

Medical Schools Council

Improving Selection into the Foundation Programme
An Option Appraisal

January 2010

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Executive Summary

- 1.1 The Medical Schools Council was commissioned by the Department of Health (DH) to lead a Steering Group to carry out an option appraisal for the best approach for selection of applicants into the UK Foundation Programme and allocation to Foundation Schools. The Option Appraisal was a collaborative venture between the Academy of Medical Royal Colleges (AoMRC), the British Medical Association (BMA) Medical Students Committee, the Conference of Postgraduate Medical Deans (COPMeD), the General Medical Council (GMC), the Medical Schools Council, The National Association of Clinical Tutors (NACT), the Northern Ireland Medical and Dental Training Agency (NIMDTA), NHS Employers, the Scottish Board for Academic Medicine, the Scottish Foundation Board, the UK Foundation Programme Office (UKFPO) and the four UK Health Departments.
- 1.2 The Next Stage Review: A High Quality Workforce stated that 'new work needs to be undertaken to develop more reliable and valid selection tools for recruitment' to Foundation Programme training. This was based, to some extent, on shared concerns about the reliability, validity, comparability, NHS consultant time required, possible plagiarism and the longevity of the current online application system. This ranks applicants using a combined score derived from answers to a set of white space questions (weighted 60%) and an academic quartile ranking (40%) provided by the applicant's medical school.
- 1.3 In 2008-9, there were 7,004 applicants allocated to 7,075 vacancies, plus approximately 350 allocated to academic programmes and 60 Defence Deanery posts outside of this process. In this option appraisal, the Steering Group aimed to determine the best process to use in selection, thereby minimising the risk of legal challenge particularly if the ratio of applicants to places were to change.
- 1.4 The guiding principles behind this Option Appraisal have been that:
 - In order to protect patients and to reassure employers it is necessary to ensure that all applicants for the Foundation Programme are fit for purpose and, in scenarios of over-subscription, the most appropriate applicants are selected
 - Performance in Medical School should inform allocation of Foundation posts. However allocation must occur before Final examinations have been taken and so it is not possible to use performance in Finals as a selection tool.
- 1.5 The recommendations of the Steering Group have been informed by evidence that change is necessary, and evidence that the recommended changes would improve the selection process. Evidence was gathered as follows:
 - 1.5.1 The Steering Group commissioned three reviews of published academic literature by research teams in Durham, Newcastle and Warwick to examine the international evidence for alternative selection tools.
 - 1.5.2 An International Expert Panel was appointed, with representation from medical educationalists in the UK, Australia, Canada and continental Europe to use their expertise and the evidence from the three literature reviews in proposing a short-list of selection options for further consideration by the Steering Group.
 - 1.5.3 The Steering Group commissioned an independent Cost Benefit Analysis (CBA) to assess both the quantifiable economic costs and important, but non-financial, benefits. The costs were summarised as a Net Present Value (NPV), and non-quantifiable benefits scored and weighted against agreed assessment criteria. A sensitivity analysis was undertaken to identify any likely variations in the findings of the CBA.
 - 1.5.4 The Steering Group consulted with twelve stakeholder groups, and received written feedback from eight further stakeholder groups, on the proposed selection options. The BMA Medical Students Committee independently consulted with 341 students. Stakeholder feedback was mapped against the CBA assessment criteria.
 - 1.5.5 An online questionnaire, with 1810 respondents, sought views on the principles of selection.
- 1.6 Selection tools not short-listed for further consideration were personality questionnaires, unstructured interviews, assessment centres and portfolios/ Structured Records of Achievement.
- 1.7 Selection tools short-listed for further consideration by the Steering Group were the current system (do nothing), Educational Performance Measurement (alone), a National Examination, Structured Interviews (plus measures of Educational Performance), Multiple Mini Interviews (plus measures of Educational Performance) and Situational Judgement Tests (plus measures of Educational Performance).

- 1.8 The Foundation Programme currently matches applicants with Foundation Schools using a hybrid of the First Preference First and Serial Dictator algorithms. The Steering Group commissioned a technical analysis of UKFPO data and considered this in its discussions.
- 1.9 The recommendations of the Steering Group are based on concerns around the current system, and overwhelming evidence in favour of evolution.
- 1.9.1 **Concern:** The Next Stage Review (2008) raised concerns about the robustness, reliability and validity of current arrangements for recruitment,
Recommendation: The current mechanism for allocation/selection is not sustainable in the long term, and the Option Appraisal has demonstrated a need for change. Work must begin immediately to pilot and evaluate alternative evidence-based mechanisms of allocation/selection.
- 1.9.2 **Concern:** The use of white-space questions as a selection tool is unsustainable, the marking is labour intensive, and use of non-invigilated conditions raises concerns around the risk of plagiarism and coaching.
Recommendation: Work should begin to develop and pilot Situational Judgement Tests (SJT) which would assess, under invigilated conditions, the professional behaviour, judgement and fitness for purpose of applicants based on a detailed job analysis,.
- 1.9.3 **Recommendation:** Job analyses should be undertaken for the Foundation Programme in order that selection tools might be based on a more detailed person specification which will include a requirement around clinical communication.
- 1.9.4 **Concern:** The academic quartile system makes it difficult to compare fairly between applicants from different universities and is too blunt an instrument to differentiate between students.
Recommendation: UK Medical Schools should work together to develop a common framework which will be used by all schools to provide a fine grained (differentiated) ranking of educational performance of applicants in Medical School. The impact of using this measure of educational performance should be piloted against current procedures.
- 1.9.5 **Recommendation:** Successful evaluated pilots of each of the selection tools, independently and in combination, are a pre-requisite for any change to be implemented. The relative weighting of two components will be informed by modelling the data gathered during piloting and will aim to produce the most valid and reliable composite score.
- 1.9.6 **Recommendation:** There should be consultation with students, employers and other stakeholders as to the preferred matching algorithm
- 1.9.7 **Recommendation:** A tracking mechanism should be introduced so that progress of all doctors through the Foundation Programme and beyond can be linked to initial selection. This will enable thorough evaluation of the effectiveness of the proposed selection option.
- 1.9.8 **Recommendation:** The new selection tools should not be implemented before the 2012 Foundation Programme so as to allow sufficient time for in-depth piloting and further consultation and communication with key stakeholders.
- 1.9.9 **Recommendation:** A feasibility study, which would scope out the work involved in taking the above recommendations forward and develop a detailed project plan, should be commissioned as a matter of urgency.

List of Acronyms

AFP	Academic Foundation Programme
AoMRC	Academy of Medical Royal Colleges
BMA	British Medical Association
COPMeD	Conference of Postgraduate Medical Deans in the UK
DPMD	Defence Postgraduate Medical Deanery
EEA	European Economic Area
GMC	General Medical Council
GP	General Practice
HEAR	Higher Education Achievement Record
HENSE	Higher Education National Strategic Exchange
IELTS	International English Language Testing System
MDAP	Multi-Deanery Application Process
MEE	Medical Education England
MMC	Modernising Medical Careers
MMI	Multiple Mini Interview
MTAS	Medical Training Application System
NACT	National Association of Clinical Tutors
NBME	National Board of Medical Examiners (US)
NHSE	NHS Employers
NIMDTA	Northern Ireland Medical and Dental Training Agency
OSCE	Objective Structured Clinical Examination
PLAB	Professional and Linguistics Assessments Board
QABME	Quality Assure Basic Medical Education
SJT	Situational Judgement Test
SRoA	Standardised Record of Achievement
TOI	Transfer of Information
UK	Applicants who will graduate from a UK Medical School
Non UK	Applicants who will graduate from a Medical School outside the UK
UKCAT	UK Clinical Aptitude Test
UKFPO	UK Foundation Programme Office

Improving Selection into the Foundation Programme – An Option Appraisal

1.0 Introduction

The *Next Stage Review: A High Quality Workforce*¹ set out that 'new work needs to be undertaken to develop more reliable and valid selection tools for recruitment' to Foundation Programme training. In autumn 2008, officials of the Department of Health, the UK Foundation Programme Office (UKFPO) and the Medical Schools Council, together with the Heads of five Medical Schools, met to discuss shared concerns about the current method of selection into the Foundation Programme. The Medical Schools Council was invited to submit a tender to lead an Option Appraisal into alternative selection tools and the bid was approved by the DH and H.M.Treasury in January 2009. The Medical Schools Council was tasked with leading a Steering Group to conduct an option appraisal to recommend a robust, reliable, valid, feasible and sustainable method for selection into Foundation Programme training, which minimises the risk of legal challenge. The appraisal ties in with work streams of NHS Medical Education England (MEE) and the Higher Education National Strategic Exchange (HENSE).

The Option Appraisal was a collaborative venture between the Academy of Medical Royal Colleges (AoMRC), the British Medical Association (BMA) Medical Students Committee, the Conference of Postgraduate Medical Deans (COPMed), the General Medical Council (GMC), the Medical Schools Council, The National Association of Clinical Tutors (NACT), the Northern Ireland Medical and Dental Training Agency (NIMDTA), NHS Employers, the Scottish Board for Academic Medicine, the Scottish Foundation Board, the UK Foundation Programme Office (UKFPO) and the four UK Health Departments.

The guiding principles behind this Option Appraisal have been that:

1. In order to protect patients and to reassure employers it is necessary to ensure that all applicants for the Foundation Programme are fit for purpose, and, in scenarios of over-subscription, the most appropriate applicants are selected.
2. Performance in Medical School should inform allocation of Foundation posts
3. Allocation must occur before Final examinations have been taken and so it is not possible to use performance in Finals as a selection tool

1.1 Background

The Foundation Programme is a two-year training programme for graduates from Medical School, which is designed to give trainees a range of experience in secondary and primary care environments before beginning specialty training. As Foundation doctors, the trainees are also employees of NHS Trusts and must fulfil their obligations as employees. Recruitment to the Foundation Programme is thus subject to European employment law, whilst simultaneously representing a period of full time education and training.

The Foundation Programme was introduced in August 2005 by the *Modernising Medical Careers* (MMC) Programme Board on behalf of the four UK health departments. The current system of selection into Foundation Programme training posts is a national, online application open to both UK and non-UK citizens who meet the eligibility criteria. Candidates are awarded a score reflecting academic performance (40%) and answers to white-space questions mapped against the Foundation Programme person specification (60%). Eligible candidates are allocated to a Foundation School based on their stated Foundation School preferences and their application score. The process by which Foundation Schools then match candidates to an individual Foundation Track was outside the scope of the Option Appraisal, although it is noted that scores from the national recruitment round are likely to be used at this stage.

¹ Department of Health (2008) *A High Quality Workforce: NHS Next Stage Review*, available from http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_085840

In 2009 about 7,400 students graduated from UK Medical Schools and this number will rise rapidly to nearly 8,000 over the next two years. All applicants from UK and non-UK Schools must demonstrate that they meet the eligibility criteria for the Foundation Programme. Under EU freedom of movement legislation², EU students are entitled to compete equally for Foundation Programme training posts in the UK, provided they meet these minimum eligibility criteria and are able to communicate effectively in English. It is difficult to estimate the number of non-UK graduates who will apply to the Foundation Programme in any one year, and the current policy is to provide headroom of 5% over the anticipated number of graduates from UK Medical Schools to allow for applicants from non-UK Medical Schools. However this headroom is not equally distributed across the UK, with London and Scotland producing more graduates than there are Foundation Programme places.

Applicants inevitably have preferences as to the geographical location of their first workplace and selection into Foundation training has worked on the premise that the 'best' performing student should have the first choice of post. In the current situation where available posts overall outstrip applicants, the tasks are:

1. To confirm that candidates are eligible to be employed.
2. To devise a mechanism for students to choose their Foundation Programme posts, and, for over-subscribed schools, a process to allocate students to foundation school, based on their preferences and relative performance.

The competition ratio of applicants to posts may change in the future, resulting in possible oversubscription to the Foundation Programme. This has major implications as, under Section 15 of the 1983 Medical Act, UK Medical School graduates are granted provisional registration with the GMC. To obtain full registration, provisionally registered doctors must demonstrate by the end of Year 1 of the Foundation Programme that they have met the outcomes in *The New Doctor (2007)* and the requirements set out in the *Curriculum for Foundation Years in Postgraduate Education and Training*. On this background, task 2 above becomes:

3. To devise a mechanism to allocate applicants to Foundation Schools within the Foundation Programme in a scenario of under-subscription, and to select the most appropriate applicants for the Foundation Programme in a scenario of over-subscription.

This is the context in which the Department of Health has commissioned an option appraisal of selection methods for distinguishing reliably and fairly between applicants, and which satisfies the requirements of employers in the central matter of patient safety.

1.2 Rationale for an Option Appraisal

The Next Stage Review (2008): *A High Quality Workforce* raised concerns about the robustness, reliability and validity of current arrangements for recruitment to Foundation Programme training.³ The current success of allocation and recruitment for Foundation Programme training is based upon the historical context of more posts than candidates, resulting in the majority of candidates being offered a training post in their first choice Foundation School. The current UKFPO selection system has worked well to date, with no history of legal challenge, and using the First preference First algorithm (see Para 3.9), around 90% of candidates are allocated to their first choice of Foundation School. However there are shared anxieties amongst key stakeholders relating to individual selection tools, and the potential for these to be subject to legal challenge, such that:

- 1.2.1 The use of 'white space' questions is not sustainable as a selection tool in the long term, and will become steadily less discriminatory between candidates given that there is a limited range of new questions that can be generated.
- 1.2.2 The use of 'white space' questions in non-invigilated conditions is logistically simple but raises concerns around the risk of plagiarism and coaching.
- 1.2.3 The marking of 'white space' questions is labour intensive.

² Articles 43-48 (ex. 52-58) of the EC Treaty

³ Para 32

- 1.2.4** The academic quartile system makes it difficult to compare fairly between candidates from different universities, as it is not standardised or subject to quality assurance across Medical Schools.
- 1.2.5** Given the issues outlined above, if there is an increase in the number of eligible non-UK applicants such that the Foundation Programme is over-subscribed, the selection process may be more likely to be subject to legal challenge from those who have failed to secure a training post in a Foundation School.

The tasks of the Option Appraisal were to:

- 1.2.6** Characterise the current selection process from the perspective of both UK and non-UK candidates, of employers and of the Regulator.
- 1.2.7** Evaluate expert opinion and available evidence on the current selection process compared to possible alternatives, moving from a long-list to a short-list of possible options.
- 1.2.8** Evaluate the short-listed options through an objective and independent cost and benefit assessment, resulting in the identification of a favoured option(s).
- 1.2.9** Define in detail a potential mechanism from the identified preferred option(s).
- 1.2.10** Define the work required to pilot and evaluate the preferred selection tools.

1.3 Modes of working

The Medical Schools Council appointed a Steering Group, with representation from students, employers, the four UK Health Departments, the regulator and undergraduate and postgraduate educators, to lead the Option Appraisal. The Steering Group took responsibility for overseeing the process of gathering and synthesising evidence, consulting with stakeholders, commissioning further research and agreeing a recommendation to the Department of Health. The members of the Steering Group are;

Professor Paul O'Neill (Chair)	Medical Schools Council
Dr Stuart Carney	Foundation School Director
Tim Crocker-Buqué	BMA Medical Students Committee
Dr Ian Curran	Education supervisors and London Deanery
Sir Neil Douglas	Academy of Medical Royal Colleges
Dr Ashley Fraser	NHS Employers
Professor Derek Gallen	UK Foundation Programme Office, COPMeD
Martin Hart	General Medical Council
Professor Stuart Macpherson	Postgraduate Medical Education and Training Board
Professor Jim McKillop	Scottish Board for Academic Medicine
Terry McMurray	NIMDTA
Joanna Perkin	Department of Health (on behalf of four UK health departments)
Lindsey Proctor	Department of Health (on behalf of four UK health departments)
Dr Katie Petty-Saphon	Medical Schools Council
Professor Sir John Tooke	Medical Schools Council

Support for the project was provided by Siobhan Fitzpatrick, Policy Officer, and Amy Stringer, Communications Officer (both Medical Schools Council). Funding awarded by the Department of Health was held in a restricted account controlled by Jessica Pugh, Finance Manager of Universities UK.

1.4 Evidence

The Steering group gathered and commissioned evidence from a wide range of sources and stakeholders to ensure that the recommendations are informed by evidence that change is necessary, and that the recommended changes would improve the selection process. The evidence base for this project and the resulting recommendations set out in the report, includes the

available academic literature, expert opinion, objective assessment of costs, benefits and risks, and feedback from stakeholder groups. Confirmation of the legality of the approaches was sought from a barrister from the Treasury's 'A' list of Counsel.

1.4.1 Academic Literature

Given the short time scale of the option appraisal, the Steering Group commissioned three reviews of the published literature, which gave confidence that all important publications have been identified and that differing interpretations or weightings of these have been balanced across the reviews. The aim was to seek out good quality primary research, so enabling the empirical evidence around possible methods for selection into Foundation Schools to be scoped and evaluated. Seven bids were received from an open call for proposals. The Steering Group commissioned research teams in Durham, Newcastle and Warwick to examine the evidence for high stakes (medicine) selection from around the world for each of the following methods; 'white space' questions and academic quartiles; interviews; a national exam (for ranking, not certification); a structured record of achievement; and any other selection tool. The reviews are included as Appendices K, L and M.

1.4.2 Expert opinion

The Steering Group appointed an International Expert Panel, with representation from medical educationalists in the UK, Australia, Canada and continental Europe, to review and synthesise evidence from the three literature reviews. From these, and drawing on their own knowledge and expertise in medical education and recruitment, the Expert Panel was able to provide a qualitative assessment of the options, resulting in a short-list of options for further consideration by the Steering Group.

The Expert Panel members were;

Professor Fiona Patterson (Chair)	City University
Dr Henk van Berkel	Maastricht University, The Netherlands
Professor John Bligh	Peninsula College of Medicine and Dentistry
Professor Alison Bullock	Cardiff University
Dr Kelly Dore	McMaster University, Canada
Professor Eamonn Ferguson	University of Nottingham
Professor Richard Hays	Keele University
Professor Neil Johnson	University of Warwick
Professor Chris McManus	University College London
Professor Harold Reiter	McMaster University, Canada

Support for the International Expert Panel was provided by Victoria Carr, City University. Weighted recommendations and suggested actions recommended by the International Expert Panel were presented to the Steering Group in the final week of May 2009. The final report of the International Expert Panel was provided to the Steering Group in the second week of June, and it is included as Appendix C.

1.4.3 Cost Benefit Analysis

The Steering Group received five bids from academic institutions and private consultancies to undertake an independent and objective Cost Benefit Analysis (CBA) of the current selection system and the proposed short-listed alternatives. Denis Shaughnessy, Methods Consulting Ltd, was appointed to undertake the CBA, in close liaison with both the Expert Panel and the Steering Group.

The CBA was undertaken in compliance with official H.M. Treasury guidance known as the 'Green Book' to assess systematically the favourable and adverse impacts of selection options, in quantifiable economic costs and important non-financial benefits, measured against assessment criteria. The costs of a selection option were quantified in monetary terms and summarised as a Net Present Value (NPV). Each cost was expressed as an expected value, and an associated range of

uncertainty, modelled over 5 years using appropriate discount factors. For the non-financial benefits, a set of assessment criteria was defined to represent the desired characteristics of an ideal selection tool, against which each option O_j was given a score S_{ij} . For any criterion the scores ranged from 0 to 10, where 10 was allocated to the option that best meets the criterion and 0 to the worst. Each criterion was allocated a weighting, W_i . A performance matrix was constructed, constraining the scores, S_{ij} , and an overall weighted score such that $S_j = \sum_i W_i S_{ij}$. A sensitivity analysis was conducted to assess whether any likely variations in scores, weightings or NPVs would affect the relative ranking of the different selection options.

The CBA reduced the short-list, which was proposed by the Expert Panel and endorsed by the Steering Group, down to two preferred options for the Steering Group to consider further. The final report of the Cost Benefit Analysis is included as Appendix D.

1.4.4 Stakeholder Consultation

In order to achieve the broadest possible stakeholder involvement, a series of workshops and focus groups was held to seek views around the strengths and weaknesses of the current system and of possible alternative mechanisms. The meetings followed a standard structure to ensure that each group was given the same opportunity to reflect on the options and provide feedback. Stakeholders were asked about the pros and cons of the present system as well as moving to an alternative selection system, including interviews, national assessment for ranking purposes, structured record of achievement and any other method such as situational judgement tests and educational performance.

Members of the Steering Group met with twelve stakeholder groups, in addition to two cross-stakeholder workshops held to consider in depth the refined possible options and to agree the cost benefit analysis criteria and weightings. Written and oral updates were provided regularly to partner organisations, and additional written feedback was collated via email. Feedback from each of the twenty stakeholder groups, and the written report from the BMA, was considered by the Steering Group and the Expert Panel. Written and verbal feedback from the twenty stakeholder groups consulted directly was mapped against the CBA assessment criteria, as detailed in Appendix E. The BMA Medical Students Committee independently held a series of focus groups with 341 medical students in 25 Medical Schools between February and May, reported in Appendix F. The Steering Group is grateful to the AUKUH HR Directors who gave advice on important attributes and characteristics of a fair, open and legally defensible selection system. The Steering Group is also grateful to NACT who provided useful commentary on the current system, selection systems and proposed changes.

An online questionnaire⁴ sought views on important principles of selection and the link was circulated via Steering Group member organisations to relevant stakeholder groups. Responses were received from 1251 medical students, 199 Foundation doctors, 104 specialist trainees, 142 Consultants, and 114 others including employers. A graphical analysis of responses is provided in Appendix G.

1.4.5 Legal Opinion

In late August 2009, once the Steering Group had reached its conclusions, a Legal Opinion was sought from Mr Gerard Clarke, a barrister in Blackstone Chambers specialising in EU and employment law and on the Treasury's 'A' list of Counsel. The Opinion is provided in Appendix A and has also been shared with the GMC and NHS Employers.

⁴ www.surveys.medschools.ac.uk/MS

2.0 Characteristics of the current system

2.1 Current process of recruitment to the Foundation Programme

Recruitment to the Foundation Programme comprises three main steps: national selection through a) exclusion of those not qualified to proceed, b) allocation to a Foundation School through a process of matching to ranking/preference, and c) matching to a specific Foundation Track (local process). This Option Appraisal encompasses a review of steps a) and b) but was not charged with reviewing the processes involved with matching to Foundation Posts at local level, the Academic Foundation Programmes, special circumstances, linked applications or allocation within the Defence Deanery. Further detail about the current system, and the elements to be retained, is provided in Appendix B.

All applicants who meet the eligibility criteria, as verified by the UKFPO, complete an anonymous online application form with six-eight competency-based white space questions matched against the Foundation Programme person specification. Each form is scored horizontally by a panel of two trained assessors, and a total mark (maximum 60 points) is awarded. This mark is added to the maximum 40 points awarded for performance by the applicant's Medical School, with 40, 38, 36 and 34 points awarded to applicants from each quartile. The means of obtaining this rank is defined entirely by each Medical School and is not subject to outside scrutiny. All applicants, UK and non-UK, are required to provide a Dean's statement confirming their academic quartile ranking.

Candidates receive a combined score based on their responses to white-space questions (60%) on the application form and the academic quartile (40%) from their Medical School. Candidates are allocated to Foundation Schools through an algorithm that matches firstly by preference, then by score. Once all first choices have been allocated, candidates are allocated according to their score to the next school on their list with vacancies.

Figures made available to this Option Appraisal by the UKFPO indicate that in the 2008/09 recruitment round, there were 7,004 applicants for 7,075 available places. There were 521 applications from overseas (285 EU graduates, 299 non-EU graduates), down from 1,100 in the previous year. Of these, 164 met the eligibility requirements and UKFPO person specification (119 EU graduates, 45 non-EU graduates). Approximately 60% of UK graduates applied to their local Foundation School.

2.2 Algorithm

Successful applicants to the Foundation Programme are allocated to individual Foundation Schools by following matching rules (algorithms), which take into account the applicants' preferences and scores, and the availability of spaces at the Foundation Schools. Technical reports on analyses of UKFPO data conducted on behalf of the Steering Group highlighted the advantages and disadvantages of the current allocation algorithm and alternative matching algorithms (see Appendix H).⁵

The current matching algorithm is a hybrid of the First Preference First⁶ and Serial Dictator⁷ algorithms and results in the highest possible number of candidates matched to their first choice Foundation School. The perceived advantage of the current system with 90% of applicants being allocated to their first choice Foundation School is a characteristic of the matching rule and the ratio of applicants to posts and not of the selection tools used to produce the ranking of applicants. However, there are concerns that applicants not allocated to their first choice Foundation School drop significantly, allocated on average to their sixth choice (based on 2009 data), and sometimes dropping as low as their 19th choice. In the case of over-subscription, score will need to be taken into account before the algorithm may be applied.

⁵ Technical analysis was conducted by Professor Chris McManus, Expert Panel member, in the first instance. A second technical report was provided by Dr Rob Irving and Dr David Manlove, University of Glasgow.

⁶ Priority is given to candidates for whom a school is first preference.

⁷ Candidates are matched to the school highest on their list of preferences that still has at least one post remaining.

2.3 Academic Foundation Programmes

Currently, recruitment to an Academic Foundation Programme (AFP) takes place up to six months before the application period for recruitment to the general Foundation Programme, in an independent selection process not encompassed by the Option Appraisal. Applicants are nominated for an AFP by their Medical School Dean, and eligibility is checked nationally. Recruitment processes are set locally, and usually comprise an application form and interview (telephone, video conference or panel), as well as evidence of academic performance from the Medical School, although academic quartiles cannot be taken into account owing to the timeline. There are around 400 AFP places available, and typically twice the number of applications is received, with a fill rate of around 90%. If academic posts are not filled, they may be allocated as general training posts. Similarly if candidates are unsuccessful in their application to an AFP, they are still eligible to apply through the national recruitment system.

2.4 Selection into the Defence Medical Services

Candidates apply directly to the Defence Medical Services, either during their basic medical training or upon full registration with the GMC. The Defence Postgraduate Medical Deanery (DPMD) provides a list of military Foundation Doctors wishing to enrol in a regional Foundation School (six in total). The numbers are approximately similar each year to assist with workforce planning. The regional Foundation School endeavours to place all military foundation doctors in the Trust nearest to the MoD Hospital Unit. A memorandum of understanding between the DPMD and the regional deaneries ensures that military foundation doctors are cost neutral, such that the Trust receives the service component as a 'free good' and does not charge for the educational component. Military foundation doctors are thus exempt from the national recruitment system and are not affected by the outcomes of this Option Appraisal.

3.0 Consideration of options

The Steering Group had oversight of the work of the international expert panel, received the literature reviews and members of the Steering Group were closely involved in gathering and analysing the feedback from the major stakeholder groups. This chapter sets out the evidence that was considered and subsequently factored into the independent Cost Benefit Analysis. It also sets out, in brief, which selection options were either discarded or were subject to the CBA.

3.1 Assessment, selection and allocation

The Steering Group used the following definitions:

- **Assessment** provides a means by which selection or allocation can take place, by certifying the achievement of a minimum threshold and/or providing a ranking score of an applicant.
- **Selection** uses a predictive paradigm, usually informed by assessment, to identify candidates with the best suited profile for employment and successful completion of education and training. By implication not all candidates are selected.
- **Allocation** is the process of matching individual applicants with Foundation Schools or Foundation Tracks, and may or may not involve a method of assessment or selection.

Care must be taken to differentiate between selection, assessment and allocation. Historically, there have been sufficient Foundation Programme posts available for all eligible candidates and thus the primary process has been allocation. The small element of overall selection has been in stopping applications from the few applicants who have not met the person specification. There has been also a degree of selection for applicants to oversubscribed Foundation Schools. As competition ratios may increase in future, this approach may have to change radically and quickly, so all options within this Option Appraisal have been considered in the context of selection in a competitive environment. That is to say, any preferred mechanism must be able not only to *allocate* applicants to Foundation Schools in scenarios of under-subscription, but also to distinguish

sufficiently and appropriately between applicants to enable *selection* to the Foundation Programme in scenarios of over-subscription.

3.2 Employer and candidate preferences

All posts within the Foundation Programme are considered to be of equal quality and there is a common person specification for the Foundation Programme across the UK. Similarly all eligible graduates both UK and non-UK are considered to have met the same minimum standards of qualification and expertise, irrespective of where they trained.

Around the world, different processes are used. In the US and Canada, both applicants' and schools' preferences are taken into consideration in matching candidates with residency training posts, and there is a separate application process for international candidates. In Australia, some States run lottery (random) allocation systems⁸ as does the Netherlands for admission to Medical School.

After deliberation by the Expert Panel and then the Steering Group, it was reaffirmed that performance in Medical School should be taken into account by allocating positions first to those who have performed best. The matching algorithm itself is considered further in Para 3.8.

3.3 Cognitive and non-cognitive ability

The International Expert Panel recommended that the selection options chosen should assess clinical knowledge/ skills and professional attributes. In the literature this is commonly referred to in terms of cognitive and non-cognitive attributes. There is research evidence for an emphasis on selection based on non-cognitive attributes, as medical graduates are relatively homogeneous academically and it is thus more difficult to differentiate between applicants on this basis. Furthermore, there was wide consensus that professional attributes are important for employability. The International Expert Panel recommended that a combination of selection tools is needed to cover the broad range of attributes required by the current person specification, and to achieve sufficient reliability and validity.

3.4 Overview of evidence base and Cost Benefit Analysis

The detailed evidence gathered from the three literature reviews, international Expert Panel advice, Cost Benefit Analysis, and stakeholder consultation is provided in the appendices. In completing the Option Appraisal and making recommendations, the Steering Group was required to make a judgement about value for money, total cost and acceptability to stakeholders. A summary of the evidence and deliberations is set out below.

When reviewing the literature, it is important to distinguish between selection into pre-employment (Medical School) and selection into employment (postgraduate training). There is a significant volume of research exploring predictors at the time of entry of subsequent performance at Medical School, but very little UK or international literature exploring entry into postgraduate medical training. The published evidence on selection into pre-employment cannot simply be generalised to selection into the Foundation Programme, as the latter is concerned with employment and as such is subject to specific employment law. The Expert Panel noted other significant issues concerning the literature such as the frequent lack of an appropriate outcome measure against which the effectiveness of selection tools could be evaluated, the use of tools not designed originally for selection/ matching, little focus on prediction of negative behaviours, and lack of meta-analytic studies. In general, many studies of selection were observational with relatively small numbers of subjects. The International Expert Panel (and the three literature reviews) concluded that there is only limited evidence to support any individual tool or combination of selection tools for postgraduate training, and even less evidence in the context of selection to the Foundation

⁸ Applicants are assigned a number at random, and their preferred Foundation School is considered in this order through the *Optimised Preference Program*.

Programme in the UK. However, this may change as there is emerging literature on selection within UK higher postgraduate training.

The report of the international expert panel, the three literature reviews and the analysis of the stakeholder feedback was used to inform the Cost Benefit Analysis (CBA). This independent analysis of monetary and non-monetary costs and benefits was conducted in accordance with the H.M.Treasury's guidance ('the Green Book'). The short-listed selection options were subject to an in-depth CBA, including the 'Do Nothing' scenario. Several elements were common to all selection options, including the assumption that there would be a national portal for application and administering the selection process, that the GMC would continue to determine the subsequent registration of applicants, and that there would be common costings including procurement and central administrative costs. Data used in the NPV calculations were obtained from the UKFPO and the Medical Schools Council and there were agreed estimates for manpower and legal challenge.

In conducting the CBA, it was essential to consider the acceptability of the selection tools to different stakeholder groups in terms of a set of non-overlapping assessment criteria. For example some tools which may be fair, such as random allocation, might be unacceptable to stakeholders. The Steering Group agreed the assessment criteria set out in the table below and were used to assess the non-monetary benefits of the different selection options:

Criterion	Description	Weighting
Reliability	The technical reliability of the selection technique associated with the option. Broadly this means the likelihood that applying the technique in the right way will give consistent results.	10
Validity	The technical validity of the selection technique associated with the option. Broadly this means the extent to which the technique is actually measuring the characteristics of a 'good' doctor.	10
Granularity	The extent to which the selection tool can separate out (differentiate between) the performance of comparable candidates for the purpose of scoring.	1
Consistency	The extent to which the selection techniques can be expected to be applied consistently across the UK.	7
Longevity	The extent to which the performance of the option can be maintained over successive recruitment rounds.	12
Educational Impact	The extent to which the option supports or undermines educational objectives.	15
Fairness	The extent to which the option offers a level playing field for candidates.	5
Compliance	The extent to which the option discourages, prevents, or otherwise guards against the effects of cheating or malpractice.	7
Transparency	The ease with which candidates can understand what is expected of them and why they achieved their scores.	2
Applicant Burden	The extent to which the option minimises the costs and effort for applicant.	4
Medical Time	The extent to which the option minimises the amount of medical staff time required for selection.	8
Feasibility	The ease with which the option could be brought into successful live use.	10
Public Opinion	The extent to which the general public, when presented with a sound-bite description of the process, is likely to agree with it.	1

The short-listed selection options were scored against each criterion, with the scores being constrained between 0 and 10, where 10 was allocated to the selection option that best meets the criterion and 0 to the worst. The scores were agreed by the Steering Group and were informed by the feedback gathered from the stakeholder groups. Similarly, the Steering group agreed a weighting to be assigned to each criterion based on its relative importance to the selection process and these are also shown in the table.

Given the subjective nature of the scoring and weighting of the criteria used to determine the non-monetary benefits, it was important that these, together with the monetary costs (NPVs) were subject to sensitivity analysis. This tested out whether there were any likely variations in scores, weightings, or in the estimated values of costs and benefits that could alter the relative ranking of selection options. It also ensured that the Steering Group could identify whether any major differences in stakeholder opinion on either the weighting attached to a particular criterion or the scoring of an option against that criterion would markedly change the outcome of the CBA.

3.5 Selection tools NOT short-listed by the International Expert Panel

A key function of the international expert panel was to recommend the exclusion of any selection tools that were clearly unsuitable for use in selection into Foundation based on the commissioned literature reviews and the expertise of the panel. The recommendations of the panel were subject to discussion and endorsement by the Steering Group.

3.5.1 Personality questionnaires

The literature reviews considered the use of personality measures as a selection tool, in particular assessments of conscientiousness which relate to performance across a broad range of jobs. The literature identified evidence that personality dimensions measured at entry-level are positively associated with performance during Medical School, but there is little predictive validity for postgraduate performance. The literature also indicated that personality questionnaires are best used to inform focused questioning during an interview process, rather than as a stand-alone tool. Depending on the mode of delivery, issues of plagiarism and coaching may be a major concern and this may impact upon stakeholder acceptance. In the context of recruitment into the Foundation Programme, the Expert Panel agreed that ranking candidates on the basis of a conscientiousness score does not have an evidence base as a discriminator and is not feasible.

3.5.2 Unstructured interviews

Unstructured interviews are an open panel-candidate discussion using varying questions, conducted in person, via telephone or video conferencing. With applicant numbers of several thousand, the Expert Panel advised that it would be difficult to compare interview scores or panel opinions fairly or consistently without a standardised process. The Steering Group was informed that unstructured interviews have low reliability and validity, whereas structured interviews or multiple interview approaches offer stronger reliability and predictive validity. The overwhelming majority of responses to the online questionnaire agreed that all elements within the application process should be standardised.

3.5.3 Assessment Centres

The Expert Panel reported that assessment centres, whereby candidates undergo multiple tests in a single location, offer advantages over other types of selection tools as they require applicants to demonstrate target attributes using a multivariate approach rather than relying on self report. However, assessment centres have high costs in terms of resources and time (including NHS clinicians). There is the additional disadvantage that an option that requires applicants to be present in a specified location at a specified time would be very difficult because of clashes with final year electives. Assessment Centres are commonly used for selection with a high competition ratio, or where the cost of a wrong decision is high. The Expert Panel informed the Steering Group that the additional costs and complexities of using assessment centres would not add value in the context of selection into the Foundation Programme.

3.5.4 Portfolios/ Structured Records of Achievement (SRoAs)

Portfolios and SRoAs are broadly defined as documents which capture and summarise the skills and achievements of a candidate. The SRoA is designed to provide a personal profile including detailed breakdown of examinations, courses and modules, examples of critical reflection on performance and learning, and an encounter log. The UK higher education sector is moving towards the use of SRoAs in the form of the Higher Education Achievement Record (HEAR) with one aim being to help comparability of international degree qualifications. It was noted that medical schools within UK Universities may subsequently be required to conform to prescribed standards of SRoAs.

The literature reviews reported that there was no evidence of use of portfolios or SRoAs in selection. It was unclear how portfolios or SRoAs could be measured or scored and a selection rank produced. Advantages include the standardisation of information locally, but difficulties in the interpretation of subjective responses, comparability between institutions of course-specific information and the time intensive nature of assessment were highlighted. The BMA student focus groups reported mixed responses to structured records of achievement, citing lack of full understanding as a primary reason. However the focus groups also highlighted that this option enables candidates to represent themselves fully, and encourages continuous personal development. The Expert Panel concluded that the predictive validity of both portfolios and SRoAs is uncertain, but that they may show moderate reliability if designed and used properly. The cost of introducing a standardised system across Medical Schools is likely to be high, and acceptability amongst stakeholders low.

3.6 Selection tools short-listed by the International Expert Panel and subject to an independent Cost-Benefit Analysis

The Steering Group and the Expert Panel agreed that two selection tools in combination are required to test the range of clinical knowledge/ skills and professional attributes required of a Foundation doctor, underpinned by the introduction of Common Content of Assessment for all UK Medical Schools. It is on this basis that the following short-listed options were defined and evaluated.

3.7.1 Current system: white space questions and academic quartile ranking

The current system, as described in Chapter 2, ranks students according to their combined performance on an online application form (white space questions – 60%) and an academic quartile ranking from their Medical School (40%). The current system was appraised throughout this project as a ‘do nothing’ option, in order to offer a benchmark for alternative options and to gather evidence of a possible case for change.

There is very limited research literature on the use of white space questions for selection, and the Expert Panel extrapolated evidence from comparable methods such as personal statements. The Steering Group acknowledges the high acceptability of the current system reported by stakeholder groups throughout the consultation. One of the main advantages of the current system raised by stakeholders is the high proportion of applicants matched to their first choice of Foundation School (91% in 2008), although as Chapter 2 outlined, this is a function of the algorithm and the applicant to post ratio rather than the selection tool. Other perceived advantages of the current system include; a national process, the system being well-understood, geographic flexibility and special circumstances being taken into account. The Steering Group observed that these aspects do not relate to the individual selection tools and thus do not differentiate between the current system and alternative tools, but they are key elements to be retained in any new system. Other advantages cited by stakeholder groups include anonymity, flexibility of timing (online system), and the assessment of attributes broader than simply academic attainment.

Perceived disadvantages of white space questions within the current system include depersonalisation, lack of longevity, risk of plagiarism, coaching and a lack of reliability. There was also feedback that white space questions assessed creative writing

rather than knowledge, skills or learning. The potential to reward institutional structure rather than individual behaviour was also noted (i.e. Schools where all students intercalate). Limited availability of new white space questions has led to concerns about longevity. Stakeholder feedback also highlighted concerns about the academic quartile rankings, particularly around the lack of transparency, non-standardisation and discrimination between candidates at cut-off margins.

The Steering Group and the Expert Panel considered how the current system might become more sustainable with minor modifications, for example whether the completion of white space questions under invigilation and/ or time-constraints would overcome some concerns about plagiarism/coaching. However whilst this may mitigate against one of the key purposes of white space questions in capturing reflection, the Steering Group and Expert Panel agreed that the low added value would require unjustifiable high resource costs.

The CBA (see table x and figure y) found that in monetary costs, the current system, including developing the rules, administrative costs incurred by Medical Schools in providing quartile rankings, manpower for scoring white space questions, and venue hire, as well as procurement and other common factors, has an NPV of -£21.2M over five years. When assessing the non-monetary costs and benefits, 'Do Nothing' was assessed to be the least preferred option compared with alternative selection tools when measured against six of the assessment criteria; Reliability, Consistency, Longevity, Compliance, Transparency and Public Opinion. Only in terms of Feasibility (short term), was 'Do Nothing' assessed to be the preferred option.

3.7.2 Educational Performance Measurement

An Educational Performance Measurement as a selection tool refers to a ranking score produced by the applicant's Medical School cohort to reflect the applicant's achievements or performance on a range of assessments, derived using a specified and standardised transparent framework of existing performance measures (e.g. agreed weighting between performance in early and later years at Medical School, assessment of clinical skills and knowledge, academic prizes or additional degrees, achievements outside of the programme). All UK and non-UK Medical Schools would be required to provide a local educational performance ranking to the UKFPO derived using this standardised framework.

Stakeholder feedback showed support for the use of some measure of academic performance as well as non-academic and extra-curricular activities. Of the 1810 responses to the online questionnaire, 79% agreed or strongly agreed that the application process should reflect academic performance and 81% of respondents agreed or strongly agreed that a measure of clinical skills should be included. 62% of respondents to the online questionnaire agreed or strongly agreed that extra-curricular activities should be considered.

Perceived advantages of an Educational Performance Measurement include the minimal effect on diversity of curricula, little disruption to students and the encouragement of consistent student performance throughout the years at Medical School. Perceived disadvantages include the additional burden on Schools and the challenges of agreeing and using a standardised framework across UK and non-UK applicants.

The Steering Group observed that a uniform transparent framework for an Educational Performance Measurement would address some of the current concerns about comparability between applicants of the same quartile from different schools. Additionally, it is envisaged that this Measure would enable greater granularity (differentiation) between students than the current system. The Expert Panel supported the principle of making greater use of information accumulated during Medical School, and the development of a standardised educational performance measurement. The Steering Group considered the usefulness of Educational Performance Measurement as either a single selection tool or in combination with another tool.

In this option, an educational performance score is the only measure being used for selection. Therefore, it would need to be a more robust and granular score than an educational performance score that is used in combination with another method. As such, the associated time and costs in developing an educational performance score are higher when used alone as the rules need to be considered in more detail. The cost benefit analysis works from this assumption, and the sensitivity analysis examines its importance.

The CBA found the NPV for an Education Performance Measurement over five years to be -£15.2M, including the costs of administration and defining and maintaining the rules of generating scores. When assessing the non-monetary costs and benefits, 'Educational Performance Measurement' was the preferred option when scored against six of the assessment criteria; Longevity, Educational Impact, Transparency, Applicant Burden, Consultant Time and Feasibility (long term).

3.7.3 National Examination

In the context of selection, a national examination was considered for the purpose of ranking towards the beginning of the final year, and not for certification of competence at the end of a basic medical degree programme. It was anticipated that an examination would be a combination of a machine-markable knowledge test and an Objective structured clinical examination (OSCE), which would be undertaken by all candidates in invigilated conditions on a single day. Non-UK applicants, and UK applicants in overseas placements, would be required to travel to the UK.

The literature reviews highlighted evidence from other countries with a national licensing exam which indicated that performance on an examination can be a moderate predictor of performance in later clinical practice. However there is little evidence that a national exam for the purposes of ranking would easily separate out several thousand candidates (as distinct from a bimodal certification of competence), nor that the issue of timing and impact on design and delivery of different curricula could easily be addressed. Advantages of a national examination, as perceived by stakeholder groups, include fairness for all applicants (including non-UK), transparency, and quality assurance of output from Medical Schools (n.b. the latter is the role of the regulator). Perceived disadvantages include concerns about cost and logistics, impact on curricula design and delivery, limiting innovation in assessment and the lack of representation of the applicant as an individual.

Many key stakeholders were strongly opposed to a national examination, including medical students and Medical Schools. The GMC, as the regulator, has not taken this forward. The BMA student focus groups report indicated that 86% of students rated the option of a national examination for ranking purposes as having little or very little value in selection.

The CBA found the NPV of a national examination over five years to be -£32.2M including the costs of administration, developing and delivering the examination, and the cost of applicant travel expenses. When assessing the non-monetary costs and benefits, a National Examination was the preferred option against only one assessment criterion, Granularity (differentiation), but the least preferred option against seven of the assessment criteria; Validity, Educational Impact, Fairness, Applicant Burden, Consultant Time, Feasibility Short Term and Feasibility Long Term.

3.7.4 Structured interviews

Structured interviews follow an arrangement of a single panel-candidate discussion conducted in person, via telephone or video conferencing, with pre-defined questions and a standardised mark scheme. It was envisaged that the interview would be structured to assess the broader professional attributes of the applicant, linked to the person specification for the Foundation Programme. Non-UK applicants, and UK applicants in overseas placements, would be required to travel to the UK. The Steering Group considered the use of structured interviews in combination with an Educational Performance Measurement, and costing and deliberations reflect this accordingly.

The Expert Panel advised the Steering Group that structured interviews have moderate reliability and there is some evidence of moderate/ good predictive validity. Perceived advantages of structured interviews include assessment of communication skills, positive public perception, quality assurance against plagiarism, and the introduction of the 'human element' perceived by candidates to be desirable. However, concerns were raised about the cost of training for interviewers and calibration of interview scores, the high opportunity cost of interviewer time, unintended bias (loss of anonymity) and the risk of interviews being overly structured and not producing the desired range of scores between candidates.

Responses to the online questionnaire highlighted that all stakeholder groups, with the exception of General Practitioners and other Healthcare Professionals, thought it important or very important for applicants to be represented in person. At variance with this was the response of 67% of all respondents who believed that applicants should remain anonymous.

It should be noted that interviews, together with Curricula Vitae, are used in assessing candidates for Academic Foundation Programmes (AFPs), and they are also used by some Foundation Schools to match individuals with specific posts. However, in both contexts applicant numbers are significantly smaller, and the aim is to match individuals to posts with particular features.

It was assumed that there would be 12 interviews per panel per day, over three days, plus one day for preparation and evaluation. Each panel would consist of two clinical members and one lay member. The CBA found the NPV for structured interviews used over five years to be -£22.8M including the costs of administration, manpower, venue hire and registration. When assessing the non-monetary costs and benefits, structured interviews were the preferred option against only one assessment criterion, Public Opinion (which carried a low weighting), but were not the least preferred option against any of the criteria.

3.7.5 Multiple Mini Interviews (MMIs)

MMIs are a consecutive set of standardised short interviews with an individual panel member. It was assumed that each interview would be mapped against a pre-defined competency or set of attributes linked to the person specification for the Foundation Programme, scored using a standardised marking framework, similar to the horizontal marking of the current online application form. Non-UK applicants, and UK applicants on overseas placements, would be required to travel to the UK. The Steering Group considered the use of MMIs in combination with an Educational Performance Measurement, and the subsequent costing and deliberations reflect this accordingly.

As described in 3.7.4, the literature reviews highlighted evidence that structured interviews have moderate reliability and moderate/ good predictive validity and these are enhanced by approaches involving MMIs. If interviews are to be used, the Expert Panel recommended the use of MMIs, although the higher costs and resource implications may be prohibitive. The other perceived advantages and disadvantages, as well as stakeholder feedback, for MMIs are similar to those for structured interviews.

The CBA assumed that for MMIs, 178 interview teams would each interview 15 applicants over 3 days, plus an additional day on preparation and evaluation. Each interview team would consist of three clinical, one lay and two senior members per team. The CBA calculated the NPV for MMIs used over five years to be -£26.3M, included the costs of venue hire and administration. When assessing the non-monetary costs and benefits, MMIs were the preferred option against one assessment criterion, Public Opinion (which carried a low weighting), but were not the least preferred option against any of the criteria

3.7.6 Situational Judgement Tests

Situational Judgement Tests (SJTs) are designed to assess judgements of applicants in hypothetical work-based scenarios. A variety of answering formats can be used, for example applicants identify the best/worst response in a situation, or they are required to rate the effectiveness of different responses. An SJT would assess attitudes, ethical values and likely professional

behaviours required for working and training as a Foundation doctor, rather than knowledge or clinical skills. Responses would be evaluated against a pre-determined scoring key to provide a profile of the applicant's judgement in a particular context. It was anticipated that applicants would record their answers on paper in invigilated conditions, the answers being marked by machine. It was assumed that the SJT would be sat by all UK and non-UK applicants in one of two possible sittings at around the time that the current white space questions are made available to applicants. By providing two occasions to sit an SJT (and using test-equating for these) the need for students to travel back from their final year elective would be alleviated. Non-UK students would be required to travel to the UK to take the SJT. The Steering Group considered the use of SJTs in combination with an Educational Performance Measurement, and the subsequent costing and deliberations are reflective of this.

The commissioned literature reviews highlighted that SJTs have become increasingly popular over the last 20 years and are used in large-scale selection processes, often for candidate short-listing. In the UK, SJTs are used nationally to select GP registrars and in other 'high stakes' selection. The research literature indicates that SJTs have good validity in predicting job performance and can offer incremental validity over methods such as ability tests and personality questionnaires. SJTs typically relate to general experience and ability, rather than job-specific knowledge or experience, and may be fairer than other methods in contexts where candidates have little or no experience in the target post. SJTs tend to show smaller differences in performance between candidate groups defined by a particular feature (e.g. ethnicity) compared with cognitive ability tests. SJTs are often favourably rated by candidates because they appear directly relevant to the job role. The BMA student focus groups indicated a positive response to the proposal of SJTs, but their unfamiliarity with this mode of selection would need to be addressed by a comprehensive communications strategy.

Evidence on the reliability and acceptability of SJTs is available from the US National Board of Medical Examiners (NBME) and from selection into UK GP specialty training. Given that the literature reviews reached consensus that measures of professional attributes are important for employability, the Expert Panel advised the Steering Group that selection tools focusing on these should be used for the Foundation Programme and that an SJT is the best available method.

The CBA calculated the NPV for the use of an SJT over five years to be -£19.3 M, including the cost of administering, developing and delivering the SJT. When assessing the non-monetary costs and benefits, SJTs were the preferred option against seven assessment criteria; Reliability, Validity, Granularity, Consistency, Fairness, Compliance and Consultant Time. The SJT was not the least preferred option against any of the criteria.

3.8 Algorithm

The perceived advantage of the current system that 90% of applicants are allocated to their first choice Foundation School is a characteristic of the matching rule and the current ratio of applicants to posts, and not of the selection tools used to produce the ranking of applicants. The current matching algorithm, a hybrid of the First Preference First⁹ and Serial Dictator¹⁰ algorithms, allocated the highest possible number of candidates matched to their first choice Foundation School. However this does mean that where two applicants are competing for the last place at a school, a lower-scoring applicant for whom the school is a first choice will be given the place ahead of a higher scoring applicant for whom the school is not a first choice. Furthermore, analysis of 2009 data indicated that applicants not allocated to their first choice Foundation School may be allocated to a School as low as their 19th choice, with an average allocation to their sixth choice Foundation School.

There are some general measures which can be used to classify algorithms (matching rules) in terms of their effectiveness. Important properties include whether the matching is *stable* (i.e. there is no situation where an applicant is unmatched or would prefer to be allocated to a Foundation School, A, where A has an unfilled place or the applicant is preferable compared to at least one assignee), whether the matching is *exchange-free* (i.e. there is no set of two or more applicants who could arrange to

⁹ Priority is given to candidates for whom a school is first preference.

¹⁰ Candidates are matched to the school highest on their list of preferences that still has at least one post remaining.

exchange their school in some way so all of them would be better off), and whether the matching mechanism is *strategy-proof* (whether candidates can improve their chances by misrepresenting their preference list).

A value judgment needs to be made whether the preferred algorithm should maximise the number of first choice allocations, minimise the number of low choice allocations, or act in a pure Serial Dictator way, such that each applicant in turn is allocated to their highest preferred Foundation School (with remaining places) using the applicants' selection ranking scores, despite this not allocating the highest proportion of applicants to their first choice school. This latter method will have to be used should over-subscription occur.

The Steering Group recommends consultation with medical students, the UKFPO, Medical and Foundation School staff and employers around the preferred matching algorithm, informed by a series of briefing papers and a structured presentation.

4.0 The Preferred Options

The Steering Group had oversight of the evidence collected throughout the consultation exercise with stakeholder groups and the online survey; as well as expert advice, three academic literature reviews and the findings of the independent Cost Benefit Analysis. In the light of evidence that change is both necessary and that the changes will improve the selection process, the Steering Group's key recommendations (see 5.0 for these in full) are to pilot and evaluate:

1. SJTs to assess professional attributes, judgement and employability for a Foundation programme post

In combination with

2. A measure of Educational Performance of applicants at their medical school to assess clinical knowledge/ skills as well as wider personal achievement.

Underpinned by

3. Continuation of a national system with features such as anonymity and eligibility checking, special circumstances pre-allocation, paired applications, geographic flexibility and selection for AFP and allocation for military personnel.
4. Further consideration of the algorithm used to match applicants to Foundation Schools

The Independent Cost Benefit Analysis quantified the economic costs (to calculate a Net Present Value) of running each of the proposed short-listed selection options including retaining the current system. In order to calculate a score of non-monetary benefits, each of the options was scored on a scale of 0-10 (where 10 was the option that best meets that criterion) against the agreed Cost Benefit criteria defined in Para 3.5. In addition, each criterion was allocated a weighting (W_i) to reflect its importance relative to the other criteria. A performance matrix was constructed, constraining the scores, S_{ij} , and an overall weighted score such that $S_j = \sum_i W_i S_{ij}$. The weightings were developed by two members of the Steering Group, and subsequently reviewed by other members of the Steering Group and by representatives of the Foundation Programme Rules Group. All costing exercises and evidence to inform the Cost Benefit Analysis are detailed in the final report in Appendix D.

Some assumptions have inevitably been made in order to reach projected cost and weighted benefit estimates for the different options. In order to mitigate against the uncertainties around the assumptions, the CBA includes a sensitivity analysis to determine the extent to which plausible variations in scores, weightings or NPVs could affect the relative ranking of the different selection options. The sensitivity analysis found that regardless of how assumptions around costs and benefits changed within plausible realms, the overall ranking of the options was robust, with the SJT (including an Educational Performance component) and Educational Performance (alone) remaining the preferred options. Table 1 and Figure 1 summarise the costs and benefits including cost per benefit point of the different options.

Figure 1: Option overview

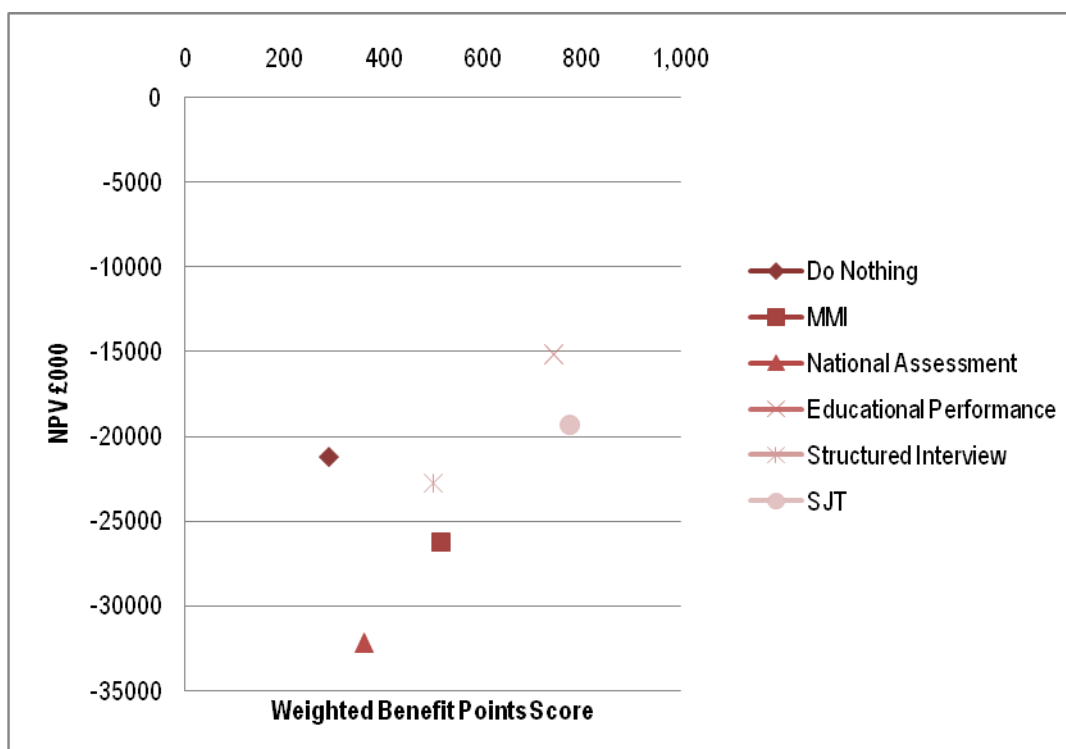


Table 1: NPV and benefit points of selection options over five years

Option	NPV -£,000.00	Total Benefit Points (weighted)	Cost per Benefit Point £
Current System	£21,223	290	£73,132
MMI (plus education)	£26,257	516	£50,916
National Assessment (plus education)	£32,187	361	£89,215
Educational Performance	£15,163	743	£20,403
Structured Interview (plus education)	£22,763	501	£45,438
SJT (plus education)	£19,301	775	£24,888

The relative desirability of the different selection tools is depicted in Figure 1, in which the top right corner represents the most desirable outcome – the highest benefit for the lowest cost - and the bottom left, the least desirable. Two selection tools, SJT (including an Educational Performance component) and Educational Performance (alone), are projected to have a lower NPV over a five year period than the current system. All of the selection options have a higher weighted Benefit Points total than the current system, with Educational Performance and SJT (including an educational performance component) scoring highest, and the lowest cost per benefit point. Under the Educational Performance Measurement (alone) option, an educational performance score is the only measure being used for selection. Therefore, it is necessary that the measure of educational performance alone encompasses the full range of knowledge, skills and attributes to be assessed during selection, and be sufficiently reliable that it can be used alone.

These are the key assumptions underlying the high score of the Educational Performance Measurement alone. The cost benefit analysis results shown above assumes it would be possible for Medical Schools in the UK to agree an all encompassing and suitably robust, valid and fair approach to scoring the performance of their students, which could be reliably followed by non-UK

medical schools, with no need for any other selection tool. If this assumption is incorrect, the economic advantages would fail to offset the other shortcomings. To mitigate the risks of over reliance on a single selection method, both the Steering Group and the Expert Panel recommend the use of two selection tools which in combination assess the professional judgements and likely behaviours as well as the knowledge and skills required of Foundation doctors. Therefore, although Educational Performance (alone) is shown to have the lowest cost per benefit point, it is thought that there is risk that the key underpinning assumption may not be feasible.

The Steering Group recommends the selection option of SJT in combination with an educational performance measurement. The proposed combination is compared with the current system in the table below:

Concern of current system (as detailed in Para 1.2)	SJT and Educational Performance, underpinned by Common Content of Assessment
The use of 'white space' questions is not sustainable as a selection tool, and will become steadily less discriminatory between candidates given that there is a limited range of new questions that can be generated.	SJTs will require a bank of questions to be available for each application round. Given that the situations experienced in the Foundation Programme are varied and complex, a bank of new questions can be built incrementally and continuously against a detailed job analysis
The use of 'white space' questions in non-invigilated conditions is logistically simple but raises concerns around the risk of plagiarism and coaching.	SJTs will be undertaken in invigilated conditions
The marking of 'white space' questions is labour intensive.	SJTs are machine markable.
The academic quartile system makes it difficult to compare fairly between applicants from different universities, as it is not standardised or subject to quality assurance across Medical Schools.	The Educational Performance Measurement will be derived from an agreed standardised framework, which will be applied to all applicants (UK and non-UK) to the Foundation Programme.
Given the issues outlined above, if there is an increase in the number of eligible non-UK applicants such that the Foundation Programme is over-subscribed, the selection process may be more likely to be subject to legal challenge from those who have failed to secure a training post in a Foundation School.	The combination of an SJT with a standardised, fine-grain (differential) Educational Performance Measurement will improve the legal robustness of the selection system. The Steering Group will consult further around the choice of matching algorithm. Further, definitive legal advice will be obtained once the detail of the proposed system has been developed.

Further description of the recommended components of the new selection system is given below together with a brief outline of the proposed piloting. A detailed project plan, for the next stage of the work, supported by a feasibility study, is being developed and submitted for consideration by the DH.

4.1 Educational Performance Measurement

Each Medical School will provide a fine-grain (differential) educational performance ranking score for every applicant from that school. The ranking will be based on the applicant's performance in his/her educational progression at Medical School up to that point.

The ranking score will be derived by use of a transparent standard framework, which will be agreed through the Medical Schools Council working with its constituent Medical Schools and in consultation with medical student representatives, as well as other key stakeholder groups. The score will be derived from a number of curricular (and possibly non-curricular) elements with an agreed weighting for each of these across all schools.

The framework will be weighted towards applicants' performance in assessments of clinical skills and application of knowledge, particularly in the later parts of their programme. Depending on agreement between all Medical Schools and informed by the evaluation of pilots, it may include other elements of performance including; option activities (e.g. student selected components); academic prizes or additional degrees; and achievements outside the programme.¹¹ The information will be required about 9 months before the applicant would be awarded a degree and so covers assessments made up to that point. All Medical Schools graduating students who have applied for the UK Foundation Programme will have to provide a statement as to how they have adhered to the standard framework for producing the ranking for their applicants.

The educational performance ranking score will be weighted with the score produced by the Situational Judgement Test to provide a composite score that will be used in assigning applicants to Foundation Schools. The relative weighting of two components will be informed by modelling the data gathered during piloting and will aim to produce the most valid and reliable composite score.

A definition of an Educational Performance Measure is provided in Appendix I.

Piloting:

Subject to legal opinion and approval, the next stage of the Selection to Foundation Programme project will be to agree a common framework, pilot and evaluate an Educational Performance Measure. The first stage will be for Medical Schools Council to set up a small group with appropriate representation, including medical students and others, to consider the feasibility of the approach and produce a draft standard framework and timeline for further discussion and approval.

4.2 Situational Judgement Tests

An SJT will be used in selection, initially as a paper based assessment of the judgement of applicants in hypothetical work-based scenarios testing attitudes, ethical values and likely professional behaviours, which will help reassure patients and employers. Work will be commissioned to determine the feasibility of an annual computer generated and marked SJT for about 8000 candidates. This will involve a detailed job analysis of the Foundation Programme to determine the appropriate domains to be tested, and determination of how many questions will need to be produced to ensure reliability, consistency, and security. Once the initial question bank has been written, piloting and evaluation will be necessary.

The SJT will be taken by all UK, EU and eligible non-EU applicants under invigilated conditions in the UK. There will be more than one test and assessment venue to allow for considerations such as timings of electives. Given this, there will need to be an element of overlap in the questions asked of candidate in different tests so that the scores can be placed on a single scale (test-equating). Answers will be multiple-choice and marking will be automated.

The detail of SJTs will be informed by outputs of the pilots, including the number of questions, the format of delivery and how the SJT score will be weighted with the educational performance ranking score to provide a composite score that will be used in assigning applicants to Foundation Schools.

A definition of an SJT, and example questions, is provided in Appendix J.

Piloting

Subject to legal opinion and approval, the next stage of the Selection to Foundation Programme project will be to set up, pilot and evaluate an SJT as a major component of a new selection system. The first stage will be for the Steering Group to

¹¹ There was a mixed response to the online questionnaire whether extra-curricular activities should be included as a measure within the application process, with two thirds of medical students agreeing with this in principle, but just 16% of consultants in agreement.

commission a feasibility study, including consultation with the Medical Schools Council, the UKFPO, employers and students and to consider the practicalities of the approach, proposed timeline and to construct a detailed project plan.

4.3 Clinical communication

It was only possible to take legal advice once the options had been assessed. The advice (Appendix A) does however have profound implications for employers. The barrister pointed out to the Steering Group that Article 53 of the EU Directive on the Mutual Recognition of Professional Qualifications states that:

Persons benefiting from the recognition of professional qualifications shall have a knowledge of languages necessary for practising the profession in the host Member State.

He confirmed that 'in the case of doctors it would be lawful to require a standard of language proficiency commensurate with clinical practice. On this basis, requiring more than just basic English language ability would be consistent with the Directive'. At its final meeting on 9 September 2009 the Steering Group agreed that reassuring employers that Foundation Doctors were able to communicate safely and effectively with patients and colleagues was highly desirable. It would therefore seem prudent to take forward work around the implications of this Opinion.

5.0 Recommendations

Having considered the range of evidence, the full recommendations of the Steering Group are that:

- 5.1 The current mechanism for allocation/selection is not sustainable in the long term and so work must begin immediately to pilot alternative evidence-based mechanisms of allocation/selection.
- 5.2 Job analyses should be undertaken for the Foundation Programme in order that selection tools might be based on a more detailed person specification that should include safe clinical communication in English
- 5.3 Work should begin to develop and pilot Situational Judgement Tests (SJT) which would assess the professional behaviour, judgement and fitness for purpose of applicants based on a detailed personal specification.
- 5.4 UK Medical Schools should work together to develop a common framework which will be used by all schools to provide a fine grain (differentiated) ranking of education performance of applicants in Medical School. The impact of using this measure of educational performance should be piloted against current procedures.
- 5.5 Successful pilots of each of the selection tools, independently and in combination, are a pre-requisite for any change to be implemented. The relative weighting of two components will be informed by modelling the data gathered during piloting and will aim to produce the most valid and reliable composite score.
- 5.6 There should be consultation with students, employers and other stakeholders as to the preferred matching algorithm
- 5.7 A tracking mechanism should be introduced so that progress of all doctors through the Foundation Programme and beyond can be linked to initial selection. This will enable thorough evaluation of the effectiveness of the proposed selection option.
- 5.8 The new selection tools should not be implemented before the 2012 Foundation Programme so as to allow sufficient time for in-depth piloting and further consultation and communication with key stakeholders.
- 5.9 A feasibility study should be commissioned as a matter of urgency to provide:
 - A detailed plan as to how the new approach is intended to work, including the identification of any significant assumptions, options or uncertainties, and definition of what constitutes the success of the new arrangements, and how these will be measured
 - Identification of any significant constraints to the way forward
 - Identification of all of the key conditions that must be met in order for a successful outcome to be achieved and investigation of the conditions to confirm that they can be satisfied.