UKMED
UK Medical Education Database

UKMED Research Conference

London, 15 March 2019

The first UKMED Research Conference was well attended by undergraduate medical school staff and researchers, as well representatives of the Medical Schools Council, the General Medical Council, the Department of Health and the Scottish Government.

During the conference researchers using UKMED data presented their findings from published and ongoing projects. They also shared tips for maximising the potential of the database. The GMC speakers explained the legal basis for using the data for research and provided information on available data types.

Significance of UKMED findings for medical school admissions policy

Predictive validity of selection tests, Professor Chris McManus

Professor McManus first gave an overview of the project UKMEDP51, noting that data are continually being added, including the ongoing inclusion of historical applications.

UKMEDP051, 'A comparison of the properties of BMAT, GAMSAT and UKCAT', was intended as the first major evaluation of admissions tests, despite these tests having been previously shown to have some individual predictive validity. The comparison will allow for relative strengths and weaknesses to be evaluated along with their potential to widen participation. This study is ongoing.

From this project Professor McManus drew various thoughts on the nature of UKMED data, firstly that UKMED are complicated: around 67,000 subjects are included in the UKMEDP051 dataset, both students and doctors. Not all data are available for all participants in all years, with data often missing for structural reasons (tests were not used in a particular year), or for other reasons (applicants chose not to take certain admissions tests). It is very useful to create a data map to help in navigating what is there, better seeing the possibilities and practicalities of it. Not all questions can be answered at this time. On a longer timeframe many more questions can be answered, but for the immediate future one must be selective.

On working in the Safe Haven, Professor McManus noted that it is based in the Health Informatics Centre in Dundee and accessed via the internet. It operates on a 'nothing in, nothing out' principle and can be most easily accessed through the VMware Horizon client. The standard software is available such as SPSS, STATA and R, and any output is screened.

The difficulties to emerge with data of this scale often revolve around measures changing, such as the introduction of A* at A-level in 2010 making direct comparison with previous years difficult, and local standardisation, for instance with Educational Performance Measure deciles. There are also instances of the same measure being reported in different forms. Careful thought needs to be given to what constitutes 'significance' when the number of subjects is very large, when it can appear that everything is significant. There is a need to calculate effect sizes and to be mindful of confidence intervals.

In discussion, Professor McManus noted that it can be difficult to communicate advanced statistical methods to medical educationalists who may not be experienced in this. There is a need to train a cohort of such experts within medical education.

Widening Participation status and admissions tests, Professor Kevin Murphy

Professor Murphy asked how we can support widening participation students and how research might be used to answer this. Previous work has been focus-group based with aim to produce a toolkit of guidance for medical schools and admissions tutors. Themes to emerge from the focus groups included advice, work experience, support networks and finance, as well as insight into what puts potential applicants off medicine, including the length of the course and concerns over future work/life balance.

Among the many useful distinctions to appear from this work between the perceptions of students from non-selective and selective schools, it was found that students from non-selective state schools had a perception of UCAT as trainable and unfairly biased towards more traditional applicants. It was also suggested that students from non-selective state schools were more anxious about sitting the BMAT and were often discouraged from doing so by their teachers, particularly when the school was unable to provide any support with specific preparation for this test.

An application to UKMED was made for research entitled, 'Selection Tests as a predictor of acceptance rate and post-graduate success of widening participation students in undergraduate medicine' (UKMEDP054). This examines relative proportions of WP students at medical schools using the BMAT or UCAT as part of their selection criteria and the effect of WP status and admissions tests on the proportion of local WP students that medical schools attract.

This aligns with the current sector focus on interested students from underrepresented backgrounds up to a competitive level and helps address some of the many questions it raises for selection. How can schools become more appealing to these students? Do we think that those we currently select make the best doctors? Should we lower our requirements further for underrepresented candidates? Are we just asking for skills we could teach? Can we give students a better idea of what university is like? Can we provide better emotional and financial support to those who need it?

Widening Participation – insights into what works

MSC Selection Alliance and graduate entry courses, Professor Paul Garrud

Professor Garrud outlined the work of the Medical Schools Council in selection and widening participation, as led by the Selection Alliance since the publication of the Selecting for Excellence report in 2014. Its aim is to ensure that application and admission to medical school in the UK is inclusive, transparent, and evidence-based.

Combining data from a wide variety of sources can work to categorise individuals, allocate resources and predict behaviour, while issues of data quality, predictive methods and interpretation can arise. Best practice will be evidence-based, transparent and cost-effective.

With this in mind, Professor Garrud's 2014 study 'Help and hindrance in widening participation' looked at the evidence around the practical impact of different academic and ability selection criteria and found that performance in the GAMSAT strongly predicted knowledge-based exams in medical school while it had no significant relationship to the combined assessment factor, skills factor or coursework factor.

In 2018 Professors Garrud and McManus published the UKMED research 'Impact of accelerated, graduate-entry medicine courses' (UKMEDP002). This compared the profile, success, or specialty destinations of graduates entering UK medical schools via accelerated four-year, standard five-year and six-year programmes. It found that GAMSAT performance strongly predicted course completion as well as Educational Performance Measure performance, and performance through other measures such as BME and female gender.

Issues encountered in this research included those of a technical nature such as missing data, as well as those around impact and implementation, noting that medical schools can be risk-averse. Professor Garrud encouraged researchers to think from the start how they may wish to influence policy. The Selection Alliance is a good forum for the dissemination of selection and widening participation research to medical schools.

Performance of Widening Participation students, Professor Jen Cleland

Professor Cleland had made one of the first applications to UKMED and has been involved with it several times since then. She has an established inter-disciplinary team including one full-time PhD student committed to UKMED projects.

In ' "Getting on" in medicine: a programme of study of careers trajectories and decisions of doctors' (UKMEDP026), Professor Cleland's team examined the relationship between sociodemographic factors, including school type and average educational performance throughout medical school. It was found that students from independent schools had significantly higher mean UCAT score than students from state-funded schools. Similarly, students from independent schools came into medical school with significantly higher mean GAMSAT scores than students from state-funded schools. However, students from state-funded schools were almost twice as likely to finish in the highest EPM deciles than those who attended independent schools.

Another part of the UKMED project saw Professor Cleland investigating 'Is there a relationship between school type and academic performance at medical school?' Through this it was found that students from state-funded schools do better at medical school assessments than their counterparts from independent schools. In relation to the wider discussion about the use of contextual markers in medical school admissions, it may be that there is an argument to accept lower scoring (UCAS tariff) applicants from state schools on the basis that they are likely to make up this discrepancy in performance.

In 'Is there a relationship between socio-demographic factors and selection into the UK Foundation Programme?' there was found a clear relationship between an individual's performance on foundation school selection (their application score) and whether or not they are allocated to their first choice of foundation school. Applicants allocated to their first choice Foundation School scored on average a quarter of a standard deviation above the sample average.

'Is there a relationship between origin (locality) and FP locality preference?' found that situating medical schools in areas of need and recruiting students from lower socio-economic groups is likely to boost the number of medical graduates who are more likely to train locally and remain in the area to serve their communities.

'Are there differences between those doctors who apply for a training post in FY2 and those who take time out of training?' found that, in terms of socio-demographics, those entering medicine after high school and doing a five-year (standard) programme, males, of white ethnicity and whose parents were educated to degree level were more likely to take time out of training than their counterparts. Broadly speaking this suggests that early career doctors from higher socio-economic groups are less likely to choose progress directly from the FP into specialty training. Recruiting medical students from more diverse groups may be one means of increasing the numbers of F2s progressing directly into specialty training.

'Is there a relationship between socio-demographic factors and specialty destination?' found that doctors who entered medicine as mature students or came from families where no parent had a degree were significantly more likely to accept a training post in general practice or mental health relative to other specialties.

Widening Participation index, Dr Paul Lambe

Dr Lambe noted that 33% of HE entrants in 2016/17 did not disclose socioeconomic class status, posing a problem for admission decisions aimed at widening participation. Applicants to higher education study are not obliged to disclose their social class, and, for those that do, this information is not available at the point of admission decisions.

There are multiple concerns about the reliability of contextual indicators because they have been shown to return conflicting information on socioeconomic circumstances, as well as doubts about the veracity of self-reported information and concern about the potential for 'gaming' the admissions process.

Current thinking suggests that use of multiple, different types of contextual indicators of disadvantage can be used to build a picture that more accurately determines socioeconomic background. Dr Lambe's study, 'Development of a UKMED multidimensional measure of widening access status' (UKMEDP041), used UKMED to test this assumption.

Three types of contextual indicator are typically used: individual-level contextual indicators refer specifically to an individuals' characteristics or circumstances, or to those of their household; area-level indicators are based on students' home postcodes and are proxies for individual disadvantage based on the average circumstances of individuals and households in the same locale; school-level measures take the form of either aggregated socioeconomic indicators, such as percentage pupils eligible for Free School Meals, or aggregated academic performance.

It was found that indicators concerning individual circumstances are generally safer than area-level or school-level characteristics. However, there is a confounding factor in that disadvantage is not neatly aligned with social class position. It was concluded that the use of multiple, different types of weighted contextual indicators mitigates the risk of false positive socioeconomic classification and is likely to increase the number of identified students from disadvantaged lower social class backgrounds.

Understanding factors that impact on performance

Medics behaving badly? Predictors of fitness to practise issues in medical students and doctors, Dr Paul Tiffin

Dr Tiffin stated that misconduct during medical school predicts future fitness to practice (FtP) events. However, relatively little is known about the factors which predict FtP issues in or prior to undergraduate study.

In, 'Predicting Fitness to Practise issues from admission profiles in UK medical school entrants' (UKMEDP001), Dr Tiffin used various educational and demographic predictor variables available in UKMED, including sex, secondary school type and socioeconomic status.

Findings included males being at significant risk of declaring conduct-related issues, and some evidence that those who self-report higher self-esteem are more likely to experience a behavioural issue. Managing Emotions and Resiliency Scale (MEARS) self-esteem may reflect aloofness or narcissism, rather than a healthy sense of self-worth. Findings also corroborate the well-known idea that students from non-professional backgrounds are under-represented in medical school. It is possible that students from such a background experience difficulty in undergraduate education, and thus are more prone to suffer from depression.

UCAT scores had some ability to predict FtP declarations, and certain self-reported personal qualities/traits were significantly associated with an increased risk of FtP declarations. A number of educational and

demographic factors were suggested to be associated with the risk of declaring depression, in particular students from non-professional backgrounds. Certain groups may particularly benefit from targeted support.

There are statistically significant predictors of FtP declarations in medical undergraduates. Postgraduate exam performance appears linked to FtP risk in doctors, and the strength and specificity of associations make doctors relatively poor 'screeners'. Questions arising include: Will the 'footprint' of SJTs be seen eventually? How do we evaluate personal qualities at selection? Do we need a more consistent approach to FtP issues in undergraduate years?

Variation in BME performance, Dr James Galloway

Dr Galloway introduced some ongoing research on understanding differential attainment among BME medical students. Its overarching goal is to identify and explain variation in the BME exam performance gap across medical schools (UKMEDP042).

The specific objectives of the research are to address: whether the BME gap varies by medical school; what the effect size is for individual-level factors on exam performance; how 'case-mix' adjustment impacts understanding of school BME gaps; and whether medical degree course characteristics influence BME disproportionality.

It was found that BME students have a slightly lower mean age (explained by fewer graduate entrants) and with proportionately more females in the BME cohort along with significantly fewer graduate entrants. BME students' average EPM decile is 1.32 lower than non-BME students. Better EPM performance associates with older age, female gender, wealthier socioeconomic position, parental higher education.

Looking at further data, it can be interpreted that BME students consistently perform less well in EPM deciles, which is only partially explained by their prior attainment, and the attainment gap appears to magnify during medical school. More work is needed to understand the drivers of variation.

Important limitations to the study include substantial amounts of missing data, refinements needed to the imputation model, and that 'BME' as a very challenging construct to study as it intertwines culture, race, socioeconomic factors and country of birth.

UKMED impact

Turning research findings into policy, Dr Thomas Gale

Dr Gale introduced his research group, CAMERA (Collaboration for the Advancement of Medical Education Research and Assessment). Its mission is to conduct research related to recruitment, selection and retention of a sustainable healthcare workforce. It submitted a successful impact case study for REF 2014 concerning selection research and from this built a focus on quantitative and qualitative research in factors affecting career choice, predictors of success in training and strategies for remediating and regulating healthcare professionals.

The shortage of primary care providers is an international problem, with 50% of postgraduate training posts now for general practice and an undersupply of GPs. The Centre for Workforce Intelligence estimates that double the number of anaesthetists will be required by 2033.

Specialty choice is shaped by multiple factors and not yet fully understood. Research indicates that specialty choice decisions are influenced by a multiplicity of factors such as student characteristics, experiences at medical school and in postgraduate training. Much of this has been survey-based research with a focus on identifying factors associated with the self-reported, intended career preferences of medical students and early career doctors. Career preferences are of course liable to change.

In this context CAMERA undertook UKMEDP030, 'What demographic and educational factors predict doctors' decisions to apply for training programmes in particular medical specialties?' with the aim of investigating factors that predict whether trainees would apply to core training in general practice, psychiatry or anaesthesia, and to delineate the typologies of doctors that are likely to apply for these.

It was found that many factors influence the predicted probability that junior doctors will apply to certain specialties, with these factors varying by specialty. Factors include individual personal characteristics, measures of prior academic attainment, educational and geographical factors. The UKMED database is a unique opportunity to investigate the contribution that these factors make to career decision-making processes. There are further research opportunities to investigate longitudinal relationships over time and during medical training.

The widening participation agenda is likely to have a beneficial effect on GP recruitment but is unlikely to ameliorate psychiatry and anaesthesia work force shortages. The characteristics of UK medical schools and foundation schools impact on the medical career decision-making process of undergraduate medical students and junior doctors.

In terms of impact, the report and summary documents were presented to the UKMED Advisory Board, Health Education England and the royal colleges. UKMEDP030 helped to inform the allocation of extra medical student places in 2018 and the workforce planning strategy and curriculum review for the Royal College of Anaesthetists.

Dr Gale suggested that applicants to UKMED consider the impact of their research from the start, by involving key stakeholders so that it is compatible with policy needs. He recommended planning how medical education research could be made visible and available to policy-makers.

Impact of UKMED on workforce planning, Dr Colin Tilley and Sean Corrigan

The joint presentation started with Dr Tilley outlining how the Scottish Government uses integrated data as part of evidence-based workforce planning. He introduced the medical profiles, which help to estimate the flow of doctors in different specialties who achieve consultant grade based on their age and sex composition.

The intake of undergraduate medical students is treated by the Scottish Government as a major instrument towards reaching target numbers of consultants. UKMED provides means of identifying the best time for measures aimed at improving trainee retention – two years from obtaining primary medical qualification.

Further insights offered by UKMED show that Scottish graduates who leave Scotland do not necessarily work in other devolved nations. Geographical mapping of the workforce and the distance between the students' graduating medical school and their workplace were presented by Sean Corrigan in the form of interactive tools developed by the GMC.

Data management for medical schools

Compliance with HESA standards, Daniel Smith

In this session Daniel Smith from the GMC presented the data available in UKMED and highlighted some of the problems that affect data quality, such as ambiguity of course titles provided by universities to Higher Education Statistics Agency (HESA). He noted that CITTLE is a field controlled by universities and it would help enormously if schools used the same text here as provided to UCAS for their application system.

To help define population, the database has the following person-level views:

VW_UKMED_PERSON_FULL: all UK medical students from 2002 onwards (HESA), All NTS Census from 2012 and NTS respondents from 2009 - 2011

VW_UKMED_APPLICANTS: all applicants to courses leading to PMQ from 2007 onwards (UCAS)

VW_UKMED_NO_APP_MATCH: all cases from 2007 onwards that SHOULD have matched to UCAS but only have a HESA match

GMC Legal perspective on collecting and sharing student/applicant data, Thomas Oppé

Thomas Oppé explained that GMC is acting on its statutory duties in processing UKMED data. Data subjects' consent is not required. Only a limited number of GMC personnel can access UKMED data and they are separate from staff that work within other GMC departments that take decisions regarding individuals. Extracts provided to researchers are pseudonymised to prevent identification of individual students and doctors.

How to match medical school's own data to UKMED, Daniel Smith

Daniel Smith explained that in order to match to UKMED data not already held in the database, the GMC must firstly check whether the privacy notice that data subjects were presented with permits this kind of sharing. Secondly, the new data must contain identifiers that would allow a robust match.

Medical school's own data have been matched to UKMED previously e.g. in case of Conscientiousness Index (UKMEDP077). As a rule, the data becomes available to all within UKMED once the study of the researchers who asked for it to be linked is completed, but this depends on the privacy notice used.

HESA contract and in school progression data, Daniel Smith

Daniel Smith noted that there was very little information within UKMED on students' progression within medical school. Currently this is restricted to HESA RSNEND field which requires cleaning using the HESA return from the subsequent year and the theory and skill scores used in the UKCAT 12-Study. UKMED has previously explored using the HESA Data Entity of Modules, but consultation suggests that this approach won't work. The GMC is now working with HESA and schools to explore returning a new entity – Assessments. In order to collect assessment data for the Academic Year 2020/21, a specification needs to be agreed by August 2019 to allow schools to prepare their systems to make the return to HESA**.** Workshops will be held in conjunction with HESA – please email Daniel.Smith@gmc-uk.org to ensure you are sent an invitation.

It was proposed that school-specific extracts could be available in the Safe Haven in return for school's help collating these data. This will allow analysis of cases from a school but no publications. It would allow analysis of de-identified linked data in the Safe Haven which would be comprised of existing UKMED data and the new assessment data.