Markers of Widening Access status and undergraduate performance in UK medical students

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Our context

- 90% of medical students are school leavers

- No SAT or equivalent – various qualifications weighted

- Widening access (WA) approach is "meritocratic" (e.g., outreach, mentoring)

- Despite much WA activity – and investment - over the last 30 years, little change in socio-economic profile of medical students

Our context

- "Medicine … has a long way to go when it comes to making access fairer, diversifying its workforce and raising social mobility… Its success in recruiting more female doctors and doctors from black and minority ethnic backgrounds indicates that with the right level of intentionality the medical profession can also throw open its doors to a far broader social intake than it does at present. …" Fair Access to Professional Careers (2010, p.3).

2012

Fernando et al. Medical Teacher, 2009; 31: 1018-1023.
Lynch et al. Medical Education, 2009; 12: 1203-1209.
Cleland et al. Medical Teacher, 2011; 33: 244-249.
Husbands et al. BMC Medical Education 2014, 14:88.
Patterson et al. Medical Education, 2016: 50: 36-60.
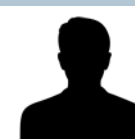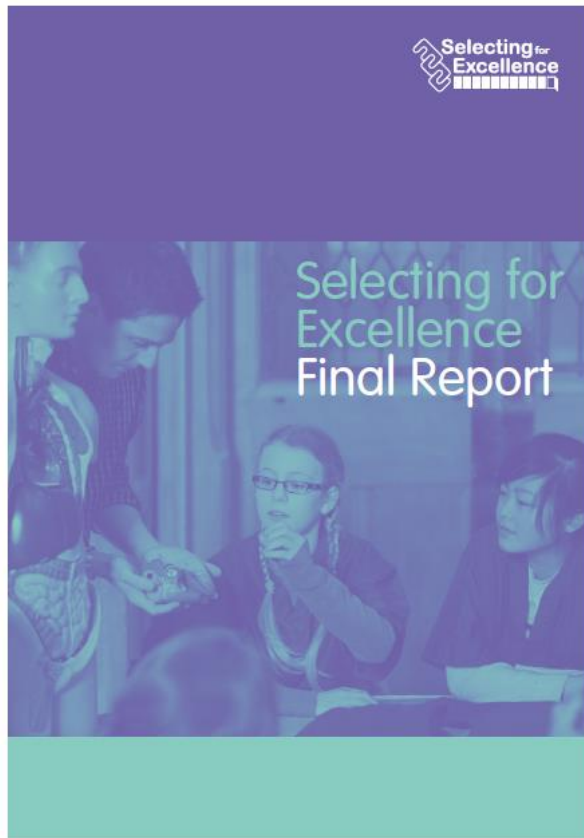
All medical schools must consider and evaluate their approach to the use of contextual data

Selection into medicine (UK)

- Diversity of approaches used - even when same approaches used, often used in different ways and weighted differently

- Yet prior attainment/academic record is consistently used as the first hurdle
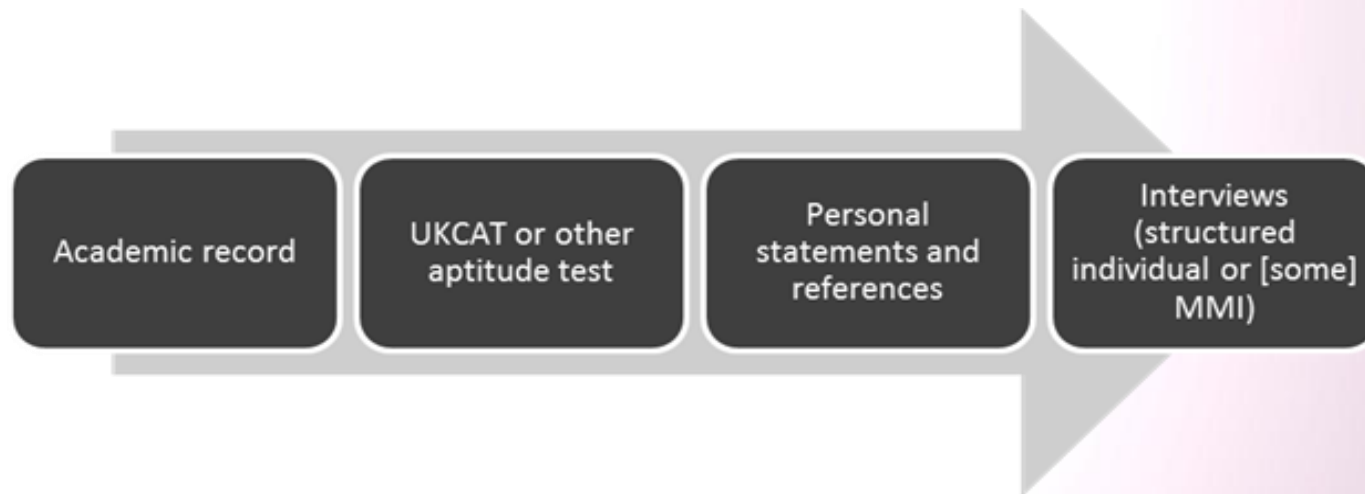
| Academic record | UKCAT or other aptitude test | Personal statements and references | Interviews (structured individual or [some] MMI) |

Prior attainment

▸ Failing to gain the required grades is the most common cause of rejection in the admissions process

▸ But is prior attainment a good indicator of whether someone will succeed at medical school and be a good doctor?

Relationship between prior attainment and performance (UK)

- "...*the construct-level predictive validity of A-levels is greatest for first year BMS exams, and declines through undergraduate and postgraduate years, although it is significant in all cases*" (p.12/21)

- A-levels had higher construct-level predictive validity than GCSEs/O-levels or Aptitude Tests, or SQA (Scottish) qualifications

Table 2 Summary of construct validity coefficients

Outcome	Predictor A-levels
First year BMS	.809 n = 3 (CI .501; .935)
BMS overall	.744 n = 4 (CI .518; .872)
All BMS	.772 n = 7 (CI .627; .865)
Finals	.625 n = 5 (CI .449; .754)
All Undergraduate except first year BMS	.684 n = 9 (CI .561; .778)
All Undergraduate	.723 n = 12 (CI .616; .803)
MRCP(UK) Part 1 (written)	.661 n = 2 (CI .523; .765)
MRCP(UK) Part 2 (written)	.502 n = 2 (CI −.030; .812)
MRCP(UK) Clinical	.303 n = 2 (CI .010; .547)
All MRCP	.506 n = 6 (CI .301; .666)
Specialist Register	.627 n = 4 (CI .450; .756)
All postgraduate	.556 n = 10 (CI .426; .663)
All undergraduate and postgraduate	.656 n = 22 (CI .574; .726)

Limitations

- Large amalgamated dataset of cohorts dating back to 1972

- BUT only UKCAT (2007-2009) entry data was contemporary, and this only looked at Year 1 medical school performance

- Limitations of A levels [1]
  - Not sufficiently discriminatory at the top end
  - Grade inflation
  - Not as simple as ability -> performance outcome
  - What about Scottish Highers? Only available in the UKCAT cohorts and so no long-term follow up.

- There is also a lack of long-term follow-up data to provide evidence that medical school applicants with higher grades go on to become better physicians [2]

[1] McManus et al. BMJ 2005;331:555–9.   [2] Patterson, Cleland et al. Medical Education 2016

International comparison - Relationship between MCAT and USMLE

- Meta-analysis of 23 published studies to determine the predictive validity of the MCAT on medical school performance and medical board licensing examinations [1]

  - in the preclinical years - r = 0.39

  - on the USMLE Step 1 - r = 0.60

  - (with the biological sciences subtest the best predictor of both (r = 0.32 r = 0.48 respectively))

- Evidence of MCAT's ability to predict performance on USMLE Step 2 a lot less convincing [2]

[1] Donnon et al. 2007. Acad Med, 82, pp. 100-106   [2] Callahan et al. 2010, Acad Med, 86, 980-987

Prior attainment

▸ Failing to gain the required grades is the most common cause of rejection

▸ Only predictive of performance to some extent

▸ And attainment is not just about ability – it is hugely dependent on schooling, family, aspirations, opportunity, etc [1, 2, 3]

1. Gorard et al. 2007. Overcoming the Barriers to Higher Education. Stoke-on-Trent: Trentham Books. 2. BMA. Equality and Diversification in UK Medical Schools. London: BMA; 2009. 3. Peers IS, Johnston M. Br J Educ Psychol 1994;64:1-18.

Only 7% of the UK population goes to independent schools, yet across the years, a pattern of more than 20% of medical students coming from such schools has remained static [1], at least in part because students in independent schools do better on school leaving examinations [e.g., 2, 3]

1. Haroon et al. Journal of the Royal Statistical Society 2013;176:431-57.
2. Gorard et al. A report to HEFCE by the University of York, Higher Education Academy and Institute for Access Studies. 2006.
3. Palardy. School Effectiveness and School Improvement 2008;19:21-49.

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▸ The use of "appropriate contextual criteria" (CA) is intended to assess an applicant's potential to succeed in HE, considering the context and circumstances in which their attainment to date has been achieved.

▸ Which CA markers are best?

1. Gorard et al. 2007. Overcoming the Barriers to Higher Education. Stoke-on-Trent: Trentham Books. 2. BMA. Equality and Diversification in UK Medical Schools. London: BMA; 2009. 3. Peers IS, Johnston M. Br J Educ Psychol 1994;64:1-18.

Table 1. Overview of the types of contextual data that may be used in UK University Admissions (based on Moore, Mountford-Zimdars et al., 2013 with further detail drawn from Bolliver et al., 2015).

Area/Community/Neighbourhood Focused

This data is based on home postcode and identifies applicants who live in an economically-deprived, low participation in higher education and/or rural area at the time of application.

School or College Focused

This refers to the context of school. There are typically two markers of school-level measure – type of school and performance of school (Bolliver et al). The first is whether the school is independent (typically fee-paying), stage/comprehensive or state selective (e.g., grammar). The second set of school-level contextual variables are aggregated school performance indicators, such as the average GPA (grade point average) of pupils in that school, or the percentage of pupils who go onto higher education.   These markers enable consideration of individual applicants in the light of the circumstances in which their attainment is achieved.

Individual Focused

This refers to factors particular to the individual, such as family history of higher education (e.g., being the first in family to go to university or medical school), being from a low income household, professional group of the applicant's parent(s) (a measure of socio-economic class), or identified as having special status such as being in care, a traveller or refugee/asylum seeker. This information is usually self-declared.

Outreach Focused

This refers to identification of attendance on a targeted widening participation activity, usually provided by the university of application for specific subject areas (e.g., "Access to Medicine" or "to the professions" summer schools or outreach activities). Participation in such courses is usually based on consideration of the above indicators, i.e. an individual has to be from a low socio-economic area, a poorly performing school and/or have individual indicators to obtain a place on a widening participation activity.

UCAS* "basket" of contextual data

UCAS "basket"

- In June 2016, this basket included:

- **Educational background** - school name [reported by the applicant], school performance average but not progression into HE

- **Socio-economic background** - percentage of pupils at the applicant's school who are entitled to free school meals or bursaries; living in a low progression to HE area; and, for Scotland only, deprivation linked to postcode

- **Self-declared data** are also available

  - At the time of application (via the UCAS form) - disability, first in family into HE, time in care, involvement in WA activities

  - After acceptance of an offer (available if the institution is registered with UCAS as above) – ethnic origin, parental occupational background (used to derive socio-economic class), national identity

Neighbourhood

- Low progression to higher education neighbourhood – postcode/POLAR

- Deprivation – only **S**IMD

Evidence for effectiveness

▶ Neighbourhood

  ▶ Conflicting evidence

    ▶ Coming from a disadvantaged neighbourhood did not disadvantage university performance across all degree courses (Hoare & Johnston 2011; Croxford et al. 2013)

    ▶ HEFCE (2014) – England-wide - a lower percentage of people from low participation neighbourhoods achieved a first or a upper-second class degree

  ▶ Inconsistency of neighbourhood markers held by UCAS

  ▶ An "ecological fallacy" (Bolliver et al, 2015) that everyone from the same area has the same characteristics

Individual level

- Self-declared through UCAS
  - Disability
  - Parental occupation
  - First in family
  - Been in care

- Evidence of WA participation encouraged in personal statements

Evidence for effectiveness

▶ Individual 1

Parental occupation

Conflicting evidence –

Smith et al. (2015) little relationship between students' degree outcomes (likelihood of achieving a first or upper second class degree) and parental occupation

Hoare & Johnston (2011) "blue collar" students performed less well than "white collar" students, but excluded med, dent and vet students from their analysis and did not control for variables such as prior attainment and school type.

Up to 50% missing data about this

How is occupation classified?

Is it always the father/mother, or is it the highest SES occupation?

▶

Evidence for effectiveness

‣ Individual 2

Where self-declared, difficult to verify

Where verification is possible, resource intensive for Schools

Some useful data may not be transferred effectively ie attending any WA scheme

Messy e.g., FSMs eligibility or receipt?

School

- School progression to HE rate (not Scotland)
- School performance average
- % eligible for Free school meals (Eng, Wales, NI) or % registered (Scot)/ Education Maintenance Allowance (Eng)

Evidence for effectiveness

▸ From studies not including medicine or dentistry *

- ▸ Those from state schools outperform those from independent schools
- ▸ Those who do better than their school average, do better at university than similar students whose grades are lower than average for their school

HEFCE, 2003, 2014; Hoare & Johnston, 2011; McNabb et al., 2002; Ogg, Zimbars, & Heath, 2009; Smith & Naylor, 2001; Naylor and Smith, 2005; Smith, 2015; Smith and White, 2014.

▸

* because medicine/dentistry have "unclassified" degree outcomes

Evidence for effectiveness

▸ What about medicine???

   ▸ Contradictory findings, possibly due to study design and outcome measures used e.g.,

      ▸ UKCAT12 - after adjusting for students' individual educational attainment, students educated at selective (independent) schools performed less well on *Year One* medical school assessments than those educated in non-selective (state-funded) schools.

      ▸ Thiele et al. – single-site study - found that most of the attainment differences observed between students from different types of school either decreased or disappeared by *year four* of a five-year programme.

McManus et al. BMC Medicine 2013;11:244.
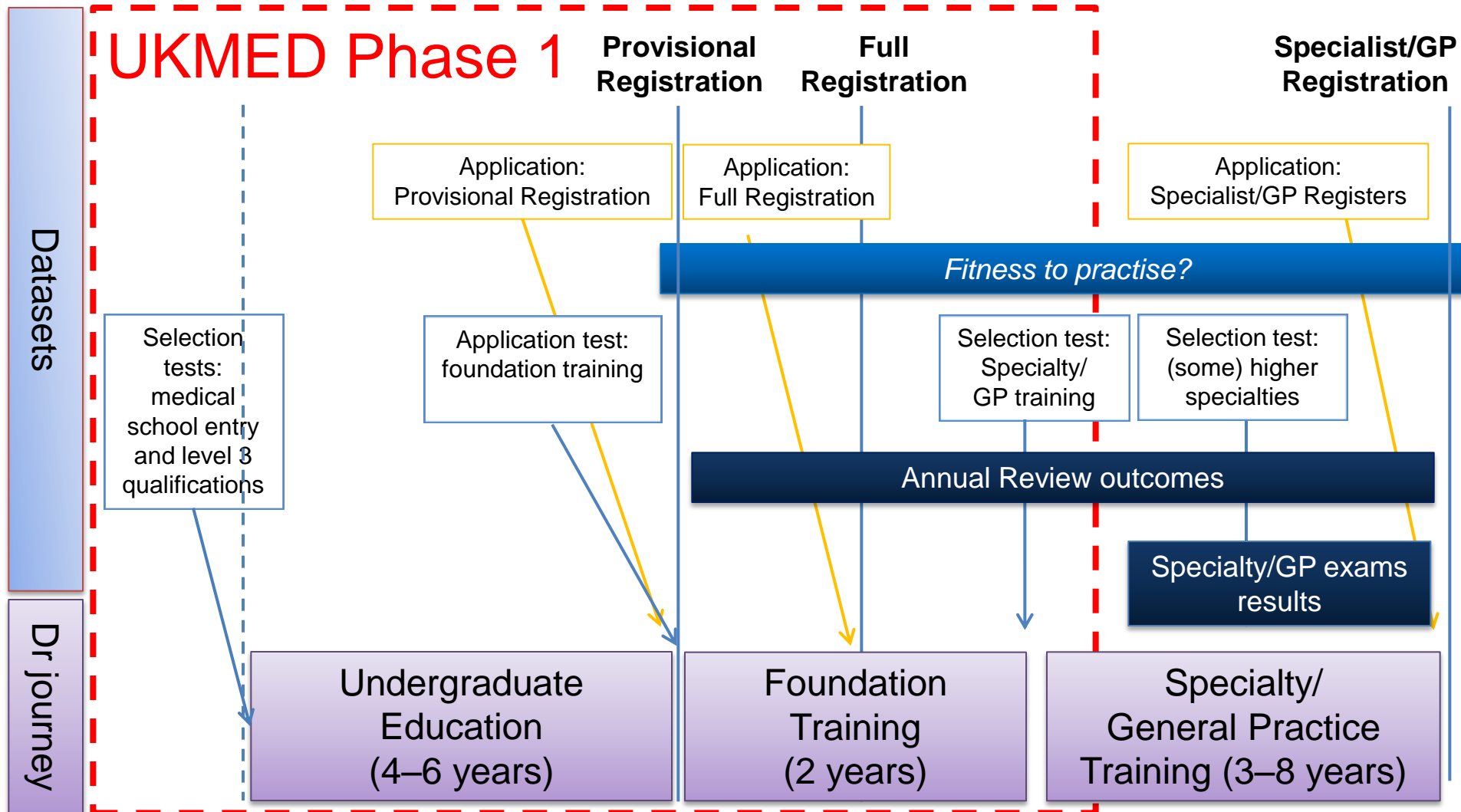Thiele et al. Studies in Higher Education 2016;41:1424-46.

UK Medical Education Database (UKMED)
Raising standards through research

General Medical Council

Development

The role of school type in predicting academic performance at medical school: a national, multi-cohort study

▸ Kumwenda et al. - in submission

▸ Graduates from 33 UK medical programmes between 2012 and 2013

▸ Compared:

  ▸ Demographics (gender, ethnicity, age)

  ▸ SEC indicators – school type, area, parental education, income indicators (e.g., free school meals)

  ▸ pre-entry grades (UCAS tariff scores)

  ▸ pre-admission test scores (UKCAT and GAMSAT)

▸ With the UK Foundation Programme (UKFPO)'s Educational Performance Measure (EPM) decile

▸

Findings

▸ Students from independent (selective) schools had significantly higher mean UKCAT or GAMSAT scores than students from state funded (non-selective) schools

▸ Non-significant differences were observed in UCAS Tariff points

▸ However, students from state funded schools were almost twice as likely to finish in the highest rank of the EPM ranking than those who attended independent schools

▸ Female gender, white ethnicity and being 21 or over on entry to med school were independently related to high performance but other socio-economic indicators were not

What's missing?

- What about "relative performance"?

  - Students who attain higher than the average of their school tend to do better at university than similar students whose grades are lower than average for their school
    - Hoare and Johnston (2011) – not medicine – if students from lower performing schools are accepted on the basis of one or two A Level grades less than applicants from higher performing schools, they will typically be as successful as their peers

- But contradictory findings in medicine (x2 single-site studies)
  - Stringer et al. (2016) - those admitted to medicine from poorly-performing schools achieve better than those from better-performing schools with the same grades on entry
  - Thiele et al. (2016) – no strong association between school performance and 4th year outcomes

Hoare, A. & Johnston, R., 2011. Studies in Higher Education, 36(1), pp.21–41. Stringer, N.S. et al. Advances in Health Sciences Education. Thiele, T. et al., 2016. BMJ Open, 6(3), p.e010169.

Conclusion

- A lot of the CA markers are "iffy" and/or non-verifiable

- There are no studies which robustly examine the use of CA in medical admissions, and/or how those who are admitted via CA perform

- There is no evidence supporting the use of "combined measures" but this is popular in practice

- At this point in time, school type (independent vs state) is the most evidence-based potential CA marker

- "Relative performance" needs to be scrutinised further

Questions?