# Title: Candidates' views on the UK Clinical Aptitude Test: Results from the Post 2012 UKCAT Survey.


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## ABSTRACT

### *Background*

Aptitude test are used internationally with the aims of complementing existing selection tools, improving the fairness of selection and widening access to the study of medicine. The UK Clinical Aptitude Test (UKCAT) is employed by the majority of UK medical and dental schools. Recent studies have raised concern about the lack of transparency about test usage in the selection process and the impact this may have on widening access. Along with examining candidates' views about the test, this study examines the question whether candidates' understanding of how universities use the UKCAT in the selection process influences application decisions, and, what impact this may have on widening access, given UKCAT score achieved and candidate background.

### *Methods*

A self-completed on-line survey of the 2012 UKCAT candidate cohort.

### *Results*

The response rate was 24% (n=5,999). The majority of respondents wanted more easily accessible and transparent information on how universities use the UKCAT in selection. Ethnic minority respondents were more likely than their counterparts to report that their UKCAT score had influenced the decision whether to apply or not, their university choices, and that they knew someone who did not apply because they considered their score was not good enough. This study found that half of respondents did not perceive the UKCAT to be fair and remained unconvinced that it measures the attributes required to be a good medical/dental student or doctor/dentist. Test performance was significantly associated with opinions about the test's face validity.

*Conclusion*

Greater transparency by universities about how they use the UKCAT in their selection process could strengthen perceptions about the face validity of the UKCAT and enable applicants to make better informed application decisions. However, this conclusion must be interpreted in the context that respondents' views appear to be strongly influenced by performance in the test.

*Key Words*

UKCAT, selection, admissions, survey, support, widening access.

## BACKGROUND

Internationally, standardised aptitude tests are a mainstay of medical and dental school selection processes. [1, 2] Here in the UK, since its introduction in 2006, the UK Clinical Aptitude Test (UKCAT) has become part of the selection process of the majority of medical and dental schools. A central objective of the test is to broaden the criteria for selection beyond academic attainment by assessing cognitive ability independent of academic knowledge and thereby widen participation.[3] The UKCAT is a multidimensional test which examines innate skills by assessment of cognitive ability in four domains: Verbal Reasoning, Quantitative Reasoning, Abstract Reasoning and Decision Analysis. A Situational Judgement Test (SJT) sub-section was included as a pilot study in 2012. Used alongside more traditional methods of selection to select candidates for interview or to make offers, its mode of usage in the selection process is determined locally by each medical and dental school.[4]

Like other aptitude tests worldwide, such as the Undergraduate Medicine and Health Sciences Admission Test (UMAT),[5] the Medical Colleges Aptitude Test (MCAT) [6] and the Graduate Australian Medical School Admissions Test (GAMSAT),[7] studies of the UKCAT to date have mainly focused on its predictive validity.[8] Little is known about the acceptability of the UKCAT among candidates, including their opinions about its fairness and validity as an assessment of the aptitude to study medicine and

dentistry. [9,10,11] This is also true of candidates' views on the quality of information made available by universities about how they use the test in their selection process and the relationship between students' test performance and their application decisions.

We acknowledge that candidate opinions about face validity and perceived predictive validity are not psychometric properties of an assessment, but individual judgements about whether the selection tool content is 'relevant to the target role', [12] and 'how well the procedure predicts future job performance'. [13] However, research into selection procedures has shown candidate perceptions of face validity and predictive validity to be associated with applicant views on selection methods, [14] and that these views 'influence a number of important outcomes'.[15] The research suggests that applicants with negative reactions to a selection method may be more likely; to view the organisation as less attractive, to decline an offer, to dissuade others from applying, or even to bring litigation.[14] Evidence also indicates that test taker reactions are associated with applicant withdrawal and retesting or reapplication intentions. [14,16] For these reasons it is important to understand how candidates perceive and react to the UKCAT.

Recent single centre studies have identified candidate concerns about the lack of transparency about how the test is used by medical and dental schools in the selection process. [9,10,11] The aim of this study was to assess the generalizability of these findings and validate candidate perceptions against their UKCAT scores. Additionally, to examine if socio-demographic factors have any influence on views about the UKCAT. A survey of candidates who took the UKCAT in 2012 was conducted and findings from a discrete section of the survey, which examined candidate opinions on the UKCAT, are reported in this paper.

## METHODS

### *The Questionnaire*

Development of the questionnaire was informed by previous UKCAT candidate surveys. [10,11] To ameliorate the impact of response bias, we avoided ambiguous terms and used simple language. [17] The questionnaire was pre-tested on a small

number of first year medical students to ensure that respondents would understand the questions and the terms used. The mode of delivery was a confidential self-completed on-line questionnaire (see Appendix A).

### *Sample and study protocol*

All candidates who sat the UKCAT in June to October 2012 (25,431) were sent an email in November 2012 inviting them to participate in the survey. In the initial contact email candidates were informed that this was an independent and anonymous survey being conducted by Plymouth University Schools of Medicine and Dentistry, University of Dundee College of Medicine, Dentistry and Nursing, and University of Dundee Health Informatics Centre. Moreover, that their participation would be much valued as the results of the study would be used to advise the UKCAT Consortium on how to improve current advice on preparation for the test. They were assured that research and analysis would only take place on fully anonymised data in compliance with the data protection requirements outlined in the UKCAT Data Privacy Statement. The following link to the statement was embedded in the email (available at http://www.ukcat.ac.uk/registration/candidate/candidate-data/). They were informed that their UKCAT test results, registration information and Universities and Colleges Admission Service (UCAS) application data, all fully anonymised, would be matched to their questionnaire response by the Health Informatics Centre, using a unique identifying number, before being released for analysis. Candidates were further reassured that participation was entirely voluntary and would not influence their application to study medicine or dentistry in any way. Importantly, they were informed they could withdraw consent at any time and or, obtain the results of the study upon request. Furthermore, it was stated that the return of the completed questionnaire would give informed consent to participate and affirm their understanding of the purpose of the study, how confidentially and anonymity was guaranteed, how the results would be used, and that they were clear that consent could be withdrawn at any time. A single non-response follow-up email was sent two weeks later and after another two weeks the survey was closed.

### *Data sources*

UKCAT scores and a range of background measures on all who sat the 2012 UKCAT, which included information provided by the Universities and Colleges Admission Service (UCAS) and candidate registration information collected by UKCAT on gender, age, ethnicity, National Statistics Socio-economic Classification (NS-SEC) and Nationality. Type of school attended was asked in the survey questionnaire (options, Comprehensive, state Grammar, Independent/Private, Sixth Form College/Further Education College, University, Other).

### *Statistical Analyses*

Descriptive and logistic regression analyses were conducted using the software Stata12 (Stata Corp. Statistical Software Release 12.0, College Station, TX, USA).

5 point Likert-type items asked respondents how strongly they would agree/disagree with statements about the UKCAT (response options coded; 1= strongly agree, 2= agree, 3= neither agree/disagree, 4=disagree, 5=strongly disagree). Likert-type items included as outcomes in multinomial logistic regression models were recoded and conflated as 1 = Strongly Agree /Agree, 2 = Neither Agree/ Disagree, and 3 = Disagree / Strongly Disagree. Multinomial logistic regression (MLR) was chosen as the 'Neither Agree/Disagree' option invalidates models for ordinal outcomes. Model fit was determined by a Likelihood Ratio chi–square test. Firstly, univariate MLR was conducted to describe the association between response outcome and performance in the test as measured by Total UKCAT score. Secondly, the background variables gender, age-group, ethnicity, National Statistics Socio-economic Classification (NS-SEC), nationality, type of school attended (see Table 1) were included as predictors in the models along with Total UKCAT score.

The final survey question asked respondents if they wished to add any other comments about their experience of the test, or any changes they think could be made to improve the information currently provided to candidates. An inductive approach was used to identify explicit themes within what respondents wrote. The aim was to obtain a sense of the most salient issues elicited by the open-ended question. [18]

## Ethical approval

Ethical approval for this study was granted by the Peninsula College of Medicine and Dentistry Research Ethics Committee on 4 October 2012.

## RESULTS

### *Response rate and representativeness*

The response rate was 24%, with 5,999 of the 25,431 UKCAT candidates who sat the 2012 UKCAT completing all the items analysed and reported in this paper. The type of educational institution attended by non-respondents was unknown and thus it was only possible to assess the representativeness of the sample in terms of gender, age (less than 19 years versus older) ethnicity and socio-economic class (Table 1). Chi-squared tests of homogeneity rejected the null hypothesis ($p<.05$) that the sample of respondents and the non-respondent population which sat the test had the same proportion of observations in respect of the gender, age, ethnicity and social class (Table 1, column 1).

Additionally, an independent two samples t-test revealed that there was a statistically significant difference in mean score between those who responded to the survey and non-respondents ($t (25429) = -31.41$, $p < .001$). [19] Respondents had a mean score of 2613 (sd = 263 minimum = 2606 maximum = 2620) compared with a non-respondent mean of 2485 (sd = 279 minimum = 2481 maximum = 2489).

### *UKCAT validity*

Almost a third of respondents either strongly agreed (8%) or agreed (23%) that 'The UKCAT is a fair way to discriminate between large numbers of very able candidates to study medicine or dentistry' (Table 2, Q13_2). Almost half of respondents disagreed (28%) or strongly disagreed (20%) and 21% neither agreed nor disagreed. Total UKCAT score was a statistically significant predictor ($LRchi2(2) = 653.2$, $p<0.001$) of the outcome (1 = Strongly Agree/ Agree, 2 = Neither Agree/Disagree and 3= Disagree/ Strongly Disagree). As Total UKCAT score increased so the probability of agreement with the statement increased and conversely, as Total UKCAT score decreased so the probability of disagreement increased (Figure 1, Graph 1).

When adjusted by the inclusion of the background variables in the model, Total UKCAT score remained statistically significant (LRchi2(12) = 582.3, p<0.001), however, the background variables were non-significant.

A quarter of all respondents either strongly agreed (3%) or agreed (22%) that 'The UKCAT tests the attributes required to become a good medical or dental student' (Table 2, Q13_3). Half of respondents either disagreed (30%) or strongly disagreed (20%) with the statement and 25% neither agreed nor disagreed. Total UKCAT score was a significant predictor (LRchi2(2) = 314.9, p<0.001) and as Total UKCAT score increased so the probability of agreement with the statement increased and conversely, as Total UKCAT score decreased so the probability of disagreement increased (Figure 1, Graph 2). When adjusted by the inclusion of the background variables in the model, Total UKCAT score remained statistically significant (LRchi2(12) = 320.2, p<0.001), however, the background variables were non-significant.

Around one in five of all respondents either strongly agreed (3%) or agreed (18%) that 'The UKCAT tests the attributes required to become a good doctor or dentist' (Table 2, Q13_4). Just over half of respondents either disagreed (32%) or strongly disagreed (22%) with the statement and 25% neither agreed nor disagreed. Total UKCAT score was a significant independent predictor (LRchi2(2) = 227.8, p<0.001) and as Total UKCAT score increased so the probability of agreement with the statement increased and conversely, as Total UKCAT score decreased so the probability of disagreement increased (Figure 1, Graph 3). When adjusted by the inclusion of the background variables in the model, Total UKCAT score remained statistically significant (LRchi2(12) = 235.4, p<0.001), however, the background variables were non-significant.

The internal consistency of the responses to the preceding three questions was high (Cronbach's alpha reliability coefficient = 0.87). The above results indicated that test performance was associated with positive views about the fairness and face validity of the UKCAT. In respect of all three items, gender, ethnic group, age, NS-SEC, National Identity and School Type were not statistically significant predictors of the outcome. Nevertheless, in response to each of the above statements around a half of respondents disagreed or strongly disagreed.

### *Test facility*

Respondents were asked their opinions about the difficulty of the UKCAT. The majority either strongly agreed (40%) or agreed (38%) with the statement 'The questions are not too hard, it's the timing that makes the test difficult' (Table 2, Q13_5). 8% disagreed, 1% strongly disagreed, and 13% neither agreed nor disagreed. Total UKCAT score was a significant predictor (LRchi2(2) = 653.2, p<0.001). However, respondents across all levels of UKCAT performance were as highly likely to Strongly Agree/ Agree (Figure 2, Graph 1) with the statement. The result indicated that respondents endorse the view that the UKCAT questions are not too hard but the time constraint makes the test difficult. Gender, ethnic group, age-group, NS-SEC, National Identity and School Type were non-significant when included in the model, however, Total UKCAT score remained statistically significant (LRchi2(12) = 42.3, p<0.001).

### *Access to information about the UKCAT*

Seven out of ten respondents either strongly agreed (23%) or agreed (47%) with the statement 'I understand how my test result is used by all my chosen universities' (Table 2, Q15_3). Less than one in five either disagreed (14%) or strongly disagreed (4%) and 12% neither agreed nor disagreed. Total UKCAT score was a significant predictor of the outcome (LRchi2(2) = 109.9, p<0.001). . As scores increased so the probability of Strongly Agree/ Agree increased and conversely, as scores decreased so the probability of Disagree/ Strongly Disagree increased (Figure 2, Graph 2). Although the results indicated that the majority of respondents understand how their chosen universities used the UKCAT in selection, usage remained unclear for around a fifth of respondents. When adjusted by the inclusion of the background variables in the model, Total UKCAT score remained statistically significant (LRchi2(12) = 103.9, p<0.001), however, the background variables were non-significant.

Four out of ten either strongly agreed (9%) or agreed (31%) that 'It was easy to find information regarding how my universities used the test' (Table 2, Q15_4). Equally four out of ten either disagreed (31%) or strongly disagreed (9%) and 20% were undecided. Total UKCAT score was a significant predictor of the outcome (LRchi2(2) = 50.7, p<0.001). . As scores increased so the probability of Strongly Agree/ Agree

increased and conversely, as scores decreased so the probability of Disagree/ Strongly Disagree increased (Figure 2, Graph 3). When adjusted by the inclusion of the background variables in the model, Total UKCAT score remained statistically significant (LRchi2(12) = 46.2, p<0.001), however, the background variables were non-significant.

Almost nine in ten respondents either strongly agreed (52%) or agreed (35%) that 'Universities should tell candidates more about how they use the test in their selection' (Table 2, Q15_5). One in ten was undecided, 3% disagreed and no respondents strongly disagreed with the statement. Total UKCAT score was a significant predictor of the outcome (LRchi2(2) = 43.6, p<0.001). Respondents across all levels of UKCAT performance were as highly likely to Strongly Agree/ Agree (Figure 2, Graph 4) with the statement. When adjusted by the inclusion of the background variables in the model, Total UKCAT score remained statistically significant (LRchi2(12) = 48.4, p<0.001), however, the background variables were non-significant.

The results indicated that even though the majority of respondents understood how their test result was used by universities in the selection process, for around 20% it was unclear, for 40% this information was not easy to find, and that the majority would like universities to be more explicit about test usage.

### *Impact on application decisions*

Around a third of respondents either strongly agreed (13%) or agreed (21%) that 'My UKCAT result influenced my decision as to whether to apply to medicine and dentistry' (Table 2, Q15_1). Over half disagreed (30%) or strongly disagreed (22%) with the statement and 14% were undecided. Once again performance in the test was a significant independent predictor (LRchi2(2) = 96.4, p<0.001) of the outcome. As scores increased so the probability of Disagree/ Strongly Disagree increased and as scores decreased so the probability of Strongly Agree/Agree increased (Figure 2, Graph 5). When adjusted by the inclusion of the background variables in the model, Total UKCAT score and ethnic group were statistically significant (LRchi2(12) = 125.6, p<0.001), however, all other background variables were non-significant. The factor change in odds of a respondent answering Strongly Agree/ Agree relative to answering Disagree/Strongly Disagree were almost a third times greater (odds ratio

= 1.3, 95% Confidence Interval = 1.12 to 1.47, p<0.001) for BME respondents than for non-BME holding all other variables constant.

Almost seven out of ten respondents either strongly agreed (40%) or agreed (28%) that 'My UKCAT result influenced my choice of university'. Whilst 9% were undecided, and 15% and 8% respectively disagreed or strongly disagreed with the statement (Table 2, Q15_2). Total UKCAT score was a significant predictor of the outcome (LRchi2(2) = 19.3, p<0.001). However, respondents across all levels of UKCAT performance were as highly likely to Strongly Agree/ Agree (Figure 2, Graph 6) with the statement. When background variables were included in the model Total UKCAT score was no longer significant but ethnic group was a statistically significant predictor of the outcome (LRchi2(12) = 51.7, p<0.001). The factor change in odds of a ethnic minority respondent answering Strongly Agree/ Agree relative to answering Disagree/Strongly Disagree were two times greater (odds ratio = 2.04, 95% Confidence Interval = 1.73 to 2.40, p<0.001) than the odds for a non-BME respondent, holding all other variables constant.

Respondents were asked (Survey Question 14) 'Are you aware of anyone who decided not to apply for medicine or dentistry because they thought their UKCAT score was not good enough?' The response options were yes or no and 46% (2738/5999) reported affirmatively and 54% (3261/5999) negatively. Across all types of educational institutions attended a significant proportion of respondents reported that they were aware of someone who decided not to apply for medicine or dentistry because they thought their UKCAT score was not good enough (Figure 3). Total UKCAT score (chi2(1)= 81.73, p<0.001) and ethnicity (chi2(1)= 57.11, p<0.001) were statistically significant independent predictors of the binary outcome whether a respondent was aware or not of such a person. As UKCAT score increased the probability of knowing someone decreased (Figure 4). The odds of an ethnic minority (BME) respondent reporting affirmatively were one and a half times greater than the odds of a white respondent (Odds ratio = 1.6, 95% Confidence Interval = 1.42 to 1.84, p<0.001) holding Total UKCAT score constant. No other background variables were predictive of the outcome.

*UKCAT SJT validity*

In response to the statement, 'Overall the content of the Situational Judgement Test is relevant to those applying to medical/dental school', 25% strongly agreed and 46% agreed (Table 2, Q13_8). Whilst 8% disagreed, 6% strongly disagreed and 15% neither agreed nor disagreed. Gender was found to be a significant independent predictor of the outcome (LRchi2(2) = 66.41, p<0.001) and the odds of a male respondent answering Disagree/Strongly Disagree relative to answering Strongly Agree/ Agree were almost two times greater (odds ratio = 1.8, 95% Confidence Interval = 1.57 to 2.11, p<0.001 ) than those of a female. Ethnic group, age-group, NS-SEC, National Identity and School Type were non-significant.

In response to the statement, 'Overall the content of the Situational Judgement Test is fair to those applying to medical/dental school', 19% strongly agreed and 44% agreed, 11% disagreed, 6% strongly disagreed and 20% neither agreed nor disagreed (Table 2, Q13_9). Gender was found to be a significant independent predictor of the outcome (LRchi2(2) = 48.35, p<0.001) and the odds of a male respondent answering Disagree/Strongly Disagree relative to answering Strongly Agree/ Agree one and a half times greater (odds ratio = 1.5, 95% Confidence Interval = 1.32 to 1.74, p<0.001) than those of a female. Ethnic group, age-group, NS-SEC, National Identity and School Type were non-significant.

The internal consistency of the responses to the preceding two questions was high (Cronbach's alpha reliability coefficient = 0.9).We were unable to examine the association between performance in the SJT subsection and opinions about the fairness and construct validity SJT as scores were not available at the time.

In the final survey question respondents were asked if they wished to add any other comments about their experience of the test, or any changes they think could be made to improve the information currently provided by UKCAT to candidates. One in three respondents (n=2036) entered comments in the free-text box. The majority of these respondents (n =1476) made multiple points related to the face validity and fairness of the test, and a desire for more information about how universities use the test in their selection process.

We believe that the following verbatim extracts are representative and exemplify respondents' views:-

- ‘I believe that the UKCAT score does not show a person’s personality and ability to pursue a course in medicine’.
- ‘Honestly, the test is interesting, but I don’t see much relevance to a medical degree. I do not think it a reliable way to distinguish between candidates.’
- ‘Greater transparency of how medical schools use the UKCAT from all UKCAT universities. With only 4 choices it is crucial that official cut offs are known, rather than those rumoured on websites such as the student room.’
- ‘I am extremely pleased with the result I achieved and I believe it was helped by familiarising myself with the timing which would be my advice to everyone taking the test in the future. My university choices were influenced by my UKCAT score as I chose the universities which put a heavy weighting on the UKCAT. However, I do think the information on how the different universities used the UKCAT was hard to decipher and some universities could make it clearer to prospective applicants.’
- ‘A single list of all the universities and how they use the UKCAT should be made available so it is easy to find the information.’

## Discussion

Selection research indicates that opinions about selection tests may depend on test performance and selection outcomes, with those who perform better and those who are selected more likely to have positive views about both fairness and face validity. [20, 21] The findings of this study concur with this view. Respondents’ views about the fairness and face validity of the UKCAT were significantly associated with performance in the test. Although respondents did not know if their application to study medicine or dentistry had been successful, they were aware of their UKCAT score. The findings indicate that poorer performance in the test may jaundice candidate views about the fairness and face validity of the UKCAT.

Nevertheless, the equitability and face validity of the UKCAT, in terms of its ability to discriminate between large numbers of very able candidates and its ability to measure the attributes of a good student or doctor and dentist, were viewed negatively by around half of respondents. These findings align with those of a recent study which

sampled the views of first year medical students whose performance in the UKCAT and selection outcome had clearly been positive. The study identified concerns about the lack of face validity and fairness of the test and found that only 20% of respondents felt that the UKCAT was a useful addition to the selection procedure. [9]

The majority of respondents considered that they understood how their UKCAT result would be used by their chosen universities. Somewhat contradictory to this was the finding that the vast majority of respondents endorsed the view that universities should tell candidates more about how they use the test in their selection process. The explanation for this contradiction is likely that many respondents found it difficult to access information on how universities use the result of the UKCAT. Indeed, only four in ten respondents considered that it was easy to do so. This finding concurs with that of a study of teachers in UK schools and colleges that it is 'challenging to keep up to date with medical admissions practices and requirements as there is currently no one source of accurate information'. [22] A further factor complicating application decisions is that the use of the UKCAT is not standardised, or centrally controlled or reported. Universities employ the UKCAT in an evolving variety of ways; weighted factor, borderline, rescue and threshold methods, and many employ more than one method at different stages of the selection process. [4]

It has long been recognised that institutions should be transparent about the use of admissions tests as part of their admissions process. [23, 24, 25, 26] In response, in 2015, the UK Medical Schools Council published an applicant guide to the entry requirements of UK medical schools which included information on how each institution uses aptitudes tests in their selection process. [27] However, out of the 24 UK medical schools in the guide offering standard entry courses, only eight provided information on the weighting accorded to UKCAT in their selection process and only four, without being specific, stated that a minimum total UKCAT score is required. What constitutes a minimally acceptable score remains elusive and applicants are directed to individual medical school websites which are not explicit about how the UKCAT is used in combination with other selection tools. The desire for

Given the variety of usages of the UKCAT in the selection process and dearth of accessible and detailed information on its usage, it was unsurprising that most respondents felt the UKCAT result played a major part in deciding to which

universities they would apply. For example, applicants with a UKCAT score of 2500 or less applying for entry in 2013 to one of the many medical schools which used the UKCAT as a threshold for invitation to interview would compete with a potential applicant pool comprised 13,831 of the 25,431 candidates who sat the 2012 UKCAT and who scored between 2510 and 3460 points.

However, of concern is the finding that for around a third of respondents their UKCAT result appeared to have influenced decisions whether or not to apply. This was particularly true for ethnic minority respondents as was the influence of UKCAT score on their choice of university. It would appear that the availability of UKCAT score in advance is an important factor in the application decision making process of all students and particularly so for subgroups which are also characterised by weaker academic attainment. [28, 29]

Further research is warranted to determine whether a lack of understanding about the use of the UKCAT in the selection process is adversely affecting application decisions and thereby undermining the commitment of the medical and dental professions to widening access. [30, 31]

Candidates' views may also be adversely affected by their perception of test difficulty. [32] This may be the case in respect of the UKCAT. Although the majority of respondents endorse the view that the UKCAT questions are not too hard they consider that the time constraint makes the test difficult. The timing of the UKCAT and the ease of access to transparent information on test usage are worthy of further scrutiny.

In stark contrast with opinion about the UKCAT cognitive scales, the vast majority of respondents endorsed the views that the content of the SJT subtest was both relevant and fair to those applying to study medicine or dentistry. This finding is consistent with research evidence that SJTs are positively viewed by candidates. [33] However, we found that female respondents were more likely to endorse the fairness and relevance of the SJT than male respondents, which may be explained by the fact that female candidates tend to perform better in SJTs than male candidates. [34]

It is generally accepted that selection for the health professions 'should follow the same quality assurance processes as in-course assessments'. [1]

Indeed, all assessments, particularly high stakes ones, require validity evidence to support the reasonableness of the interpretation of scores.[35] In this case, the use of UKCAT scores in selecting among equally academically qualified applicants who vastly outnumber places available. Candidate perceptions of face validity and predictive validity are not psychometric properties and thus do not constitute legitimate evidence to assess the overall construct validity of a test. [29] By contrast, content validity, evidence that subject matter experts judge the content to be directly relevant to the target role, is an integral component of the overall construct validity of a test. [29] In this respect the online advice to candidates provided by the UKCAT explaining why aptitude in Verbal Reasoning, Quantitative Reasoning, Abstract Reasoning and Decision Analysis are important appears to fail to convince candidates. Performance as a doctor or dentist 'is a somewhat distal criterion' and encompasses a multiplicity of skills and aptitudes. [36] It follows that the more dimensions and measures a construct has, the more difficult it is to ensure content validity and the more difficult it is to convince candidates of the relevance of the content or, face validity of a test.[37] Above all selection processes 'must be transparent and trusted by all stakeholders'. [38] In respect of candidates this remains a challenge for the UKCAT.

Thus, despite increasing evidence of predictive validity in respect of medical and dental student course performance, incremental validity over and above measures of academic ability and efficacy to widen participation, a considerable proportion of candidates appear to remain unconvinced of the UKCAT's fairness and face validity. [39, 40, 29, 41]

## Limitations

The representativeness of a survey refers to how well the sample drawn compares with the population of interest, and this has implications for the reliability and validity of survey findings. [42] We recognise that the use of a non-probability sampling plan (self-selected sample) prevented evaluation of the reliability of the resulting estimates and the limitation this may impose on how much confidence can be placed in the interpretation of this survey's findings. The response rate to this survey was low and respondents were aware of their UKCAT score so this survey is vulnerable

to selection as well as other biases inherent in surveys. Nevertheless, a key strength of this study was the sample size which enabled plausible subgroup analyses. The UKCAT is but one test of many, and these findings relate exclusively to the UK context, so it is impossible to know how transferrable they may be to other countries or tests.

## Conclusion

The study indicates that respondents desire better access to more explicit information about how universities use the UKCAT in the selection process. Providing this would enable those aspiring to study medicine and dentistry to make better informed application decisions, may enhance widening access and improve candidates' perceptions of the test's validity. The findings of this study show that almost half of respondents did not perceive the UKCAT to be a fair way to discriminate between large numbers of very able candidates to study medicine or dentistry, and are unconvinced that it measures the attributes required to be a good medical/dental student or doctor/dentist. However, this conclusion must be interpreted in the context that respondents' views appear to be strongly influenced by performance in the test.

# Tables

**Table 1: The analytical sample of respondents (n=5999), non-respondents and the population of candidates which sat the 2012 UKCAT. Results of chi –square tests of homogeneity respondents versus population which sat the 2012 UKCAT.**

| | Respondents (n=5999) | | | Non-respondents (n=19432) | | All (n=25431) | |
|---|---|---|---|---|---|---|---|
| | | % | n | % | n | % | n |
| Gender<br><br>(chi2(1) = 62.94, p<.05). | Male | 40.00 | 2388 | 46.0 | 8954 | 44.59 | 11342 |
| | Female | 60.0 | 3611 | 54.0 | 10474 | 55.39 | 14085 |
| | missing | 0.00 | 0 | 0.02 | 4 | 0.02 | 4 |
| | Total | 100.00 | 5999 | 100.00 | 19432 | 100.00 | 25431 |
| Age-group<br><br>(chi2(1) = 166.24, p<.05). | <19yrs | 74.95 | 4496 | 65.87 | 12799 | 68.01 | 17295 |
| | >=19yrs | 24.90 | 1494 | 33.89 | 6585 | 31.77 | 8079 |
| | missing | 0.15 | 9 | 0.25 | 48 | 0.22 | 57 |
| | Total | 100.00 | 5999 | 100.00 | 19432 | 100.00 | 25431 |
| Ethnicity<br><br>(chi2(1) = 172.48, p<.05).<br><br>*Black Minority Ethnicity (BME) | White | 49.52 | 2,971 | 42.35 | 8,230 | 44.04 | 11201 |
| | *Asian | 17.55 | 1,053 | 24.31 | 4,723 | 22.71 | 5776 |
| | *Black | 4.33 | 260 | 5.48 | 1,065 | 5.21 | 1325 |
| | *Mixed | 2.48 | 149 | 2.48 | 482 | 2.48 | 631 |
| | *Chinese | 2.10 | 126 | 1.35 | 262 | 1.53 | 388 |
| | *Other | 1.28 | 77 | 1.60 | 310 | 1.52 | 387 |
| | missing | 22.72 | 1,363 | 22.44 | 4,360 | 22.50 | 5723 |
| | Total | 100.00 | 5999 | 100.00 | 19432 | 100.00 | 25431 |
| NS-SEC Class<br><br>(chi2(4) = 18.1859, p<.05) | 1 | 74.78 | 4,486 | 71.86 | 13,964 | 72.55 | 18450 |
| | 2 | 4.72 | 283 | 3.87 | 752 | 4.07 | 1035 |
| | 3 | 5.62 | 337 | 6.66 | 1,295 | 6.42 | 1632 |
| | 4 | 2.12 | 127 | 1.97 | 382 | 2.00 | 509 |
| | 5 | 2.97 | 178 | 2.82 | 548 | 2.85 | 726 |
| | missing | 9.80 | 588 | 12.82 | 2,491 | 12.11 | 3079 |
| | Total | 100.00 | 5999 | 100.00 | 19432 | 100.0 | 25431 |
| School type | Comprehensive | 14.70 | 882 | Non-Selective school (Comprehensive, SFC/FEC) n = 2557 and Selective school (Grammar, Independent/Private) n = 1995.<br><br>SFC = Sixth Form College, FEC = Further Education College. | | | |
| | Grammar | 16.04 | 962 | | | | |
| | Ind/Private | 17.22 | 1,033 | | | | |
| | SFC/FEC | 27.92 | 1,675 | | | | |
| | University | 19.67 | 1,180 | NS-SEC Class 1 = Higher managerial, administrative and professional occupations, 2 = Int ermediate occupations, 3 = Small employers and own account workers, 4 = Lower supand technical occupations, 5 = Semi-routine and routine occupations. | | | |
| | Other | 2.57 | 154 | | | | |
| | missing | 1.88 | 113 | | | | |
| | Total | 100.00 | 5999 | | | | |

**Table 2: Percentage of respondents who Strongly Agree, Agree, Neither Agree / Disagree, Disagree, Strongly Disagree with statements about the UKCAT (N=5999).**

| Statement | Strongly Agree | Agree | Neither | Disagree | Strongly Disagree |
|---|---|---|---|---|---|
| Q13_2<br>The UKCAT is a fair way to discriminate between large numbers of very able candidates. | 8% | 23% | 21% | 28% | 20% |
| Q13_3<br>The UKCAT tests the attributes required to become a good medical or dental student. | 3% | 22% | 25% | 30% | 20% |
| Q13_4<br>The UKCAT tests the attributes required to become a good doctor or dentist. | 3% | 18% | 25% | 32% | 22% |
| Q13_5<br>The UKCAT questions are not too hard, it's the timing that makes the test difficult. | 40% | 38% | 13% | 8% | |
| Q15_1<br>My UKCAT influenced my decision as to whether to apply to medicine or dentistry. | 13% | 21% | 14% | 30% | 22% |
| Q15_2<br>My UKCAT result influenced my choice of university. | 40% | 28% | 9% | 15% | 8% |
| Q15_3<br>I understand how my test result is used by all my chosen universities. | 23% | 47% | 12% | 14% | 4% |
| Q15_4<br>It was easy to find information regarding how my universities used the test. | 9% | 31% | 20% | 31% | 9% |
| Q15_5<br>Universities should tell candidates more about how they use the test in their selection | 52% | 35% | 10% | 3% | |
| Q13_8<br>Overall the content of the Situational Judgement Test is relevant to those applying to medical/dental school. | 25% | 46% | 15% | 8% | 6% |
| Q13_9<br>Overall the content of the Situational Judgement Test items are fair to those applying to medical/dental school. | 19% | 44% | 20% | 11% | 6% |

## Figures

**Figure 1: Line plots of the predicted probabilities of a respondent answering Strongly agree / Agree, Neither Agree/Disagree and Disagree / Strongly disagree, to the statements (1) 'The UKCAT is a fair way to discriminate between large numbers of very able candidates, (2) 'The UKCAT tests the attributes required to become a good medical or dental student, (3) that 'The UKCAT tests the attributes required to become a good doctor or dentist (n=5999).**

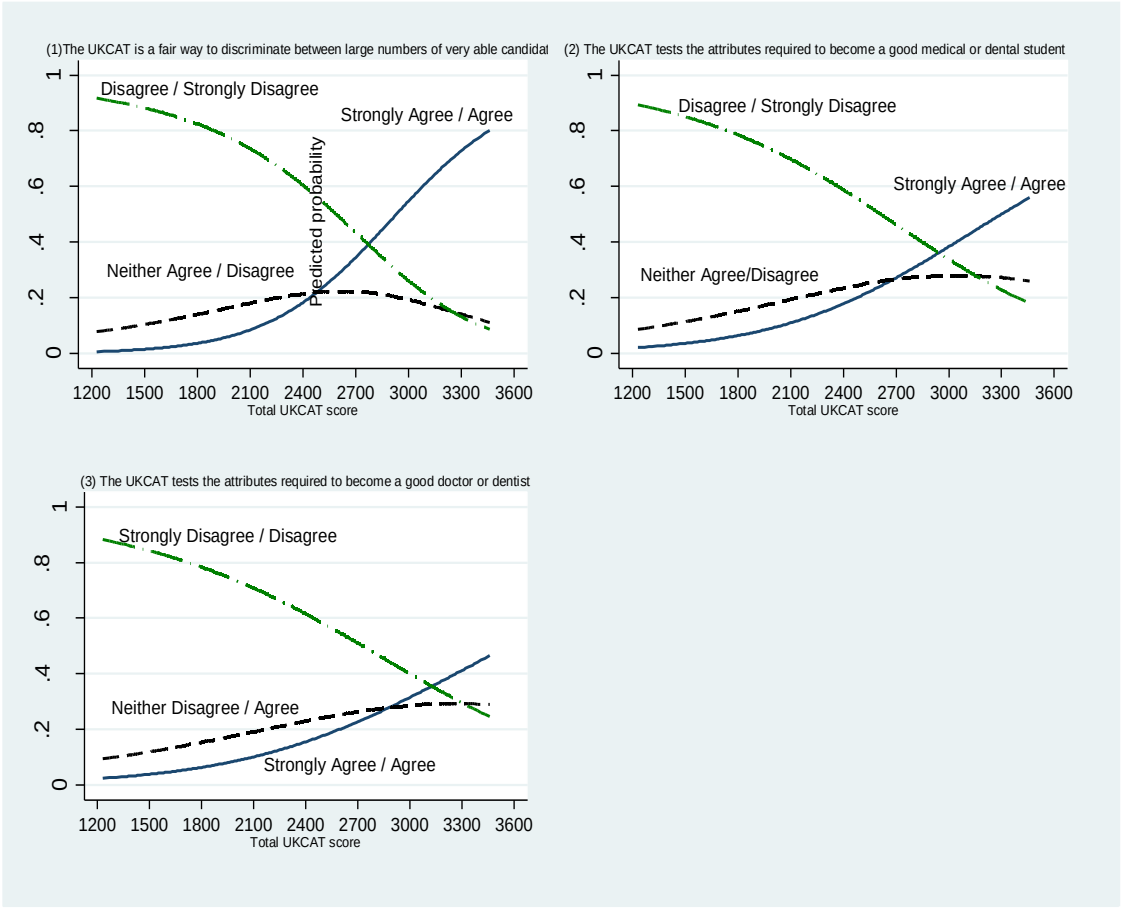


**Figure 2: Line plots of the predicted probabilities of a respondent answering Strongly agree / Agree, Neither Agree/Disagree and Disagree / Strongly disagree, to the statements (1) The UKCAT questions are not too hard. It's the timing that makes the test difficult, (2) I understand how my test results is used by all my chosen universities, (3) It was easy to find information regarding how my universities used the test, (4) Universities should tell candidates more about how they use the test in their selection (5) My UKCAT influenced my decision whether to apply to medicine or dentistry, (6) My UKCAT influenced my choice of university, (n=5999).**

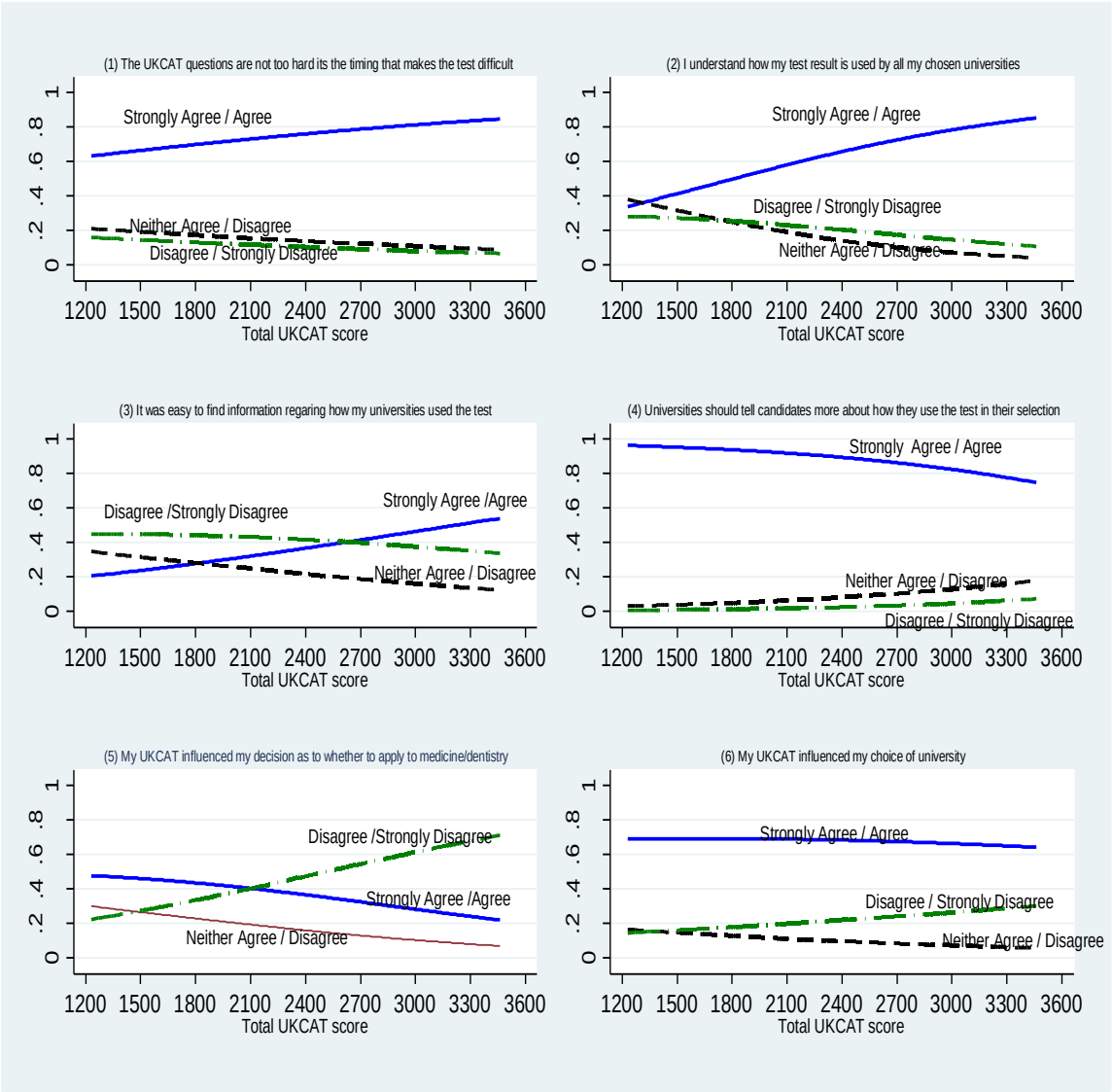


**Figure 3: Percentage of respondents who were aware of someone who decided not to apply to study medicine or dentistry because they thought their UKCAT score was not good enough, contrasted by educational institution attended.**

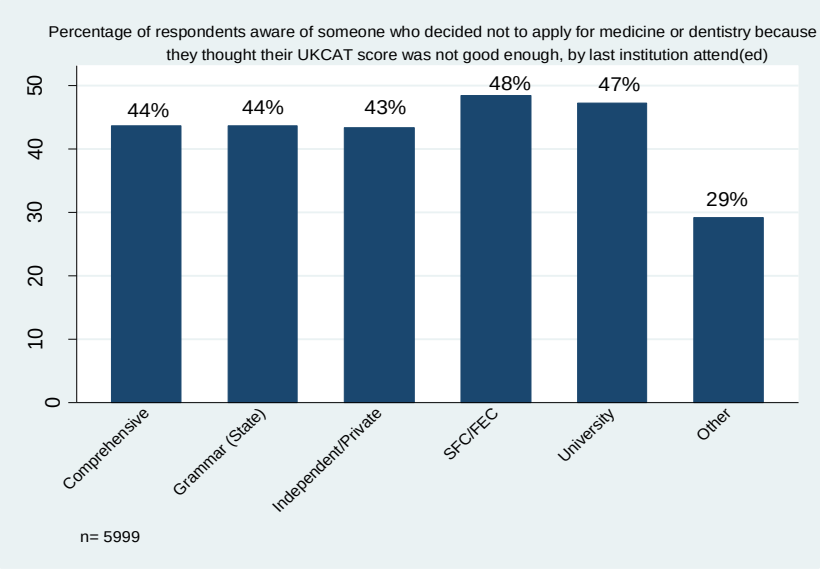
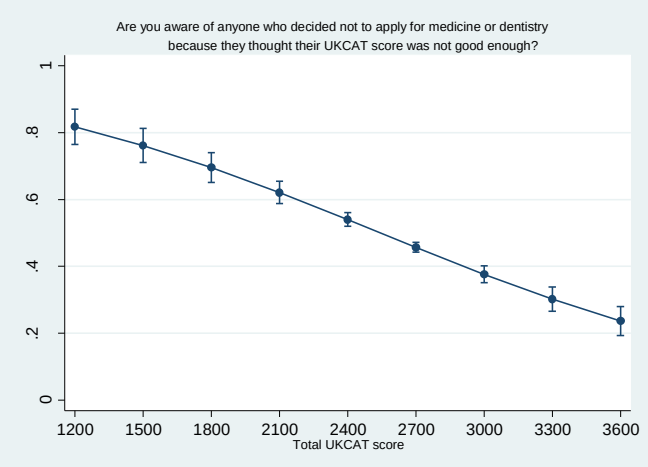



**Figure 4: The predicted probability of a respondent answering yes to the question 'Are you aware of anyone who decided not to apply for medicine or dentistry because they thought their UKCAT score was not good enough?' given total UKCAT score (n=5999).**



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**Appendix A**

# Post UKCAT Survey Questionnaire

Thank you for participating in the Post-UKCAT Survey. We anticipate that the questionnaire will take no longer than 10 minutes to complete. This independent study is being conducted by Plymouth University Schools of Medicine and Dentistry, the College of Medicine, Dentistry and Nursing (University of Dundee) and the Health Informatics Centre (University of Dundee).

We are committed to only publishing research/analysis where we are confident that individual candidates cannot be identified. The results of this survey will be used to advise the UKCAT Consortium, where necessary, on how it can improve current advice on preparation for the test, with the aim of making the test as fair as possible for all candidates.

- Consent to participate in this survey will have no effect on your application to medical and dental schools which use the UKCAT in their selection process.
- You may withdraw from participation in the project at any time and without any disadvantage to yourself of any kind.
-

## Section 1: Finding out about the UKCAT

**1. How did you first find out about the UKCAT? Please tick one box only.**

☐ Career Service

☐ School/College tutor

☐ University website

☐ Medical School prospectus

☐ Friends/Family

Other (please specify) ☐

**2. Did anyone advise you to prepare for the UKCAT?**

☐ Yes

☐ No

☐ Do not remember

**If yes, who advised you to prepare for the UKCAT? Please tick all boxes that apply.**

- Career Service
- School/College tutor
- Friend
- Family
- Medical/Dental school
- UKCAT website
- On-line Forum

Other (please specify) _____

**3. Did your school/college give you advice on preparation for the UKCAT and if so, how good was the advice you received? If you are a graduate or mature applicant please go to Question 8.**

Very good Good Satisfactory Less than satisfactory Poor Not applicable

**4. Did your school/college direct you to the UKCAT website?**

- Yes
- No

**5. Did your school/college advise you about the content of the test?**

- Yes
- No

**6. Did your school/college help with any of the following?**

| | **Yes** | **No** |
|---|---|---|
| Finding work experience | | |
| Preparation for the medicine/ dentistry admissions interview | | |

**7. How good was the overall advice you received from your school/college regarding applying to study medicine/dentistry?**

**Very good  Good  Satisfactory  Less than satisfactory  Poor**

## Section 2: Preparing for the UKCAT

### 8. Did you download the UKCAT 2012 Official Guide from the UKCAT website?

- ☐ Yes
- ☐ No

### If yes, how strongly would you agree/disagree about the following statements?

| | Strongly agree | Agree | Neither agree/disagree | Disagree | Strongly disagree |
|---|---|---|---|---|---|
| The UKCAT Guide increased my knowledge of how to prepare for the test | | | | | |
| The UKCAT Guide increased my knowledge about the content of the test | | | | | |

### 9. Did you use the timed practice tests available on the UKCAT website in your preparation?

- ☐ Yes
- ☐ No

### If yes, how strongly would you agree/disagree with the following statement?

| | Strongly agree | Agree | Neither agree/disagree | Disagree | Strongly disagree |
|---|---|---|---|---|---|
| The UKCAT practice tests increased my familiarity with the types of questions | | | | | |

asked and ability to manage

the test.

The UKCAT practice tests

increased my ability to manage

the timing of the test

**10. Approximately how many hours did you spend preparing for the UKCAT? Please include time spent on all modes of preparation (e.g. practice tests, reading, course attendance etc).**

**0-10 hours** ☐

**11-20 hours** ☐

**21-30 hours** ☐

**30+ hours** ☐

**Did not prepare** ☐

**11. How helpful were the following in your test preparation?**

| | Very Helpful | Helpful | OK | Not helpful | Not at all helpful | Did not use |
|---|---|---|---|---|---|---|
| Attending Medlink or equivalent | | | | | | |
| Books specific to UKCAT | | | | | | |
| School/College preparation course | | | | | | |
| Fee-paying preparation course | | | | | | |
| UKCAT Official Guide | | | | | | |
| UKCAT online practice questions | | | | | | |
| Other | | | | | | |

**12. Please indicate which <u>one</u> of these statements is most applicable to you.**

- I prepared well for the test and I am pleased with my result.
- I prepared well for the test but did not do as well as expected.
- I did not prepare enough for the test but I am pleased with my result.
- I did not prepare enough for the test and I am disappointed with my result.

## Section 3: Your opinion about the UKCAT

### 13. How strongly would you agree/disagree about the following statements?

| | Strongly agree | Agree | Neither agree/disagree | Disagree | Strongly disagree |
|---|---|---|---|---|---|
| Preparation enabled me to score more highly in the test. | | | | | |
| The UKCAT is a fair way to discriminate between large numbers of very able candidates. | | | | | |
| UKCAT tests the attributes required to become a good medical or dental student. | | | | | |
| UKCAT tests the attributes required to become a good doctor or dentist. | | | | | |
| The questions are not too hard, it is the timing that makes the test difficult. | | | | | |
| The questions are difficult and the timing in the test makes them even harder. | | | | | |
| It helps to review your maths skills in preparation for the Quantitative Reasoning section of the test. | | | | | |
| Overall the content of the Situational Judgement Test (Section 5) is relevant to those applying to medical/dental school. | | | | | |
| Overall the content of the Situational Judgement Test subtest (Section 5) items is fair to those applying to | | | | | |

medical/dental school.

### 14. Are you aware of anyone who decided not to apply for medicine or dentistry because they thought their UKCAT score was not good enough?

- ☐ Yes
- ☐ No

### 15. How strongly would you agree/disagree about the following statements?

| | Strongly agree | Agree | Neither agree/disagree | Disagree | Strongly disagree |
|---|---|---|---|---|---|
| My UKCAT result influenced my decision as to whether to apply to medicine or dentistry. | | | | | |
| My UKCAT result influenced my choice of university | | | | | |
| I understand how my test result is used by all my chosen universities. | | | | | |
| It was easy to find information regarding how my Universities used the test. | | | | | |
| Universities should tell candidates more about how they use the test in their selection. | | | | | |

## Section4: Test Preparation Application

UKCAT is considering developing a test preparation application for use on mobile phones.

### 16 Which of the following smart phones do you own?

- ☐ iphone
- ☐ Android
- ☐ Other
- ☐ I do not own a smart phone

**17 Would you have used a UKCAT test preparation application to help you prepare for the test?**

- Definitely
- Possibly depending on price
- Probably not
- Definitely not

## Section 5: Background information

**18. What is the best description of the last educational institution you attend/attended.**

- Comprehensive
- Grammar (State)
- Independent/Private
- Sixth Form College/Further Education College
- University
- Other

If Other, please specify

**19. Have you taken a mathematics course beyond GCSE level (post-16 years)?**

- Yes
- No

**20. Have you taken an English course beyond GCSE level (post-16 years)?**

- Yes
- No

**21. Were you part of widening access to medicine/dentistry or mentoring scheme?**

☐ Yes

☐ No

**If Yes, please specify the scheme(s) you were involved in.**

| |
|---|
| |

**22 Have you received a UKCAT bursary to cover the costs of your test in 2012?**

☐ Yes

☐ No

**23. Please answer the following questions:-**

| | **Yes** | **No** |
|---|---|---|
| I have undertaken work experience in a health care context. | ☐ | ☐ |
| A parent/guardian/close family member is a doctor/dentist. | ☐ | ☐ |
| A parent/guardian/ close family member is another type of health care worker. | ☐ | ☐ |
| I have considerable experience of health services for other reasons. | ☐ | ☐ |

**24. Are you applying to study medicine or dentistry?**

☐ Medicine

☐ Dentistry

☐ Both

☐ **Neither**

**25. Are you applying to a UKCAT Consortium medical school for entry in 2013?**

☐ Yes

☐ No

**26. Is there anything else that you want to tell us about your experience of the UKCAT or any changes that you think could be made to improve the information currently provided by UKCAT to candidates?**

**Many thanks for taking the time to participate in this survey!**