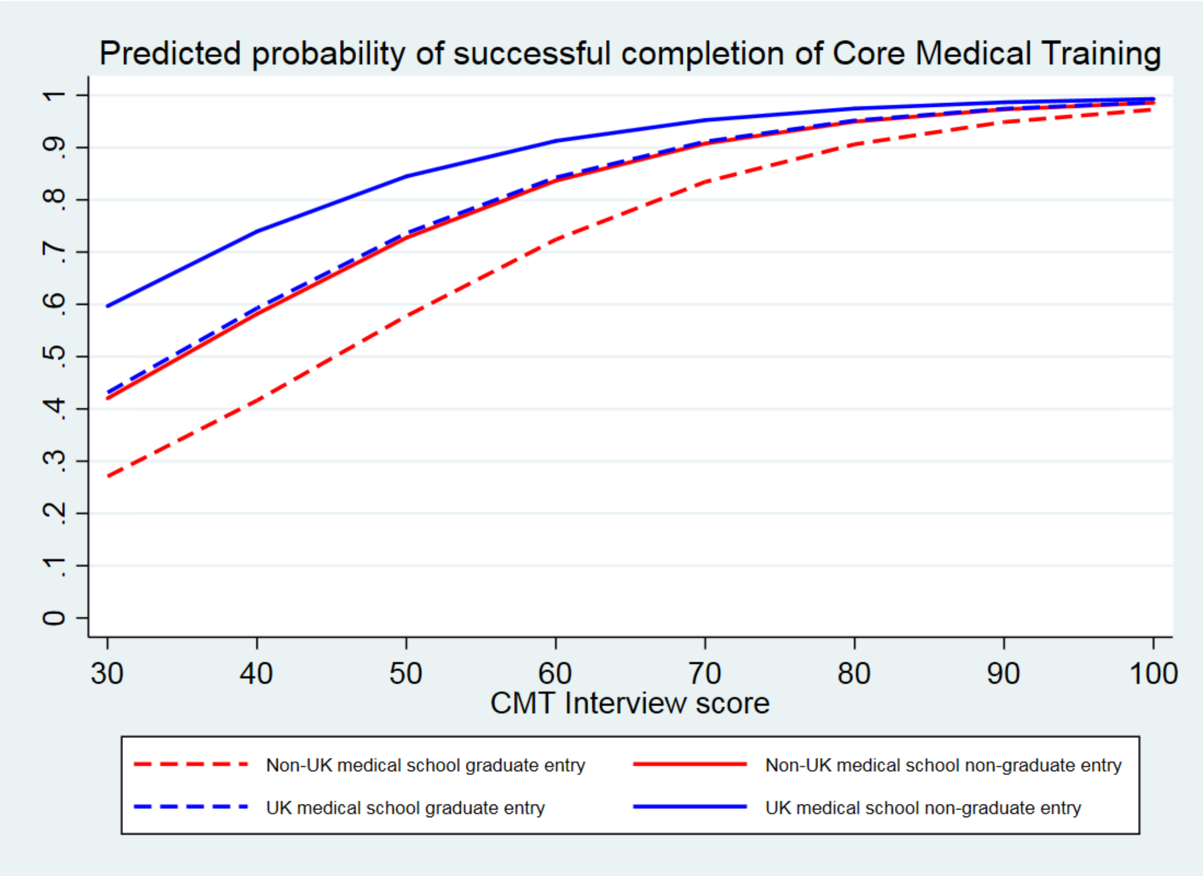


Figure 5: Predicted probability of the outcome 'successfully completed core medical training' contrasted by medical school attended derived from Model 1b. Mean predicted probability = 0.79 (dashed horizontal line).

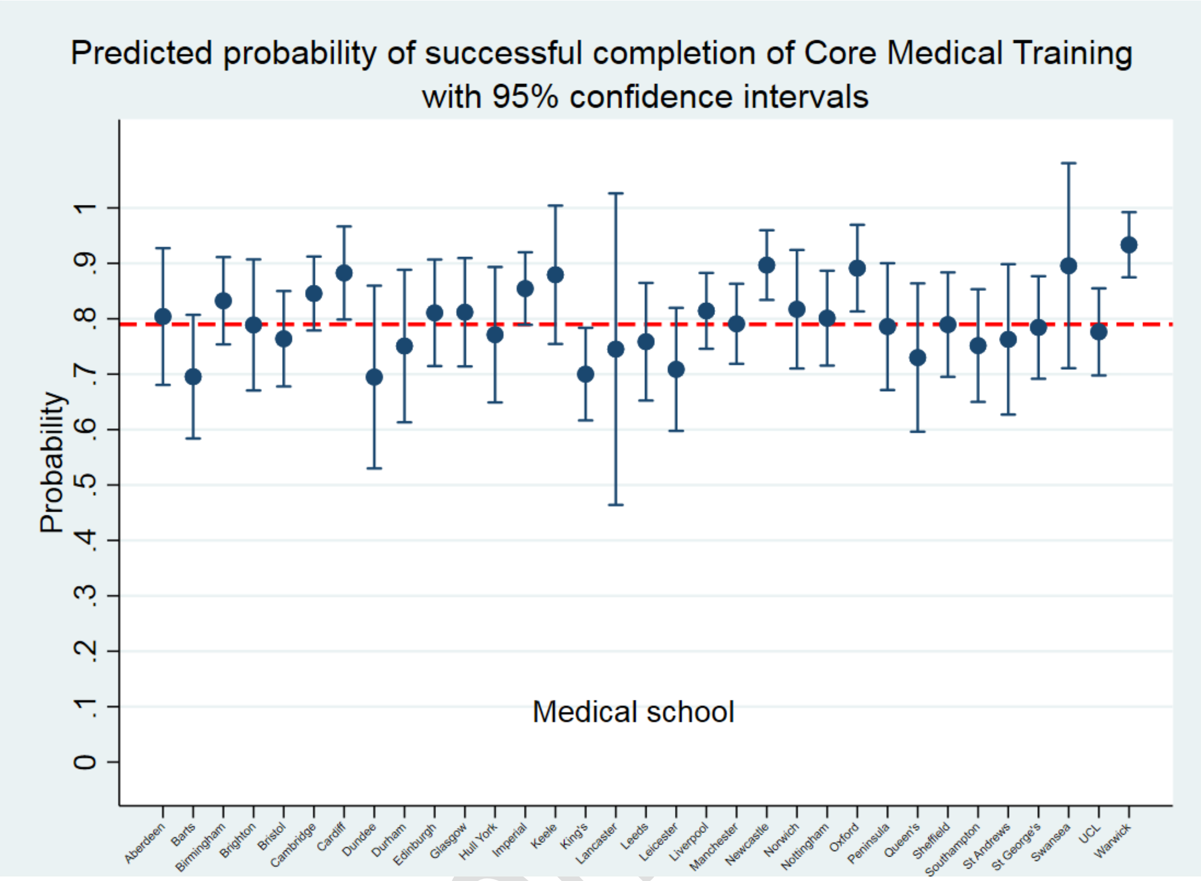


Figure 6: Predicted probability of the outcome 'successfully completed core medical training' contrasted by HE Deanery where training took place derived from Model 1b. Mean predicted probability = 0.79 (dashed horizontal line).

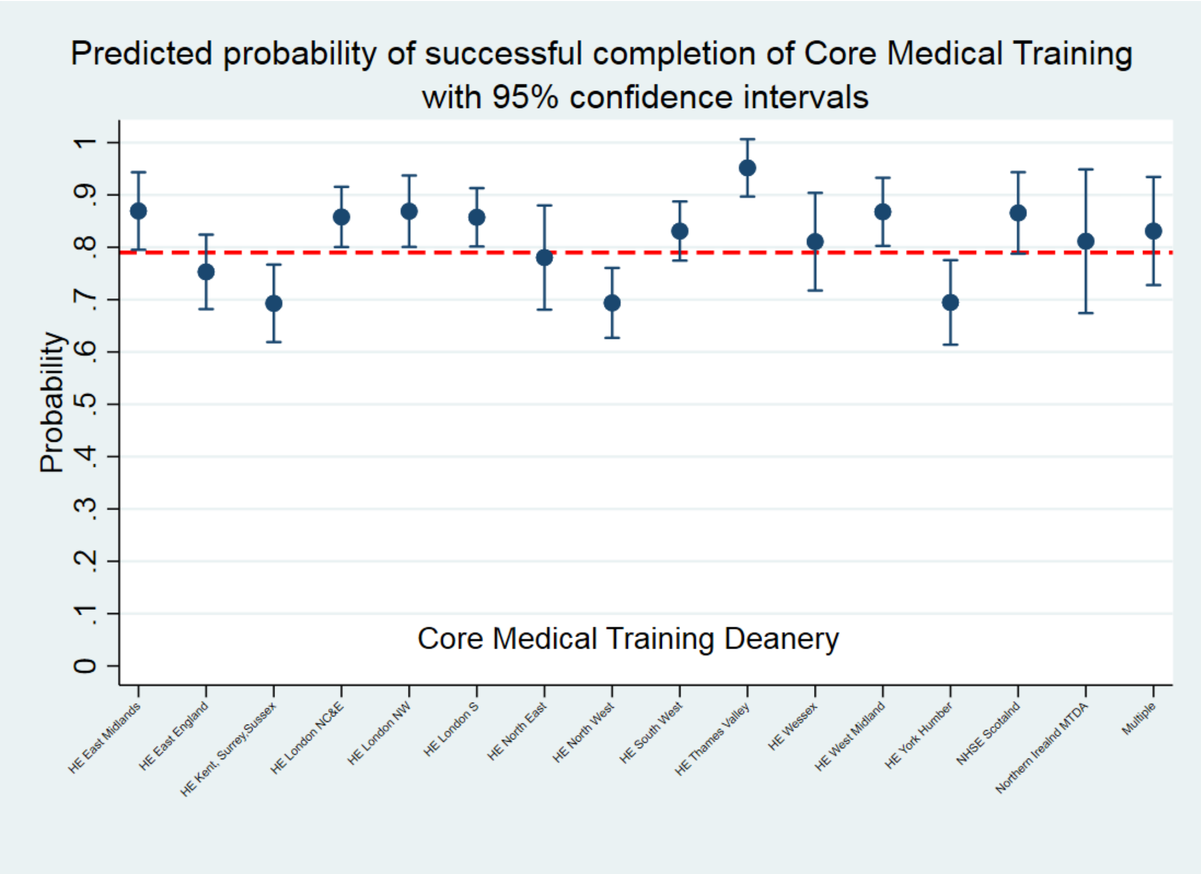


Figure 7: Predicted probability of the outcome 'successful completion of core medical training' contrasted by graduate and non-graduate entry, BME, and POLAR quintile 1 versus POLAR quintile 5, adjusted by core medical training short-listing score , derived from Model 1b.

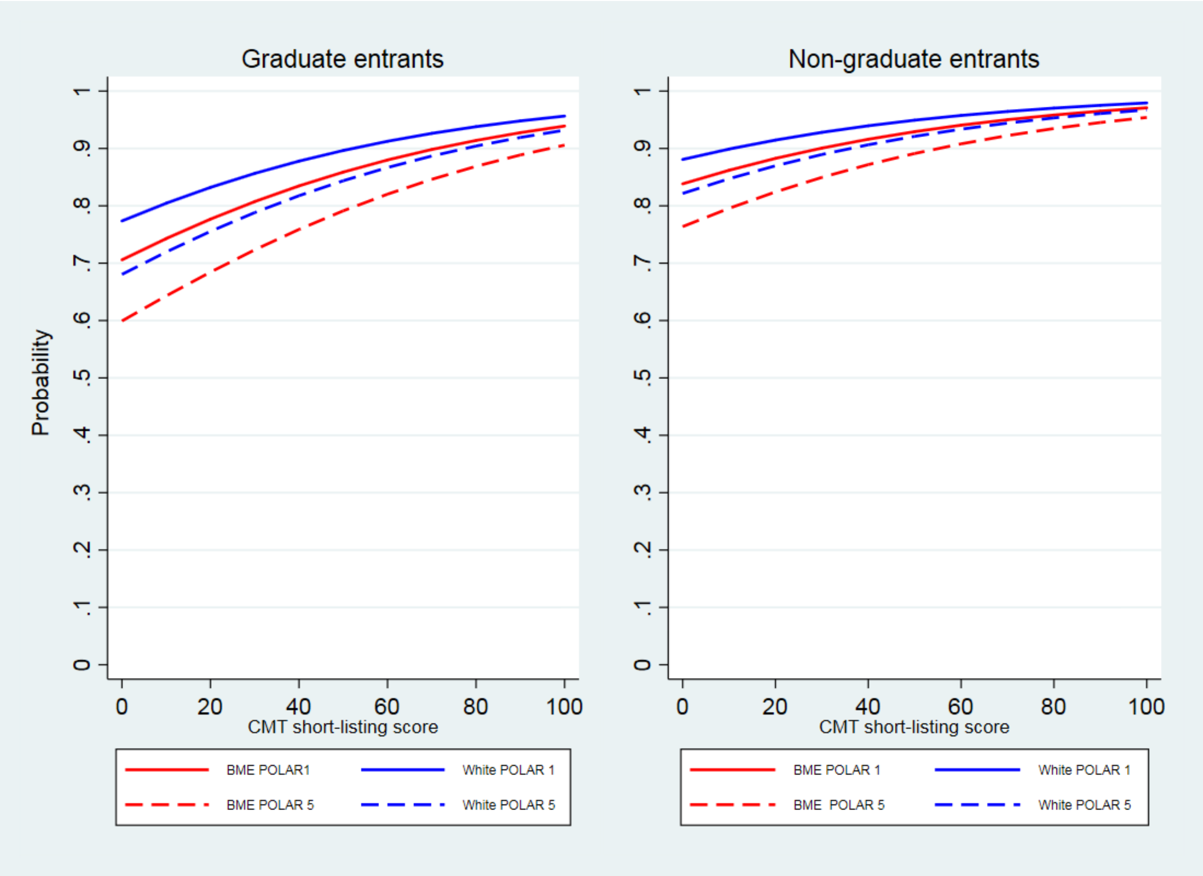


Figure 8: Predicted probability of the outcome 'successful completion of core medical training' contrasted by graduate and non-graduate entry, BME, and POLAR quintile 1 versus POLAR quintile 5, adjusted by core medical training interview score, derived from Model 1b.

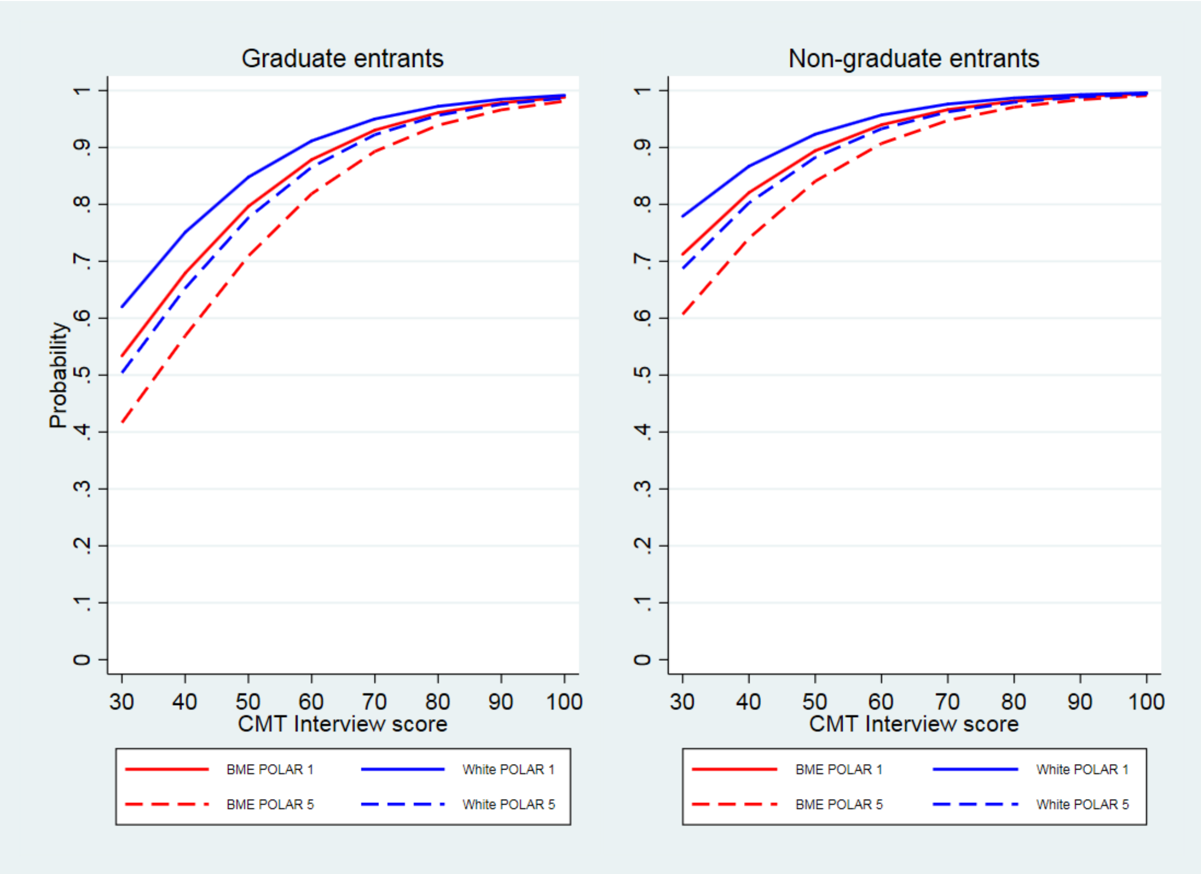


Figure 9: Predicted probability of the outcome 'applied for higher-level medical specialty training' contrasted by medical school attended derived from Model 2a. Mean predicted probability = 0.67 (dashed horizontal line).

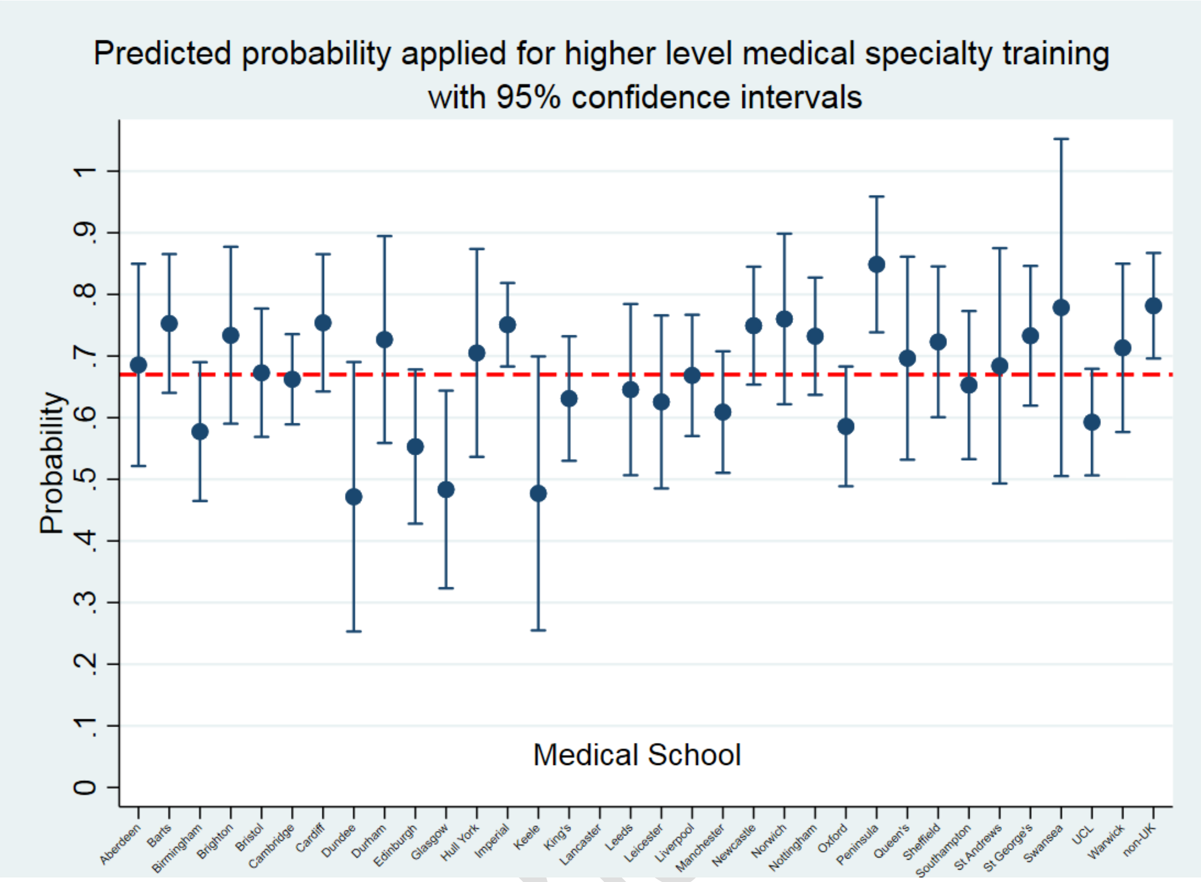


Figure 10: Predicted probability of the outcome 'applied for higher-level medical specialty training' contrasted by foundation school deanery attended derived from Model 2a. Mean predicted probability = 0.67 (dashed horizontal line).

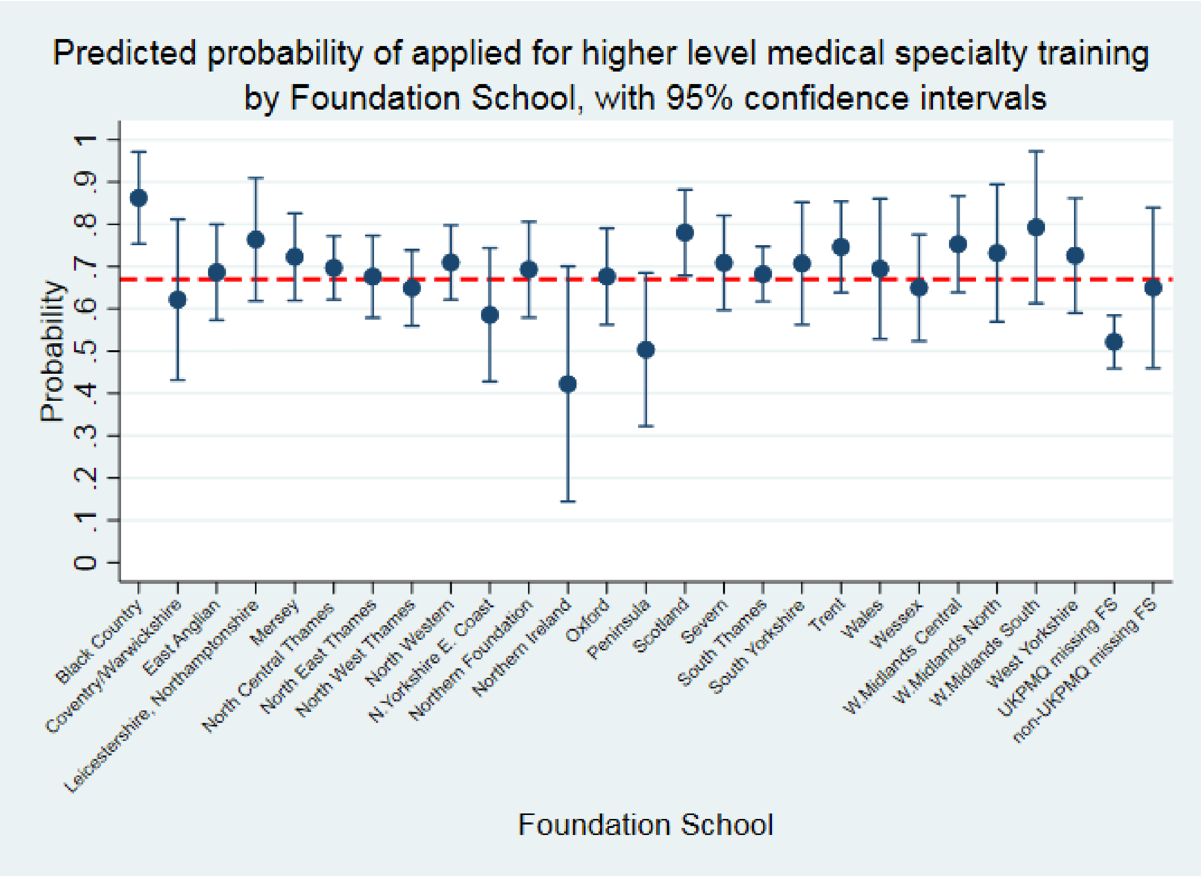


Figure 11: Predicted probability of the outcome 'applied for higher-level medical specialty training' contrasted by whether doctor intercalated at medical school or nor, adjusted by CMT shortlisting score (Graph 1) and adjusted by CMT interview score (Graph 2) derived from Model 2b.

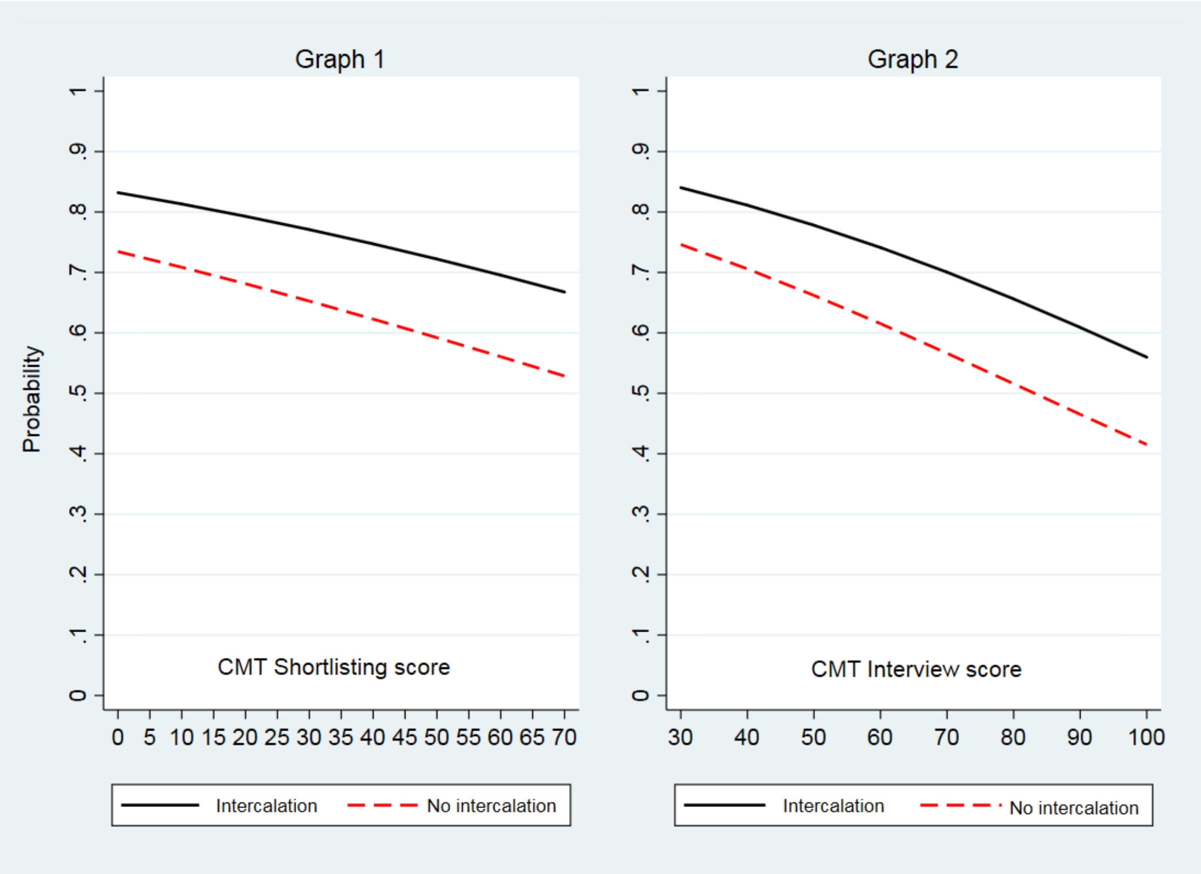


Figure 12: Predicted probability of the outcome 'successfully completed core anaesthesia training' contrasted by medical school attended derived from Model 4a. Mean predicted probability = 0.78 (dashed horizontal line).

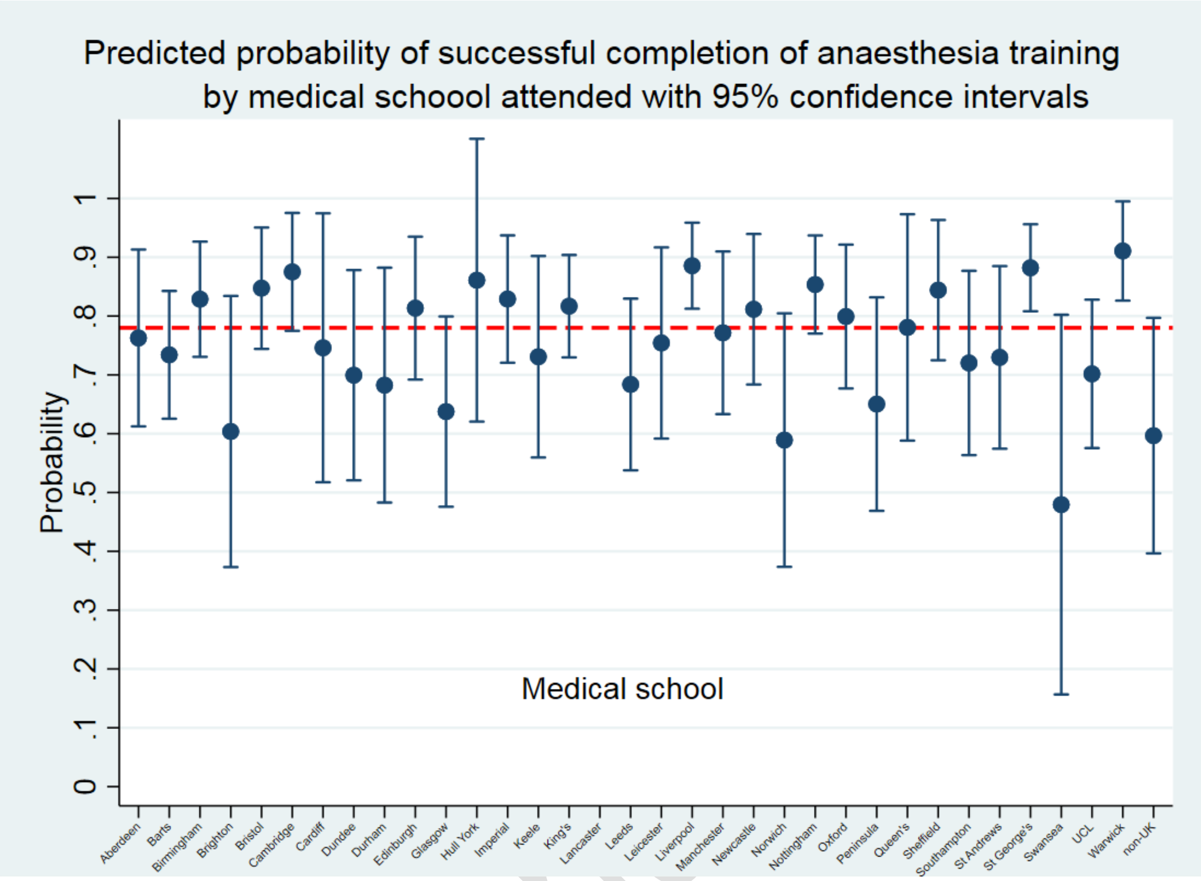


Figure 13: Predicted probability of the outcome 'successfully completed core anaesthesia training' contrasted by foundation school attended derived from Model 4a. Mean predicted probability = 0.78 (dashed horizontal line).

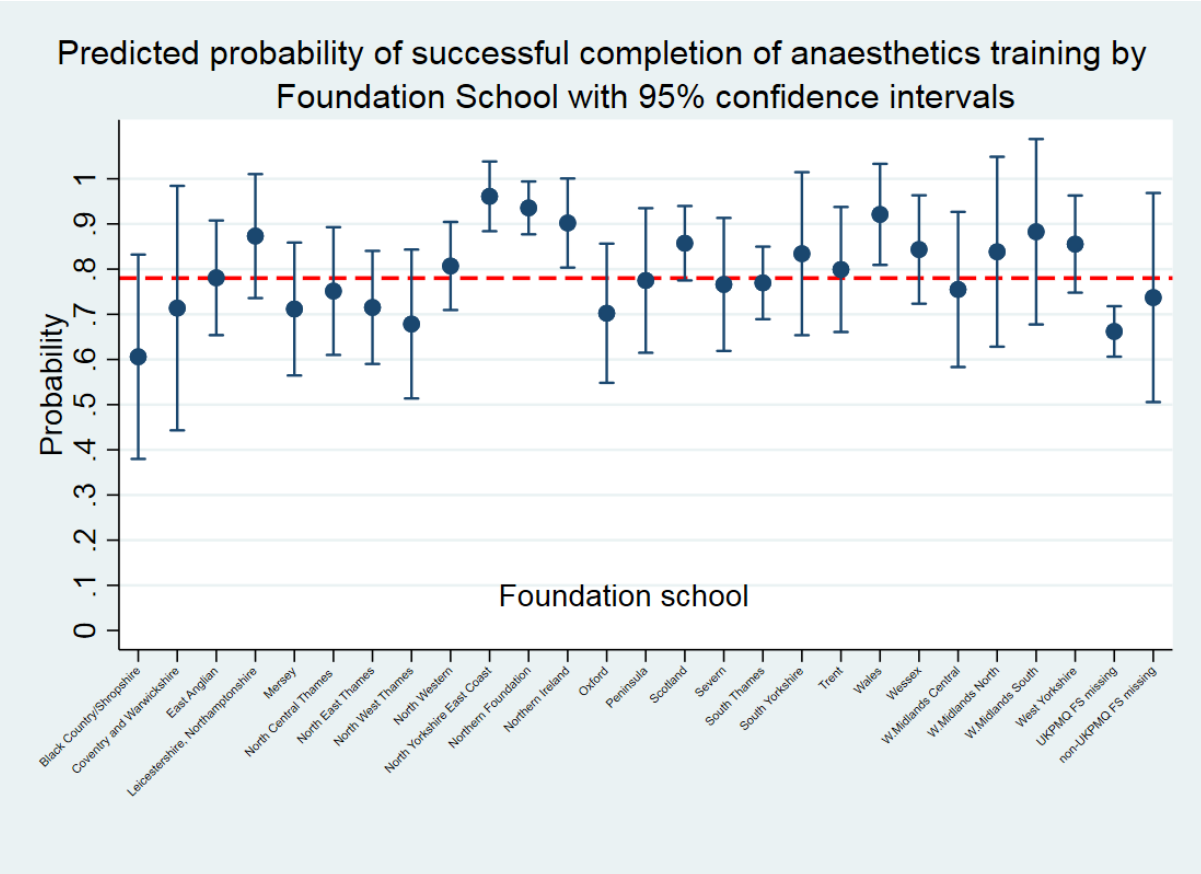


Figure 14: Predicted probability of the outcome 'successfully completed core anaesthesia training' contrasted by HE deanery where training took place derived from Model 4a. Mean predicted probability = 0.78 (dashed horizontal line).

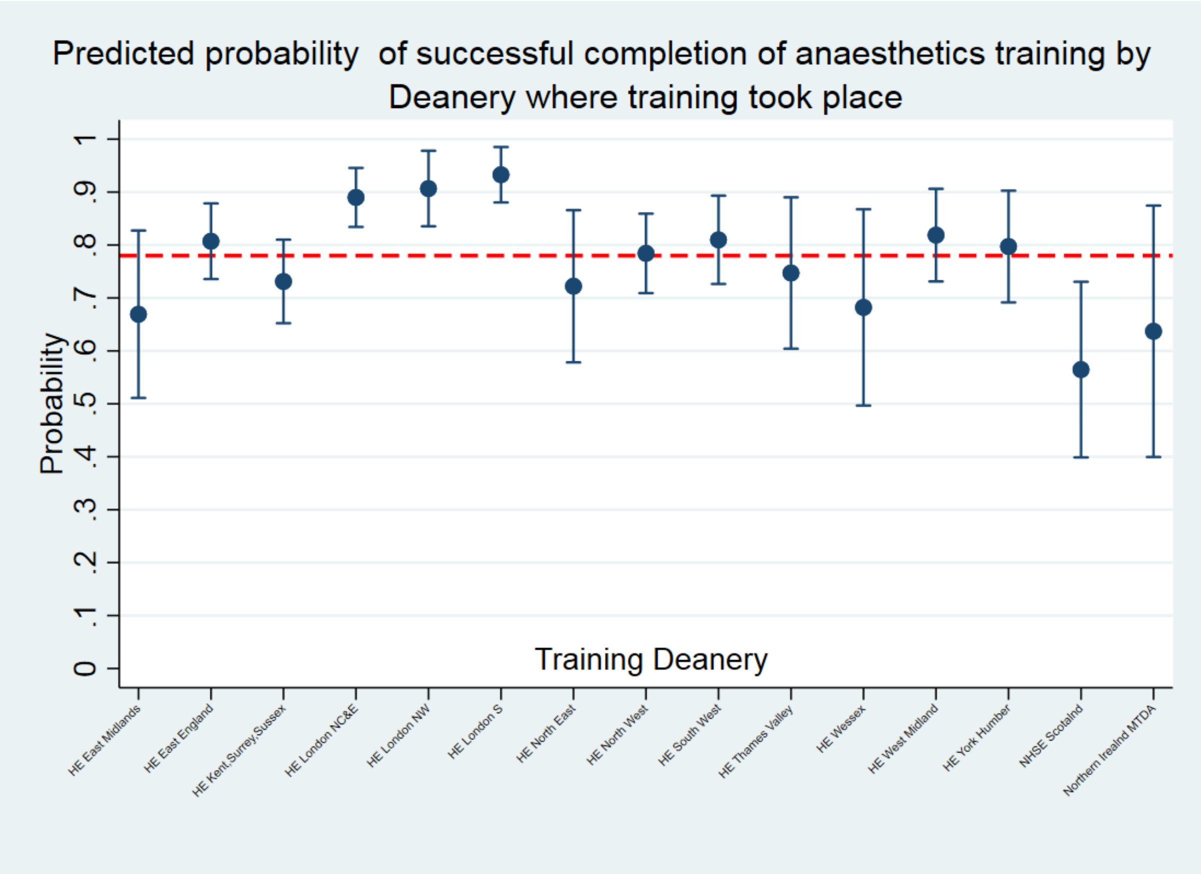


Figure 15: Predicted probability of successful completion of anaesthesia training contrasted by UK versus non-UK medical school, graduate and non-graduate entry, and gender, adjusted by interview score derived from model 4a.

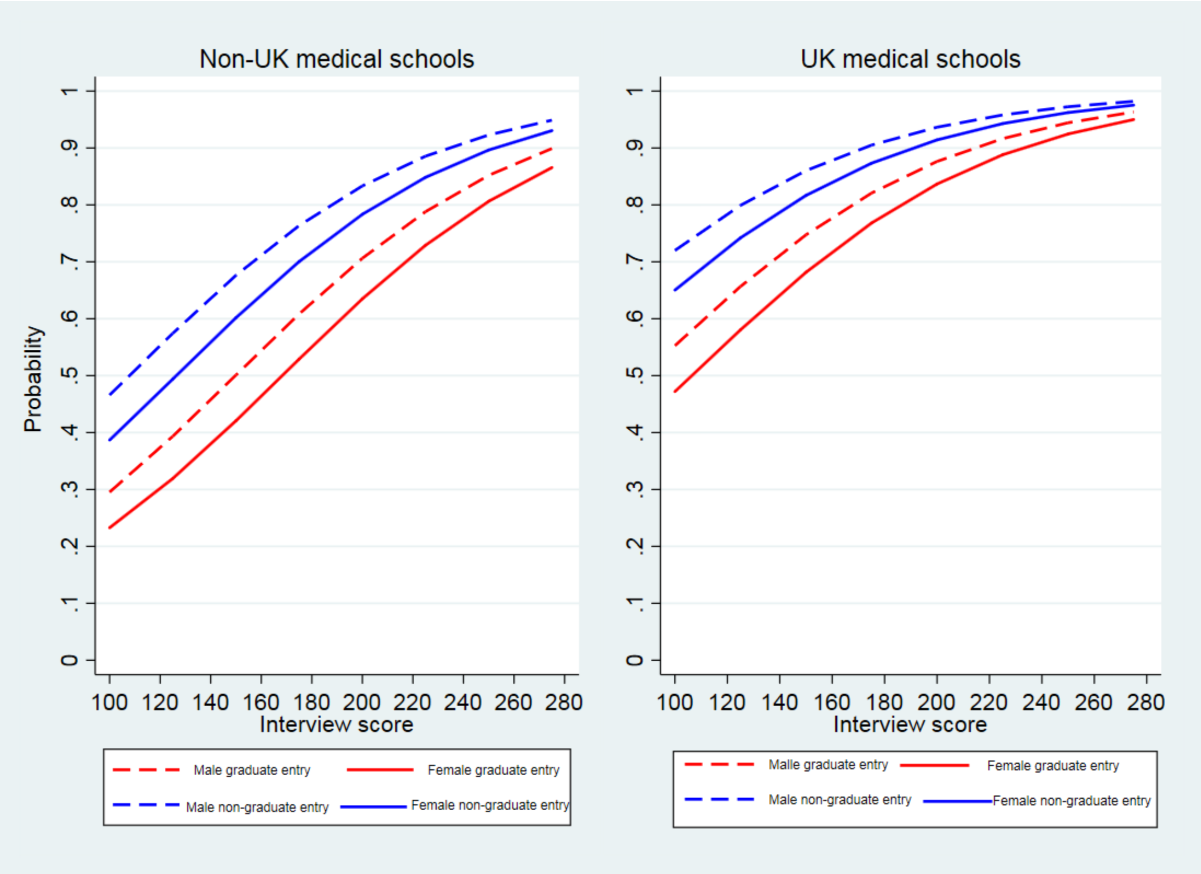


Figure 16: Predicted probability of the outcome 'successfully completed core anaesthesia training' contrasted by foundation school attended derived from Model 4b. Mean predicted probability = 0.79 (dashed horizontal line).

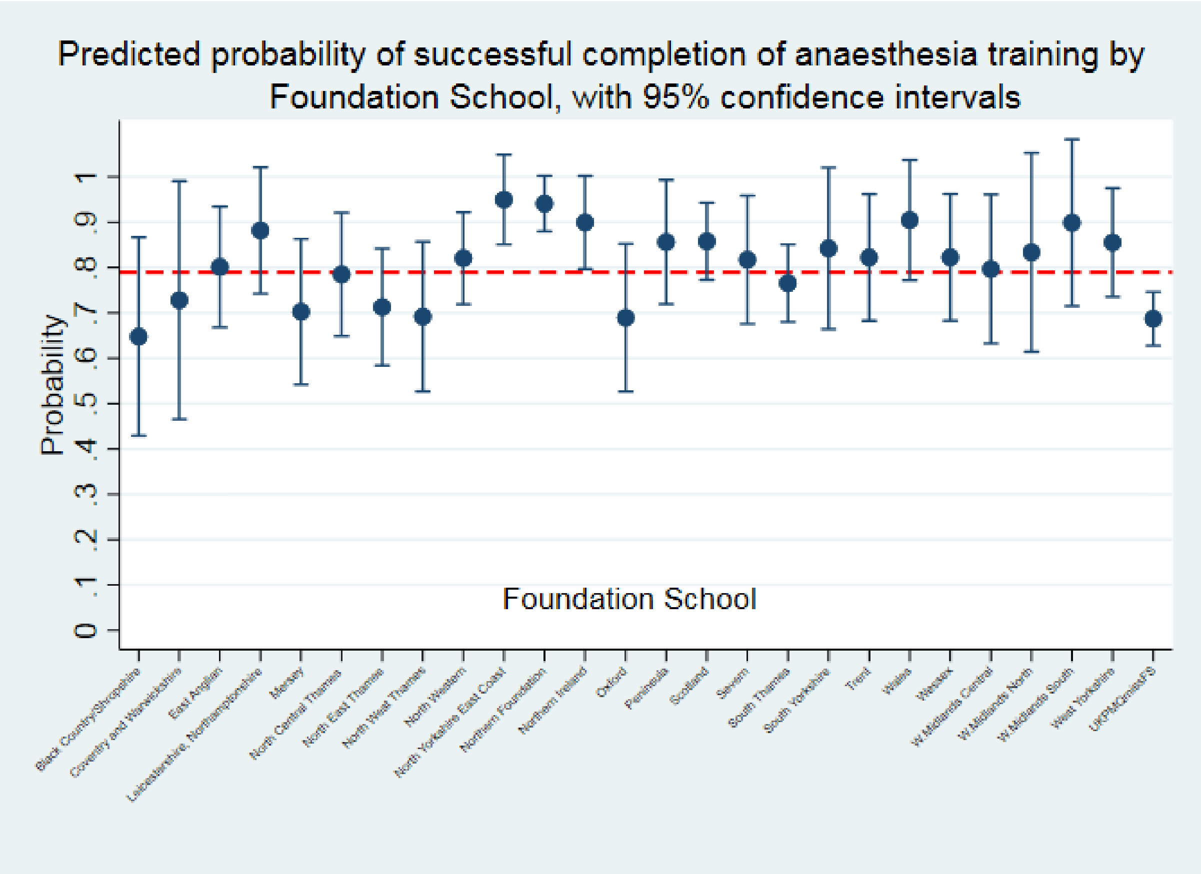


Figure 17: Predicted probability of the outcome 'successfully completed core anaesthesia training' contrasted by HE deanery attended for training derived from Model 4b. Mean predicted probability = 0.79 (dashed horizontal line).

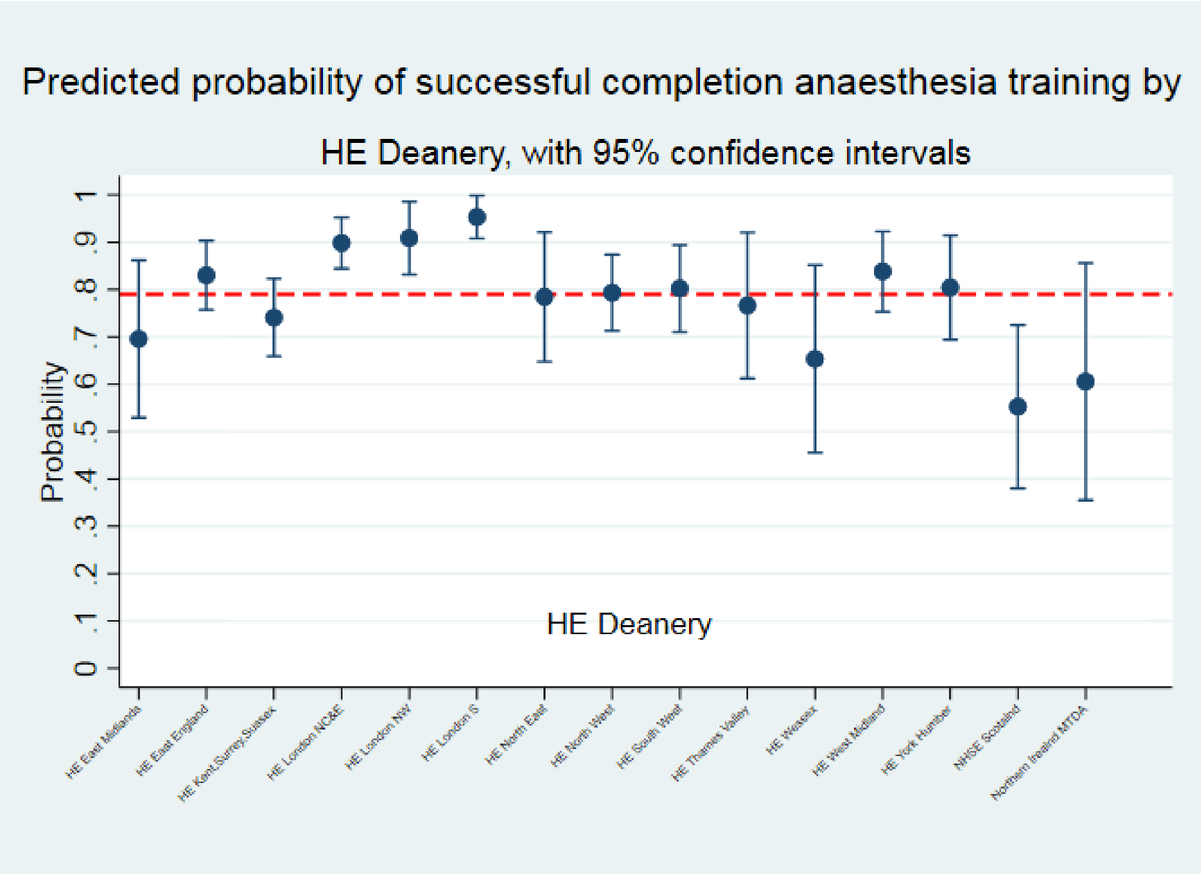


Figure 18: Predicted probability of the outcome 'successfully completed core anaesthesia training 'adjusted by gender, entry status and anaesthesia training interview score derived from model 4b.

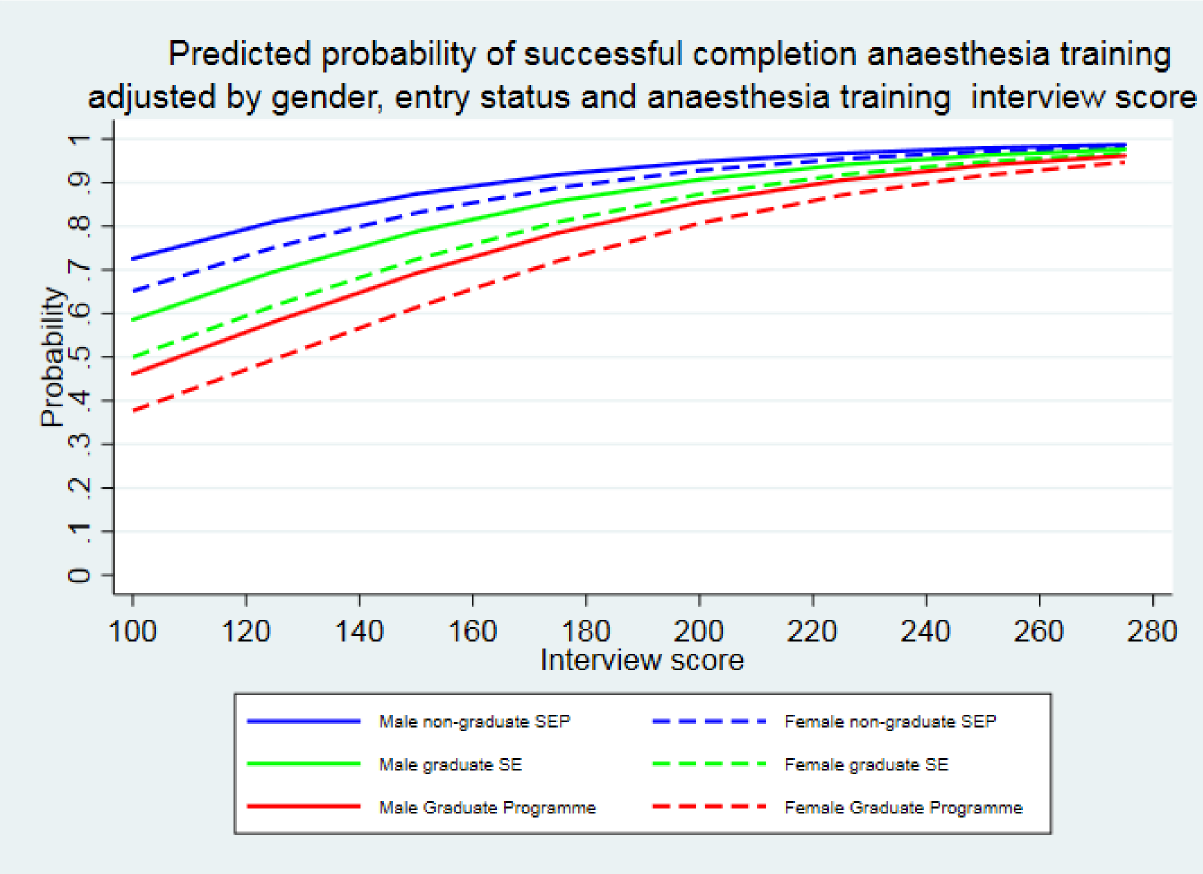
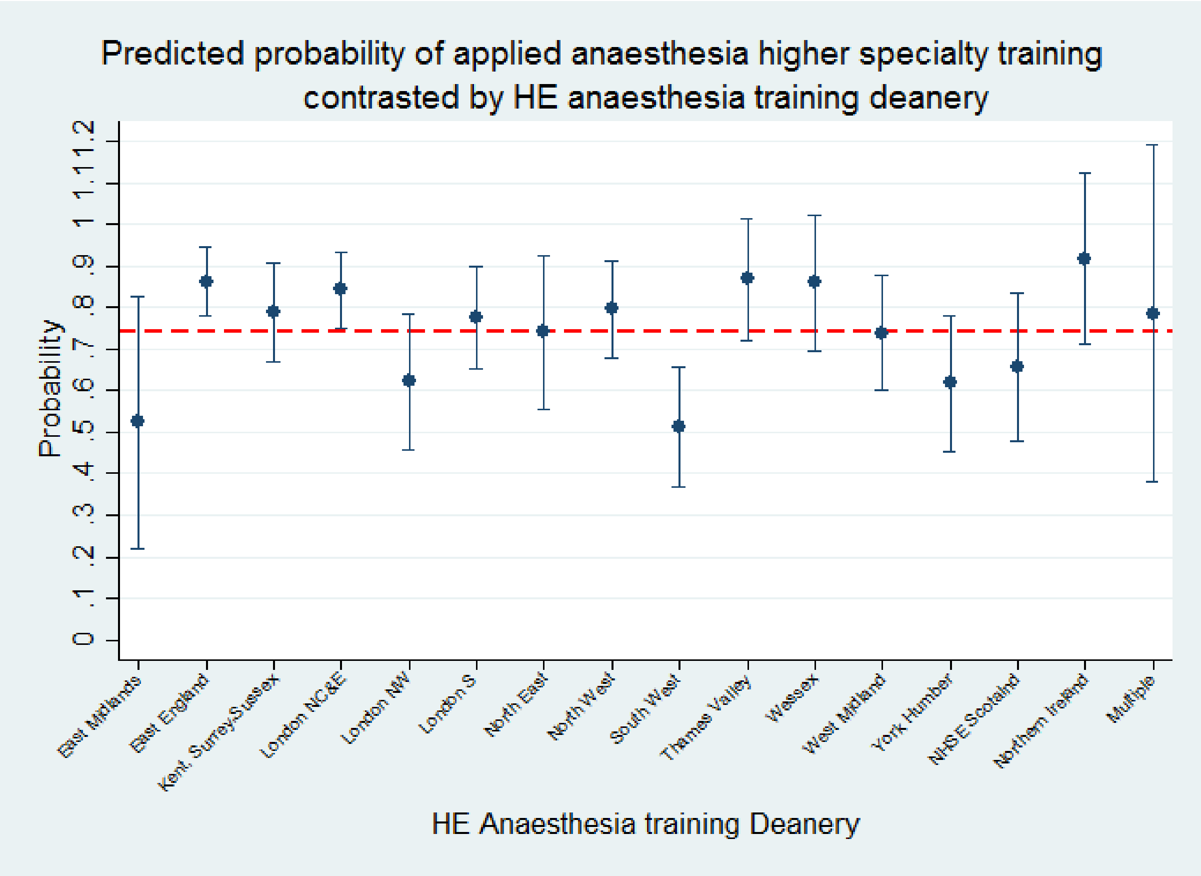


Figure 19: Predicted probability of the outcome 'applied higher-level anaesthesia specialty training' contrasted by HE Deanery where training took place derived from Model 5a. Mean predicted probability = 0.76 (dashed horizontal line).



10 Limitations

The UKMED data set provided a finite window for the follow-up of doctors entering core medical and anaesthesia training so there is likely some bias in both stages of our analysis due to censoring in the data.

- Despite our curtailment of the entry point to the years 2012 to 2014 it is possible that some of the trainees who had not completed their training by July 2017 may yet do so. The number of such trainees would be very small however: of the 917 doctors who entered core medical training in 2012 and had completed by 2017 only 19 (2.1%) took more than three years to do so. The corresponding number among the 365 who entered core anaesthesia training in 2012 was 6 (1.6%). The potential bias in the 'completion of training' analyses due to censoring is therefore small and it was felt preferable to accept this rather than to drastically reduce the sample sizes by curtailing the entry point to the years 2012 and 2013 only.
- The effect of censoring on our analyses of application to higher specialty training is probably greater, particularly in anaesthesia where doctors appear more likely than their medical counterparts to take some time out after completion of core training before applying to higher training. Of those completing their core training in 2015 for example, 24.7% of the anaesthesia trainees who applied to higher level training waited until 2017 before doing so. The corresponding proportion among those completing core medical training in 2015 was just 3.5%. Our analysis of factors associated with application to higher level training in anaesthesia is therefore limited; both by censoring and by the additional curtailment of the sample size due to missing application data (see 3.1 above). The results (Tables 22 to 26) must therefore be treated with some caution.

Missing data may also have biased our analyses though it is impossible to quantify the extent of this. Our decision not to impute missing data, explained in Section 3.2 above, led to a reduction in the size of the analytic samples but these were still much bigger than the minimum requirements for conducting the logistic regressions.

11 Conclusions and further research

There is a significant amount of attrition of the numbers of doctors who enter core training in medicine or anaesthesia, with those completing training and subsequently applying for higher level training posts in those specialties. 2633/3720 (71%) trainees completed core medical training of whom 68% applied to higher level training in medicine. Attrition was lower in anaesthetics where 1226/1577 (78%) trainees completed core training of whom 74% applied to ST3 posts in anaesthesia.

Common educational factors which predicted completion of core training in both medicine and anaesthesia were; graduate versus non-graduate entry to medical school, medical school attended and training Deanery attended. The odds of successful completion of core training for graduate entrants to medical school programmes were 0.5 times the odds of non-graduate entrants for both medicine and anaesthesia. Part-time training was associated with lower odds of completing training for medicine but not anaesthesia, although numbers of trainees who undertook part-time training were low (3% for both medicine and anaesthesia). Foundation school attended, significantly predicted completion of training in anaesthesia but not medicine.

There were differences in the socio-demographic factors associated with completion of training for medicine and anaesthesia. The odds of successful completion of core medical training for BME doctors were 0.7 times those of white doctors, and higher for doctors who at entry to medical school had lived in areas of the lowest rate of young persons' participation in Higher Education (POLAR 1). For anaesthesia, the only socio-demographic factor associated with completion of core training was gender with the odds for males completing core training 1.4 times that of females.

Selection processes to core training in medicine and anaesthesia work well in predicting those trainees that will complete the core training programme. There were strong associations between interview score and likelihood of successful completion of training in medicine and anaesthetics. Shortlisting score was also strongly predictive of likelihood of completing training in core medicine but the UKMED database contained a significant amount of missing data for shortlisting scores in anaesthetics. Although shortlisting and interview scores predicted successful completion of core medical training, these scores had an inverse relationship with the odds of applying to higher training in medicine suggesting that stronger candidates at the selection process were less likely to apply directly to higher medical specialties. This picture did not occur in anaesthetics where interview score had no association with the likelihood of applying to ST3 posts in anaesthesia. For trainees who had completed core medical training, those who had intercalated during medical school were more likely to apply and there were significant associations between medical school and foundation school attended. For anaesthesia, the only factor associated with the odds of applying for ST3 posts after completion of core training, was the HE training deanery attended. For those applicants who were offered posts to higher training in medicine and anaesthetics, none of the socio-demographic or educational factors investigated were associated with decisions to accept these posts.

We have identified common educational factors which are associated with failure to complete core training in medicine and anaesthetics and further work is needed to understand why graduate entrants to medical school, for instance, are less likely to complete their core training, as well as why there are socio-demographic differences based on ethnicity and gender. Research is needed to investigate why certain profiles of trainees are less likely to complete their training in order to help target strategies to which may help these trainees. We have highlighted factors associated with decisions to apply (or not) to higher training once core training is completed and further studies are required to follow-up those trainees who do not directly enter higher training in order to understand choices made at this stage of training.

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