National pre-registration pharmacist recruitment evaluation report
Phase 1

Executive Summary

Background

Currently there are approximately 2800 preregistration pharmacists trained each year in England and Wales. In 2015 Health Education England launched a Pharmacy Education Reform programme to improve the quality of pre-registration pharmacist training. A key project within this was the development of a Pre-registration Pharmacist Recruitment Scheme for England and Wales. The scheme was introduced in 2017; mandated for all HEE funded posts and optional for community pharmacy places funded by NHS England. In year one, the majority (2161 of approximately 2800) of pre-registration pharmacist posts were advertised via this route.

Pre-registration pharmacist recruitment and selection should be reliable, valid, acceptable, feasible, cost effective, fair and have a positive impact on education, training and quality. The aim of the Pre-registration Pharmacist Recruitment Scheme was to eliminate variation in recruitment into these training posts and bring it into line with other professions, notably medicine, dentistry and health care science. Applicants submitted a single application using the Oriel IT system and were allocated their highest preferred place, based on their performance in selection centres.

This report provides a short-term outcome evaluation exploring the immediate impact of the new recruitment scheme and with a particular focus on the reliability, validity, fairness and acceptability of the selection methods used as part of the recruitment process.

Key findings

Overall, findings suggest that the pre-registration pharmacist recruitment scheme is effective, fair and supports all applicants who exceed threshold interview scores to stay in the selection process.

The selection methods utilised within the scheme were evidence-based, demonstrated good levels of quality and difficulty and were able to effectively differentiate between applicants. There were good levels of acceptability for both applicants and interviewers.

The fill rate overall was 75%. All places were filled in hospitals. In community pharmacy it was lower than expected (62%) and in some subgroups e.g. medium sized community pharmacy businesses, less than half of advertised places were filled.

Twelve percent of applicants deemed appointable following the selection process did not have a pre-registration training place offer at the end of the recruitment process. These applicants can be clearly categorised as either requiring tier 2 sponsorship or not preferencing enough programmes.

Through the National Pre-registration Pharmacist Recruitment Scheme, places were offered and accepted for approximately 60% of all pre-registration pharmacist posts in England and Wales due to commence in August 2018. Action planned as a result of this evaluation will aim to ensure the scheme achieves increasing fill-rates over subsequent years.

Next steps

As a priority, HEE will continue to work with community pharmacy representatives and employers to identify actions that will positively impact upon application numbers and fill-rates for this sector.

A number of amendments have been made to the application process and systems for 2018, to enhance the accessibility and flexibility for the next cohort of applicants seeking pre-registration training through the national recruitment scheme.

With the aim of improving the applicant experience and improving efficiency, the Situational Judgement Test and Numeracy Test elements of selection will move from a paper-based format to on line delivery in 2018.

Phase 2 of the evaluation strategy is now planned, with an emphasis on obtaining a deeper understanding of overall recruitment process engagement as well as the longer-term impact. A priority area of focus in this second phase is further study into applicant behaviours throughout the recruitment process. A greater understanding of participation factors, preferencing behaviour and subsequent decisions about training place offers will support identification of key influences and interventions for better outcomes.

Further recommendations

The following recommendations have been proposed for future consideration as part of the ongoing planning and review of the national pre-registration pharmacist recruitment scheme:

Findings around group differences in performance are in line with differences observed in other selection processes for similar professions, however further investigation and evaluation of identified differences is recommended to inform and support future assessment development.

In accordance with best practice, it is recommended that a validation study is built into the longitudinal evaluation plans to identify the relationship between applicant scores in selection and their performance in the pre-registration training year.

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1. Introduction

1.1. Evaluation of the national pre-registration pharmacist recruitment scheme

Health Education England (HEE) exists for one reason only: to support the delivery of excellent healthcare and health improvement to the patients and public of England by ensuring that the workforce of today and tomorrow has the right numbers, skills, values and behaviours, at the right time and in the right place.

HEE aims to deliver more a responsive pharmacy workforce, equipped with the skills to deliver a clinical service across all care settings and adapt to new ways of working. To achieve this, HEE are working to enhance the current pre-registration pharmacist training, creating an education system which is sustainable to meet future patient needs, and, with NHS England, develop pharmacists' clinical assessment and decision making skills, and their consultation skills. HEE's work on training for pre-registration pharmacists starts with developing more appropriate systems of recruitment and selection, and leads onto enhanced workplace support for the tutor and pre-registration pharmacist.

A new national recruitment scheme for pre-registration pharmacists was introduced in 2017. The scheme utilises the Oriel IT platform, ensuring that recruitment of pre-registration pharmacists into training is consistent with other health care professionals across the NHS recruitment, and selection is based on evidence based methods that ensure recruitment of pre-registration pharmacists into training is consistent with other health care professionals across the NHS. Selection involves evidence based methods to ensure that pre-registration pharmacists employed to provide NHS services possess the values required to work within the NHS.

It is essential that pre-registration pharmacist recruitment and selection is reliable, valid, acceptable, feasible, cost effective, fair and has a positive impact on education, training and quality. All important aspects of this new national recruitment scheme are to be evaluated and a dedicated work stream has been formed within the pharmacy recruitment programme to facilitate this. The pre-registration pharmacist recruitment evaluation strategy comprises two distinct phases:

Phase 1: Short-term outcome evaluation exploring immediate impact and with a particular focus on the reliability, validity, fairness and acceptability of the selection methods used.

Phase 2: Longitudinal evaluation exploring engagement with the recruitment process and long-term impact on education, training and placement quality. Some elements of the Phase 2 evaluation strategy will be contingent on emergent findings from the first Phase of evaluation.

This report provides a summary of Phase 1 evaluation activity.

1.1.1 Evaluation aims and objectives

The Phase 1 evaluation aims to ascertain:

1. The demographic characteristics of the applicant population
2. The reliability, validity, fairness and acceptability of the selection methods used
3. The views and experiences of interview panel members and applicants participating in the scheme

The evaluation project team has undertaken internal analysis of applicant demographic data, for inclusion in this report.

Work Psychology Group were commissioned by HEE to develop, implement and evaluate two selection methods used in the National Recruitment scheme. To support the overall evaluation strategy, a key objective of the commissioned work was to evaluate these selection methods against the best practice evaluative criteria[1] in terms of assessment performance, including reliability, validity, fairness and acceptability amongst stakeholders.

Details regarding the operational construction for both the Situational Judgement Tests and Multiple Mini Interview, a summary of the scoring processes (including cut-score analyses) for each selection method, an overview of evaluation findings and a set of detailed recommendations are outlined in this report.

Analysis of the Numeracy test results has been undertaken internally. Details of the development and implementation process along with a summary of the results is included in this report.

1.2 Background and supporting context

The most common route to registration as a pharmacist requires trainees to complete a 4-year MPharm degree followed by a 1-year pre-registration training programme and examination. During the pre-registration year trainees are employed predominantly in either hospitals (NHS) or community pharmacy (private sector). Within the NHS, recruitment into pre-registration training posts in England and Wales has previously been managed through the NHS Pre-registration Recruitment Scheme (Pharmalife). The process of managing applications and making offers was carried out at either a regional or Trust level.

As part of the HEE Pharmacist Education Reform Programme, a decision was made in February 2016 to standardise recruitment into all HEE funded pre-registration pharmacist training positions. The requirements for this are set out in HEE's mandate for 2016/17:

- develop methods for recruiting and selecting pharmacist trainees for pre-registration training places through integration into the wider systems applied in medical, dental and healthcare science and focussing on the quality of the training to ensure that pharmacist trainees will be able to meet patient and service requirements by December 2016

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[1] Patterson, F. (2012). Selection Methods. In Cleland, Dowell, McLachlan, Nicholson, & Patterson, *Identifying best practice in the selection of medical students*. Research report to the General Medical Council.

- ensure that pharmacists' pre-registration education is fit for purpose, including the introduction of a Professional Attributes Framework (PAF) to inform the development of selection tools to aid pre-registration pharmacist recruitment.

Using the same methodology that was employed when other professions or specialties transferred to ORIEL, a Process Alignment Group (PAG) was established in Autumn 2015. The group was representative of hospital employers, Pharmacy Voice, BPSA, HEE local offices and hospital pre-registration pharmacist training providers. PAG proposals for how pre-registration pharmacists could be recruited using ORIEL in future were shared widely at 2 national recruitment roadshows in January 2016, attended by over 150 delegates, with positive response.

Following a year-long development period, a new national recruitment scheme for pre-registration pharmacists was introduced in 2017. The scheme requires students to submit one application to apply for training place/s within all pre-registration training programmes included in the scheme. In 2017, this included all HEE funded programmes and training places based in hospitals across England and Wales. Where community pharmacy employers had formally 'opted-in', NHS England funded community pharmacy pre-registration training places were also included in the scheme.

1.2.1 Governance and supporting structures

To ensure effective delivery of the recruitment of pre-registration trainee pharmacists, a Pre-registration Pharmacists Recruitment Operations Group (PPROG) was formed in August 2016. This is an operational and strategic group, whose primary function is to review all aspects of the recruitment process to ensure it is fit for purpose and meets the needs of the pharmacy workforce, as well as ensuring the safe transition onto ORIEL. Core membership of the PPROG is representative and the full membership list can be found in Appendix A.

The PPROG reports into the Pharmacy Assurance Board and is accountable to the HEE Directorate of Education and Quality Senior Leadership Team. In parallel with this it reports into the Medical and Dental Recruitment Scheme Programme Board which is responsible for the delivery of all recruitment via Oriel. The workstream is funded by the HEE Pharmacist Education Reforms programme. The pre-registration pharmacist recruitment scheme is nationally led through a lead recruitment office (PNRO) and lead Pharmacy Dean, with regional operation of selection centres.

An evaluation project workstream was established by the PPROG to inform and develop the pre-registration pharmacist recruitment evaluation proposals and prioritisation. A separate Pre-registration Pharmacist Recruitment Evaluation Steering Group provides leadership and accountability for this workstream and reports into the PPROG via the Evaluation Project Lead. Figure 1 provides an overview of the governance structure for the pre-registration pharmacist recruitment scheme project.

Figure 1: Governance structure: National Pre-registration Pharmacist Recruitment Scheme

1.2.2 Development of the Pre-registration Pharmacist Professional Attributes Framework

A core pre-registration pharmacist person specification was drafted by a sub-group and informed by national stakeholder events in January 2016. The skills and attributes section reflects the Pre-registration Pharmacists Professional Attributes Framework (PAF)[2], developed by Work Psychology Group in early 2016 and launched in July 2016. Over 1000 people contributed to the development of the PAF and it demonstrates that a common set of attributes is required for trainees, regardless of the sector in which they work.

1.2.3 Development and piloting of Situational Judgement Test and Multiple Mini Interview

Work Psychology Group (WPG) were awarded the contract to develop selection methods and interview panel member training for the national recruitment scheme. When selecting the specific methods to employ, a number of considerations were taken into account including, ability to assess the attributes identified, evidence of reliability and validity, cost-effectiveness and practicality. On this basis, two methods were selected. Firstly an MMI; a method that allows multiple measurement of attributes across different exercises whilst also providing the opportunity for candidates to meet with interview panel members face to face and respond to open questions. To complement the MMI, an SJT was also selected, with this method also able to accurately assess non-academic attributes in a reliable way. Further, due to the nature of the selection process (i.e. to rank candidates based on performance to allocate placement choices), an SJT has a further benefit of providing a large score range thus providing the granularity required for ranking.

A Situational Judgement Test (SJT) and a Multiple Mini Interview (MMI) for selection into the pre-registration pharmacist role were developed and piloted by Work Psychology Group in 2017. This pilot was designed to confirm the appropriateness of the SJT and MMI assessment

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[2] Patterson, F., Flaxman, C., Fleming, G., Ashworth, V. (2017). 'Role Analysis and Development of a Professional Attributes Framework for Preregistration Pharmacists in the UK', paper presented to An International Association for Medical Education (AMEE), Helsinki, August 2017. Accessed 27th November 2017, https://amee.org/getattachment/Conferences/AMEE-2017/AMEE-2017-APP-DATA/8E-RP.pdf

specifications. Results of the pilot analysis indicated that the SJT and MMI are appropriate measures for use as part of selection into the Pre-registration Pharmacist role[3]. The findings provided good evidence that the assessment specifications for both measures were suitable for the context and were therefore used, with target attributes remaining the same, in the further development of operational SJT and MMI for the national recruitment scheme.

The resulting assessment matrix and assessment specifications for the SJT and the MMI can be found in Appendices B to D.

1.2.4 Development and piloting of the numeracy test

The numeracy test was designed to set a minimum standard and to support identification of extreme poor performers. To ensure the numeracy test would be inclusive to all candidates and pitched at the correct level, it was developed by a steering group that consisted of a range of pharmacist professionals. This included experience in community and hospital pharmacy practice, MPharm undergraduate training, pre-registration training and the GPhC registration assessment (via representation from members of the Board of Assessors and Standard Setting Panel). Measures were taken to ensure data protection was achieved and non-published information was not discussed.

All tests were initially internally piloted by members of this group to ensure consistency, equivalency and accuracy. Further piloting was conducted on a sample of 4th year MPharm students.

1.3 Overview of the application and offers process

1.3.1 Application and preferencing

Applicants had a one-month window to complete and submit their single, online application and to preference the training programmes they were interested in. Applicants were able to use a number of filters when preferencing programmes based on the information provided by employers. These filters enabled applicants to quickly narrow down to the geography or type of training experience they were most interested in. Applicants were encouraged to select as many training programmes as they would be willing to accept, and ideally a minimum of thirty.

The 2017 pre-registration pharmacist recruitment scheme listed 1300 programmes for applicants to choose from. Programmes could have numerous training places available within them and, in total, 2161 training places were available across all programmes. Depending on organisational infrastructure and geographical spread of sites, some employers listed all training places available in their organisation as a programme and some employers listed training places in individual pharmacies as a programme. Table 1 below provides an overview of the numbers of employing organisations, programmes and training places available in the scheme, broken down by sector and Table 2 provides information regarding the geographical spread of training places.

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[3] Work Psychology Group. (2017). *Development of Selection Methods for National Pre-registration Pharmacist Recruitment.* Interim report to Health Education England.

Table 1: Pre-registration training place availability in the 2017 National Pre-registration Pharmacist Recruitment Scheme

Sector	Number of Employing Organisations	Number of Programmes	Number of Training Places	Number of Tier 2 Sponsor Licences
NHS Hospital	172	218	734	733
Large Community Pharmacy (*200+ branches*)	5	666	759	4
Medium Community Pharmacy (*25-200 branches*)	14	68	168	0
Small Community Pharmacy (*6-25 branches*)	37	98	176	4
Independent Community Pharmacy (*1-6 branches*)	207	250	324	18
TOTALS	**435**	**1300**	**2161**	**759**

Table 2: Geographical spread of training places, by sector

HEE Pharmacy Region	HEE Local Area	NHS Hospital	Large Community Pharmacy	Medium Community Pharmacy	Small Community Pharmacy	Independent Community Pharmacy
Midlands and East	West Midlands	55	79	56	11	3
Midlands and East	East Midlands	43	60	22	14	7
Midlands and East	East of England	73	93	1	25	36
London and South East	Kent, Surrey and Sussex	48	83	15	2	49
London and South East	London	197	63	6	73	182
North	North East	42	48	8	0	0
North	North West	69	71	26	11	4
North	Yorkshire and the Humber	54	86	10	9	5
South	South West	47	90	1	9	3
South	Thames Valley	28	28	6	0	16
South	Wessex	31	38	5	15	4
Wales	Wales	47	20	12	7	15
TOTALS		**734**	**759**	**168**	**176**	**324**

1.3.2 Special circumstances and reasonable adjustments

Applicants were able to request to be placed in a particular region for their training through an additional special circumstances process, if they satisfy the following criteria:

1. Are the primary carer for someone who is disabled, as defined by the Equality Act 2010

2. Have a medical condition or disability for which ongoing follow up for the specified condition in the specified location is an absolute requirement

Requests for special circumstances must be made prior to the close of the application window. If an applicant is subsequently deemed eligible for special circumstances, and subject to them being deemed appointable at interview and receiving a ranking high enough to be offered a programme, they will be pre-allocated a training place in their preferred region prior to the offer algorithm running for all applicants. A summary of special circumstances applications received for the 2017 scheme can be found in section 2.3.6.

Applicants were also able to request reasonable adjustments during the recruitment process, in line with the Equality Act 2010. Requests for reasonable adjustment must be made prior to the close of the application window. If the request is approved, applicants with disabilities are eligible to receive support at the assessment and/or selection centre stages of the recruitment process through the implementation of reasonable adjustments. A summary of reasonable adjustments made during the 2017 scheme can be found in section 2.3.6.

The full 'Flexibility in Deployment of Pre-registration Pharmacist Trainees (England and Wales)' and 'Supporting applicants with a disability at the assessment/selection centre stages of a recruitment centre process' policies can be found in the Pre-registration Pharmacist Recruitment applicant Handbook 2017[4].

1.3.3 Assessment centre selection

A longlisting process took place after the application window had formally closed. Longlisting is designed to confirm basic eligibility of the applicants to apply for a pre-registration training position. As part of the longlisting process, applicants may have been asked to provide additional information/documentation to support their application. Only complete applications were assessed against the longlisting criteria.

All longlisted applicants were invited to interview and were able to book a selection centre slot, at any selection centre, online via the ORIEL system. Applicants had a two-week window in which to self-select their centre slots. Table 3 below shows the available selections centre dates and venues. There was limited capacity on each selection centre day and therefore slot bookings were offered on a first come first served basis.

Table 3: Regional selection centres

2017 Selection Centre Dates	Venue
11 – 15 September	Newmarket Race Course (Newmarket)
12 – 13 September	Cardiff City Stadium (Cardiff)
18 – 22 September	Kassam Stadium (Oxford)
18 – 19 September	St James Park (Newcastle)
19 – 20 September	KCOM Stadium (Hull)
21 – 22 September	Etihad Stadium (Manchester)

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[4] Pre-registration Pharmacist Recruitment Applicant Handbook: *https://www.oriel.nhs.uk/Web/ResourceBank/Download?file=2e335bb8-fa95-44fa-8361-c7bc29fe4cd2.pdf&name=PreregistrationPharmacyRecruitmentApplicantGuide_FINAL.pdf*

25 – 29 September	Stewart House (London)

At the selection centre, applicants sat a Situational Judgement Test (SJT), a Numeracy Test, and completed Multiple Mini- Interviews (MMI). See section 1.4 for more information.

1.3.4 Applicant ranking

The scores of all applicants from the regional selection centres were centrally collated to produce a single national ranking list. All applicants that performed at or beyond the required competency standard were allocated a ranking and were therefore considered 'appointable' and eligible to receive a pre-registration training place offer. Each applicant was allocated a unique ranking to enable differentiation from all other applicants within the ORIEL system so that they could be appropriately allocated a pre-registration training place according to the order in with which they ranked their programme preferences.

Applicants who did not meet the pass threshold for one or more selection methods will not have received a ranking and were subsequently removed from the process.

1.3.5 Training place offers

Offers were coordinated through the ORIEL system by the Pharmacy National Recruitment Office (PNRO), during a five-week offers window. Offers were allocated according to an applicant's rank and the order with which they ranked their programme preferences. Applicants were notified of offers by email and were given 48 hours (excluding weekends and bank holidays) to accept or decline an offer.

With the exception of unconditional acceptance of offers by applicants, offer activity remained fluid until the offers window closed. Applicants were able to accept their pre-registration training place offer with or without opting into an 'upgrade' process if they are not offered their highest preference of programme. Upgrades were offered to applicants if a programme became available that was higher on their list of preferences, usually the result of another applicant declining an offer. Applicants who declined their offer or who let their offers expire were removed from the process and were not eligible to receive any subsequent offers.

1.3.6 Clearing

A clearing process was employed during the offers window. This was a special measure implemented by the PNRO in response to the high number of applicants that were deemed appointable but did not preference enough programmes and were not made an offer during the initial offers round. Eligible applicants were given the opportunity of re-preferencing programmes during this time.

1.3.7 Release of information to employers

After the offers window closed, information was released to the employer whose programme the applicant accepted. The release of information to employers took place in early January 2018. Any further changes an applicant wishes to make to their offer acceptance status after information has been released to employers is managed directly with employing organisations.

1.4 Operational construction of the selection process

The selection process is comprised of three parts:

1. Situational Judgement Test (SJT) – 104 minutes
2. The Multiple Mini-Interview (MMI) – 39 minutes
3. Numeracy Test – 15 minutes

The order in which applicants sat the SJT and MMI varied depending on the selection centre slot that they had selected. As it takes place in the same setting, the numeracy test was always scheduled to take place immediately after the SJT. Table 4 summarises the two available timetables for undertaking selection centre assessment.

*Table 4: Selection Centre Slot Running Orders*Table

Order A	Time	Selection Method
1	104 minutes	SJT
2	15 minutes	Numeracy
Break	**Break**	**Break**
3	39 minutes	MMI
Finish	**Finish**	**Finish**
Order B	**Time**	**Selection Method**
1	39 minutes	MMI
Break	**Break**	**Break**
2	104 minutes	SJT
3	15 minutes	Numeracy
Finish	**Finish**	**Finish**

1.4.1 Situational Judgement Test (SJT)

SJTs are a measurement methodology designed to assess judgement in work relevant situations. The SJT is a written test examining four of the attributes from within the Pre-registration Pharmacist Professional Attributes Framework (PAF). Applicants are asked to place themselves in the role of a Pre-registration Pharmacist and indicate what they should do in response to the situation presented. Within the SJT there are two types of response format:

1. Ranking five responses in order of appropriateness in response to the scenario
2. Multiple choice; selecting the three most appropriate actions (out of a total of 8) in response to the scenario

Two operational versions of the SJT were developed and the version that applicants sat was randomly allocated based on location and date that they attended the selection process.

Each SJT consisted of 52 scenarios. Of these, 45 were operational and 7 were pilot scenarios. There were 25 ranking operational items and 20 multiple choice operational items within each paper version, plus the 7 additional trial items.

1.4.2 Multiple Mini Interviews (MMI)

The MMI consisted of six short, practical exercises; each exercise measured two attributes and was assessed by two interview panel members. The six exercises were grouped into three stations, which comprised of a 'seen' exercise (i.e. where a short scenario or piece of information was provided before the exercise began) and an 'unseen' exercise. For each station, the applicant remained in the same assessment room and was assessed by the same two interview panel members. There were four circuits, each comprising of a different version of each of the six exercises. Figure 2 below provides a visual example of an MMI circuit.

Figure 2: MMI circuit example

Start time 11:00

11:13

11:26

Station 1
- Prep (3 mins)
- Exercise 1a (5 mins) — Scenario based exercise
- Exercise 1b (5 mins) — Past behavioural interview question

Station 2
- Prep (3 mins)
- Exercise 2a (5 mins) — Scenario based exercise
- Exercise 2b (5 mins) — Past behavioural interview question

Station 3
- Prep (3 mins)
- Exercise 3a (5 mins) — Scenario based exercise
- Exercise 3b (5 mins) — Past behavioural interview question

Finish time 11:39

*Please note, exact content of the stations may vary, the above is shown for demonstration purposes only.

As part of the MMI process, interview panel members could give applicants a 'red flag' if it was deemed that the applicant had behaved in a way that would be viewed as unacceptable by a future employer (rather than just due to poor performance on the exercise).

Interview panel members were given guidance on what types of behaviour could trigger a red flag during the MMI, with examples including the display of aggressive or abusive behaviour or in relation to patient/customer safety concerns.

Any red flags that were triggered were reviewed as soon as possible by the Pharmacy Selection Centre Lead and Lay Representative, with a decision made as to whether they would be upheld.

1.4.3 Numeracy test

Numeracy is an essential pharmacy skill to ensure therapeutic dosing, safe administration and correct supply of medications[5]. Numeracy aptitude is tested during MPharm courses across the

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[5] General Pharmaceutical Council. (May 2011). Future pharmacists. Standards for the initial education and training of pharmacists. Available from:

country and is assessed by the General Pharmaceutical Council (GPhC) in a dedicated calculations assessment paper as part of the pharmacist registration process at the end of the pre-registration year[6]. The GPhC calculations assessment is based upon the framework outlined in Table 5 below. Some framework domains are more complex in nature and so better suited to developing skills in the final year of MPharm and in pre-registration years. Other areas however should be developed by end of the third year of MPharm and were therefore used in the development of the numeracy tests for the national recruitment scheme.

Table 5: GPhC calculation skills assessment framework

GPhC Assessment Framework Calculation Skills	Covered in National Recruitment Numeracy
Doses and dose regimens	Yes
Dosage and unit conversions	Yes
Estimations of kidney function	No
Displacement volumes and values	No
Concentrations (e.g. expressed as w/v, % or 1 in x)	Yes
Dilutions	Yes
Molecular weight	No
Using provided formulae	Yes
Infusion rates	No
Pharmacokinetics	No
Health economics	No
Quantities to supply	Yes

The numeracy test consisted of 10 questions, with free-text responses, designed to provide assurance of an applicant's ability to carry out basic pharmaceutical calculations. Assessment duration was 15 minutes and applicants were permitted to use stand-alone calculators within the assessment. Each paper had the same questions but with different numbers within the calculation (so producing differing answers) and were set in a different order; this was to ensure that applicants were not advantaged or disadvantaged during the staged recruitment process throughout the 8 venues, across the 15 dates.

Applicants recorded their answers by hand using a standardised answer sheet, the format of which is commonly used among universities and within the GPhC assessment. Figure 3 below gives an example of how an answer of 96mLs would need to be recorded. Instructions on completing the answer sheets correctly were provided to applicants via a rubric on the front of the numeracy test. Applicant answers were marked by interview panel members at each of the assessment centre, using a standard answer sheet.

Figure 3: Example Numeracy Test answer

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https://www.pharmacyregulation.org/sites/default/files/document/gphc_future_pharmacists_may_2011.pdf [Accessed 3rd January 2018]

[6] General Pharmaceutical Council. (2018). Pre-registration Manual. Section 5. The registration assessment. Available from: https://www.pharmacyregulation.org/the-registration-assessment [Accessed 3rd January 2018]

				9	6	.	0	0	Millilitres

1.5   Test scores

Work Psychology Group, in conjunction with HEE, facilitated a dedicated stakeholder workshop as part of the selection methods development process, to consider the evidence and support final decisions in relation to the test scoring systems i.e. weightings, aggregation and addressing tied-scores.

1.5.1 Situational Judgement Test (SJT)

A 'near-miss' scoring convention was utilised for the SJT, whereby applicants were awarded points relative to how aligned their responses were to the scoring key (rather than it being an 'all or nothing' scoring approach). Statistical equating procedures were used to account for any small differences in test difficulty, not due to differences in the applicant population.

To enable effective combination of the SJT score with the MMI score, the SJT scores were transformed onto a scale ranging from zero to 90 to align with the MMI scale (range 24-120), using a linear transformation.

Extreme low scores (more than four and a half standard deviations below the mean) were set to zero as they are deemed 'unappointable'. Any applicants scoring zero were considered no longer suitable to proceed to the allocation of places.

Table 6 below provides an overview of the range of standardised scores that were provided to applicants and the number of applicants that fell into each bracket. The four score bands were based upon percentiles (those falling below 55.0 were below the 30th percentile and those scoring above 69.0 were the 80th percentile or above).

Table 6: Range of standardised SJT scores and breakdown of applicants within each scoring band

Standardised score range	Percentage of applicants scoring in this range	Score Meaning
0-27.0	2%	Very poor level of performance
27.1-55.0	28%	Below average performance
55.1-69.0	50%	Good level of performance
69.1-90.0	20%	Very good level of performance

1.5.2 Multiple Mini Interview (MMI)

An applicant's total MMI score was based upon an accumulated score from across the six exercises completed. As each exercise measured two attributes and was assessed by two interview panel members, 24 individual scores made up an applicant's total score, with scores ranging from 24-120.

To set the cut-score for the MMI, the borderline regression method was used, which is noted as a best practice method for setting a cut score based on human judgement. Once the pass mark was set, a review event was held to review a subset of applicants falling, just above, below and on the pass mark to ensure that it was set at the appropriate level. The pass mark was deemed suitable and was therefore not changed following the review.

Any applicants falling below the pass mark were considered no longer suitable to proceed to the allocation of places.

1.5.3 Numeracy test

The numeracy test used as pass/fail with applicants being required to score over a set threshold to be eligible to be made an offer. The numeracy test was designed to set a minimum standard and a wide difference in scores was not expected. Therefore, the test was not used to differentiate between applicants and scores received for the numeracy test were not included within the combined score used for decision-making.

Applicants failing to meet the 'pass' threshold were considered no longer suitable to proceed to the allocation of places. The pass-threshold was set at 30% to ensure that only candidates with very low numeracy skills were removed from the process, whilst acknowledging that those who received 40-70% would be coached during their final MPharm year and pre-registration year to achieve standard expected for the GPhC registration assessment and future careers.

1.5.4 Aggregated score and tie-breakers

Total scores were used to rank appointable individuals against all other appointable applicants. An individual's total score, informing their overall ranking, was determined by the scores for the MMI and the SJT. These were weighted and combined to create a total score:

- MMI score = weighted at 60%
- SJT score = weighted at 40%

During the development process, decisions about weighting were informed by the above mentioned stakeholder workshop. The rationale for the greater weighting on the MMI test was that the MMI measures more professional attributes. Certain PAF domains being measured by the MMI and not by the SJT are considered very important i.e. Communication and Consultation Skills, or already expected to be developed i.e. Self-Directed Learning & Motivation.

In the event of a tied total score, scores of elements within the selection process were differentiated and weighted until all applicants could be allocated a different rank. The principal piece of information used to differentiate between applicants in a tie-break situation is the total MMI score. If this score is also equal, scores received within the MMI are differentiated using the attributes measured within the MMI. This will be undertaken in order of stakeholder rankings of the most important attributes, beginning with Professional Integrity and Ethics. If all individual attribute scores were tied, the score from the numeracy test would be used; however, there were no reported incidences where the numeracy score was required to support a tie-break decision.

1.5.5 Reported scores

Along with their overall performance ranking, applicants were provided with their scaled SJT score and comparison table (see Table 6), their raw MMI scores, as well as their combined SJT and MMI score that was used in decision-making.

2. Applicant information

This section describes applicants, applications and outcomes from the 2017 pre-registration pharmacist recruitment scheme. In addition, the section reports on any identified trends in applications by demographics (age, gender, ethnic group and right to work in the UK), trends in the ratio of applications that result in an offer of a training place and trends in applicant preferencing behaviour. Finally, the section provides information on overall fill-rates.

There is a small difference in figures reported for applicant 'offers accepted', across the tables in this section. This is due to a small number of applicants continuing to decline offers following initial acceptance whilst the data was being extracted. As a result, a data cut-off deadline of 17th January 2017 was introduced. Further changes to applicant offer acceptance status after this date has been managed directly with placement organisations and not captured by Oriel.

2.1 Applications and longlisting

2.1.1 Applications

The number of applications received via the Oriel system was 2694. 4% of submitted applications were incomplete (n=109) and could therefore not be considered. Overall, 2585 applications were progressed to longlisting. The majority of the applications received were from 3rd Year MPharm students. In addition, 3.3% of applicants were either currently enrolled on an accredited overseas pharmacists' assessment programme (OSPAP) (n=84), or were OSPAP graduates (n=6).

2.1.2 Longlisting

A very small number of applicants (n=3) did not progress through the formal longlisting process due to not meeting basic eligibility criteria, leaving 2582 applicants to be invited to take part in interview.

2.2 Interviews

Three percent (n=76) of the longlisted applicants invited to take part in interview failed to schedule their selection centre slot by the given deadline. 2506 interviews were confirmed for applicants across the seven regional selection centres. Data pertaining to applicant spread across centres along with the interview outcome is shown below in Table 7.

2300 interviews were attended by applicants. Overall, the percentage of applicants that did not attend (DNA) their scheduled, confirmed interviews was 8.2% (n=206). The Hull and Newmarket centres experienced the highest occurrence of DNA applicants, at 14.1% (n=27)

and 13.7% (n=65) respectively. Of the 2300 applicants interviewed, 2114 (92%) were considered appointable and subsequently received an overall ranking based on their test scores.

Table 7: Applicants attending selection centres

Selection Centre	Interviews SCHEDULED	Interviews ATTENDED	DID NOT ATTEND
Stewart House (London)	717	687	30
Newmarket Racecourse (Newmarket)	472	407	65
St James Park (Newcastle)	239	212	27
Etihad Stadium (Manchester)	240	229	11
KCOM Stadium (Hull)	191	164	27
Kassam Stadium (Oxford)	526	484	42
Cardiff City Stadium (Cardiff)	121	117	4
Totals	**2506**	**2300**	**206**

2.2.1 Red flags

A total of 15 red flags were reported across the centres. Following review, 2 red flags were upheld and these two applicants were considered no longer suitable to proceed to the allocation of places. In both cases, the red flags pertained to poor knowledge and command of the English language by applicants. It is important to note that both of these applicants also failed to achieve appointable scores in their selection tests and would therefore not have been eligible to progress further in the process, notwithstanding their red flag status. A possible reason for the initial number of red flags reported was an unfamiliarity of the interview panel members with the new recruitment process. Therefore, it is possible that red flags were used by panel members as an additional cautionary mechanism to flag poor performance.

2.3 Demographic composition

Applicant aspects, including age, gender, ethnic group and right to work in the UK, were monitored at each stage of the selection process to check for adverse impact and this section describes the findings. For reporting purposes:

- 'Applications received' relates to the number of applications progressed *after* longlisting.
- 'Appointable applicants' are those who performed at or beyond the required competency standard in the selection tests and were allocated an overall performance ranking in readiness for the offers process. Please note group differences at a test-level are analysed in detail in Section 3.
- 'Offers made' refers to the numbers of applicants who received a pre-registration training place offer on one of their preferred programmes. This includes offers made during clearing.
- 'Offers accepted' relates to the numbers of applicants who accepted their training place offer, regardless of whether this was withdrawn at a later date.

2.3.1 Applications and programme offers by gender

A breakdown of applicants' by gender is provided in Table 8 below, along with data pertaining to appointability and programme offers received by these two groups. Thirty-two percent more applications were received from female applicants than male. This is consistent with a growing feminisation trend within the profession reported in 2012 by the Centre for Pharmacy Workforce Studies in their GPhC Register Analysis[7].

Table 8: Applications, appointability and programme offers by gender

Group	Percentage of applications received	Percentage of appointable applicants	Percentage of offers made	Percentage of offers accepted
Male	33.4 % (864)	31.8 %(674)	31.7 % (591)	30.9 % (506)
Female	65.6 % (1696)	67.1 % (1420)	67.3 % (1255)	68.0 % % (1111)
Not disclosed	0.9 % (25)	0.9 % (20)	0.9% (17)	0.8 % (16)
Totals	100 % (2585)	100 % (2114)	100 % (1863)	100 % (1633)**

**Between this data being extracted and the data cut-off deadline of 17th January 2017, a further 8 applicants declined their training place offer following initial acceptance,

Sixty-six percent (n=1696) of the applicants that disclosed their gender were female and the outcome of the recruitment process saw 67% of overall programme offers received by females. Thirty-three percent (864) of applicants that disclosed their gender were male and this translated to 32% of overall programme offers. The slight increase in appointability and proportion of offers to female applicants is likely to be due to better performance by this gender group in the SJT and the MMI tests (see section 3.5.2). The overall positive correlation between percentage of applications and percentage of offers received (r = .99, p = 0.5) indicates that the process does not discriminate between either gender group.

2.3.2 Applications and programme offers by age

Eighty percent of the applicants that disclosed their age were in the 20-24 age group. This is to be expected, as 22 is the most common age to graduate from a 4-year degree, where a student has not taken a gap year and their birthday falls before the graduation date. Table 9 below provides a breakdown of applications received, along with data pertaining to the percentage of appointable applicants and programme offers received, for each of the age categories.

To assess the relationship between the percentage of applications received and percentage of training place offers received across the different age groups, Pearson's correlation was computed. There was a strong positive correlation (r = .99, p=0.2) between applications received and programme offers made across all age groups. Although not significant outliers, it was noted that applicants in the '25-29' and '30-34' age groups received a lower proportion of offers to applications. The most likely explanation for this is that appointable applicants in these

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https://www.pharmacyregulation.org/sites/default/files/Analysis%20of%20GPhC%20Pharmacist%20Register%202011.pdf

groups were outperformed in terms of scores by applicants in the younger age group (see section 3.5.1) and therefore they did not obtain a high enough ranking to receive a training place offer for any of their preferred programmes. This affected 17% (n=41) of appointable applicants within the '25-29' group and 18% (n=8) within the '30-34' group. The impact of preferencing behaviour on training place offer outcomes is explored further in section 2.4.

Table 9: Applications, appointability and programme offers by age group

Group	Percentage of applications received	Percentage of appointable applicants	Percentage of offers made	Percentage of offers accepted
20-24 years	78.9 % (2038)	81.7 % (1729)	82.2 % (1532)	82.7 % (1352)
25-29 years	13.5 % (349)	11.7 % (248)	11.1 % (207)	10.6 % (174)
30–34 years	2.6 % (69)	2.2 % (47)	2.0 % (39)	1.9 % (32)
35-39 years	1.8 % (49)	1.7 % (37)	1.8 % (34)	1.6 % (27)
40-44 years	1.7 % (46)	1.5 % (32)	1.7 % (32)	1.8 % (30)
45-49 years	0.2 % (7)	0.2 % (5)	0.2 % (5)	0.3 % (5)
50-54 years	0.1 % (3)	0.05 % (1)	0.05 % (1)	0.06% (1)
55-59 years	0.03 % (1)	0 % (0)	0 % (0)	0 % (0)
Not disclosed	0.8 % (23)	0.7 % (15)	0.6 % (13)	0.7 % (12)
Totals	100 % (2585)	100 % (2114)	100 % (1863)	100 % (1633)**

**Between this data being extracted and the data cut-off deadline of 17th January 2017, a further 8 applicants declined their training place following initial acceptance

2.3.3 Applications and offers by ethnic group

Seventy-one percent (n=1851) of applications were received from applicants of Black, Asian and minority ethnic (BAME) origin and 24% (n=633) were received from applicants of 'White' origin. 4.5% of applicants (n=101) chose not to declare their ethnic origin. Table 10 provides a breakdown of applications and offers by individual ethnic groups.

Pearson's correlation identified an overall positive trend (r = .98) between the percentage of applications received and the percentage of programme offers received by each individual ethnic group. Although not a significant outlier, it was noted that applicants in the 'Chinese' group were found to have a lower proportion of offers to applications than those in any other ethnic group. Findings from the analysis of group differences in performance in section 3.5.6 suggest that the 'Chinese' group did not perform as well as other ethnic groups in the MMI test. This would have resulted in appointable applicants receiving lower overall rankings amongst this group, reducing the likelihood of receiving an offer for a training place for any of their preferred programmes, particularly where lower numbers of programmes were preferred or where more popular programmes were preferred.

Table 10: Applications and programme offers by ethnic origin

Group	Percentage of applications received		Percentage of appointable applicants		Percentage of offers made		Percentage of offers accepted	
White – British	20.6 % (533)		22.1 % (469)		24.7 % (461)		26.8 % (438)	
White - Irish	0.8 % (21)	24.4 % (633)	0.8 % (17)	25.9 % (548)	0.8 % (16)	28.5 % (533)	0.7 % (12)	30.6 % (500)
Any other white background	3.0 % (79)		2.9 % (62)		3.0 % (56)		3.0 % (50)	
Mixed White and Black Caribbean	0.2 % (6)		0.2 % (6)		0.3 % (6)		0.3 % (6)	
Mixed White and Black African	0.2 % (7)	1.7 % (49)	0.2 % (5)	1.9 % (41)	0.2 % (5)	1.9% (39)	0.3 % (5)	2.0 % (28)
Mixed White and Asian	0.8 % (21)		0.8 % (18)		0.9 % (18)		1.0 % (17)	
Any other mixed background	0.5 % (15)		0.5 % (12)		0.5 % (10)		0.6 % (10)	
Asian or Asian British – Indian	16.7 % (432)		17.0 % (360)		17.6 % (328)		16.0 % (262)	
Asian or Asian British – Pakistani	12.6 % (326)	41.5 % (1076)	11.3 % (240)	40.2 % (851)	12.1 % (227)	40.2 % (753)	11.1 % (182)	37.5 % (613)
Asian or Asian British – Bangladeshi	3.8 % (100)		3.7 % (79)		3.8 % (72)		3.8 % (63)	
Any other Asian background	8.4 % (218)		8.1 % (172)		6.7 % (126)		6.4 % (106)	
Black or Black British - Caribbean	0.5 % (13)		0.5 % (11)		0.5 % (10)		0.5 % (9)	
Black or Black British - African	12.2 % (317)	13.1 % (341)	12.4 % (263)	13.4 % (284)	12.3 % (231)	13.2 % (249)	13.1 % (214)	14.1 % (231)
Any other black background	0.4 % (11)		0.4 % (10)		0.4 % (8)		0.4 % (8)	
Chinese	9.1 % (236)		9.0 % (191)		5.8 % (109)		6.0 % (99)	
Any other ethnic group	5.7 % (149)		5.7 % (121)		6.0 % (112)		5.7 % (94)	
Not disclosed	3.9 % (101)		3.6 % (78)		3.6 % (68)		3.5 % (58)	
Totals	100 % (2585)		100% (2114)		100 % (1863)		100% (1633)**	

**Between this data being extracted and the data cut-off deadline of 17th January 2017, a further 8 applicants declined their training place following initial acceptance

2.3.4 Applicants with tier 4 student visas

International students must switch from a tier 4 study visa to a general tier 2 work visa before beginning the preregistration year. Overall, 11% (n=290) of applications were received from those currently holding a tier 4 study visa and who were therefore seeking pre-registration training in an organisation able to offer tier 2 sponsorship. Of these, 80% (n=231) were deemed appointable following the selection process, amounting to 11% of all appointable applicants.

Thirty percent (n=68) of the applicants requiring tier 2 sponsorship received a final training place offer. Eighteen percent (n=12) of these offers were for the applicants first choice.

These applicants were restricted to preferencing programmes offering tier 2 sponsorship. With one exception, all NHS Hospital employers were licenced tier 2 sponsors and 12 community pharmacy employers, comprising 757 training places in total (see Table 1: Pre-registration training place availability in the 2017 National Pre-registration Pharmacist Recruitment Scheme). The programmes offering tier 2 sponsorship within their programme package were popular programmes for all applicants, particularly in the hospital sector, resulting in heightened competition for places. 91.7% (n=266) of applicants requiring tier 2 sponsorship preferenced a hospital training place as their first choice. Figure 4 provides an overview of the overall rankings of applicants requiring tier 2 sponsorship and number of programme offer outcomes.

Figure 4: Rankings and offer outcomes for applicants requiring tier 2 sponsorship
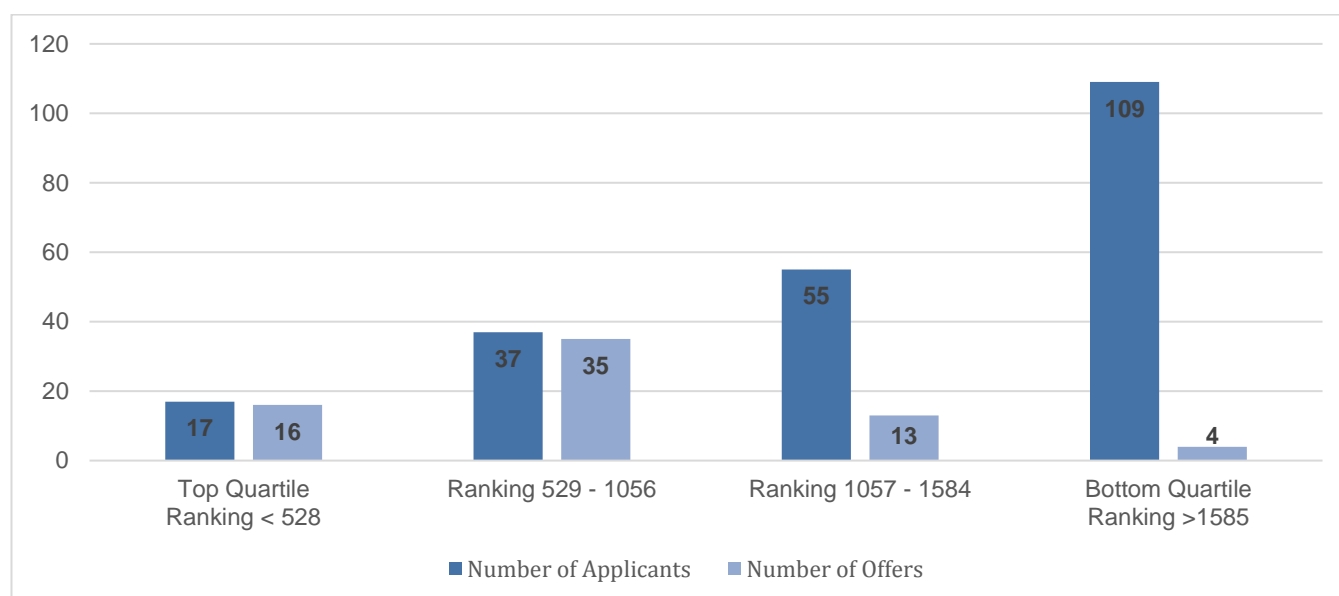
All applicants will have needed to achieve a high overall performance ranking to gain competitive advantage for the most popular training places. Of those 'tier 2' applicants whose selection score placed them in the top 50% of rankings, 94% (n=51) were successful in gaining a programme offer. 47% (n=109) of 'tier 2' applicants received a ranking of more than 1585 or lower (bottom quartile) and only 3% (n=3) of these were successful at obtaining programme offer.

Forty-five percent (n=103) of applicants requiring tier 2 sponsorship indicated they were of Chinese ethnic origin. 50% (n=52) of 'tier 2' applicants in this ethnic group received selection scores that placed them in the bottom 25% of rankings. Overall, 70% (n=73) of applicants who declared themselves of 'Chinese' origin and requiring tier 2 sponsorship did not receive a

programme offer. Findings from the analysis of group differences in performance in section 3.5.6 suggest that applicants in the 'Chinese' group did not perform as well as other ethnic groups in the MMI test. Poor MMI performance, combined with poor applicant preferencing in an already restricted and competitive category, is the likely cause of low offer outcomes for this particular group and for others requiring tier 2 sponsorship who received low rankings. The impact of applicant preferencing behaviour on training place offer outcomes is explored further in section 2.4.

2.3.5 Information supplied to Schools of Pharmacy about applicant outcomes

As this is the first year of the national pre-registration recruitment scheme, variances in applicant performance by school of pharmacy should be treated with caution. The following information has been provided to schools by the Pharmacy National Recruitment Office to support review and improvement of the preparation given to students for the national Pre-registration Pharmacist Recruitment Scheme:

- number of applications received
- mean test performance of their applicant population across the different selection methods
- offer outcomes
- anonymised comparative data

It is considered beyond the scope and objectives of this evaluation to provide descriptive statistics and analysis of applicant performance by schools of pharmacy and therefore, HEE have not published the information for year one of the scheme. Reliable results with regard to applicant performance by school of pharmacy require use of rational measurement systems over extended timescales to be able to accurately assess trends in performance over time. HEE will consider and consult on plans for publication of this data in future.

2.3.6 Special circumstances applications and reasonable adjustments

9 special circumstances applications were received by the PNRO for consideration. Table 11 below outlines the criteria under which the applications were received along with application outcomes. Details about the special circumstances process and policy can be found in section 1.3.2.

Table 11: Special circumstances applications

Criteria	Applications Received	Applications Approved
1 (Carers)	7	4
2 (Disability)	2	2

In total, 156 reasonable adjustments were approved for applicants. Table 12 below outlines the number of reasonable adjustments made and the selection centre in which they were implemented.

Table 12: Reasonable adjustments

Selection Centre	Approved Reasonable Adjustments
Stewart House (London)	26
Newmarket Racecourse (Newmarket)	3
St James Park (Newcastle)	5
Etihad Stadium (Manchester)	22
Kassam Stadium (Oxford)	9
Cardiff City Stadium (Cardiff)	9
KCOM Stadium (Hull)	1
Totals	**156**

2.3.7 MMI panel member diversity

When composing the MMI selection panels, consideration was given to the diversity of the panel members, particularly – but not limited to – gender and ethnic diversity. Table 13 and 14 below demonstrate the ethnic and gender composition of panel members, by selection centre.

Table 13: Ethnic composition of MMI interview panel members

Selection Centre	Stewart House (London)	Newmarket Racecourse (Newmarket)	St James Park (Newcastle)	Etihad Stadium (Manchester)	KCOM Stadium (Hull)	Kassam Stadium (Oxford)	Cardiff City Stadium (Cardiff)	Totals – All Centres
White panel members	38.9 % (101)	64.4 % (67)	61.7 % (29)	65.7 % (46)	80.7 % (42)	70.9 % (66)	94.8 % (37)	58.4 % (388)
Black and Minority Ethnic (BME) panel members	47.8 % (124)	17.3 % (18)	12.7 % (6)	20.0 % (14)	7.6 % (4)	12.9 % (12)	5.1 % (2)	27.1 % (180)
Not disclosed	13.1 % (34)	18.2 % (19)	25.5 % (12)	14.2 % (10)	11.5 % (6)	16.1 % (15)	0 % (0)	14.4 % (96)

Table 14: Gender composition of MMI interview panel members

Selection Centre	Stewart House (London)	Newmarket Racecourse (Newmarket)	St James Park (Newcastle)	Etihad Stadium (Manchester)	KCOM Stadium (Hull)	Kassam Stadium (Oxford)	Cardiff City Stadium (Cardiff)	Totals – All Centres
Female	65.6 % (170)	67.3 % (70)	65.9 % (31)	64.2 % (45)	55.7 % (29)	66.6 % (62)	66.6 % (26)	65.2 % (433)
Male	29.7 % (77)	28.8 % (30)	34.0 % (16)	34.2 % (24)	38.4 % (20)	30.1 % (28)	25.6 % (10)	30.8 % (205)

Not disclosed	4.6 % (12)	3.8 % (4)	0 % (0)	1.4 % (1)	5.7 % (3)	3.2 % (3)	7.6 % (3)	3.9 % (26)

2.4 Applicant preferencing, offers and fill rates

This section provides a brief overview of applicant preferencing patterns, training place offer outcomes and overall fill-rates, broken down by sector. For detailed information on the application and preferencing process and training programme availability for the 2017 pre-registration pharmacist recruitment scheme, please refer to Section1.3 Overview of the application and offers process

2.4.1 Number and range of preferences

Applicants were able to preference between 1 – 1300 programmes and rank them in order of the ones they would prefer to be offered first. Each programme actively selected and ranked by an applicant was considered a 'positive preference'. Applicants were also able to preference all available programmes across England and Wales by indicating 'no preference' on their application.

The average number of programmes preferenced by applicants was 400. Thirteen percent (n=280) of applicants indicated 'no preference', thus indicating they would be happy to receive an offer from any of the 1300 available programmes.

Ninety one percent (n=1928) of appointable applicants had preferenced a hospital training place as their first choice. This was the most competitive sector, with an average of 1094 applicant preferences received per programme. Figure 5 below shows the numbers of average preferences per available programme across the sectors.

Figure 5: Average number of preferences received per programme across sectors
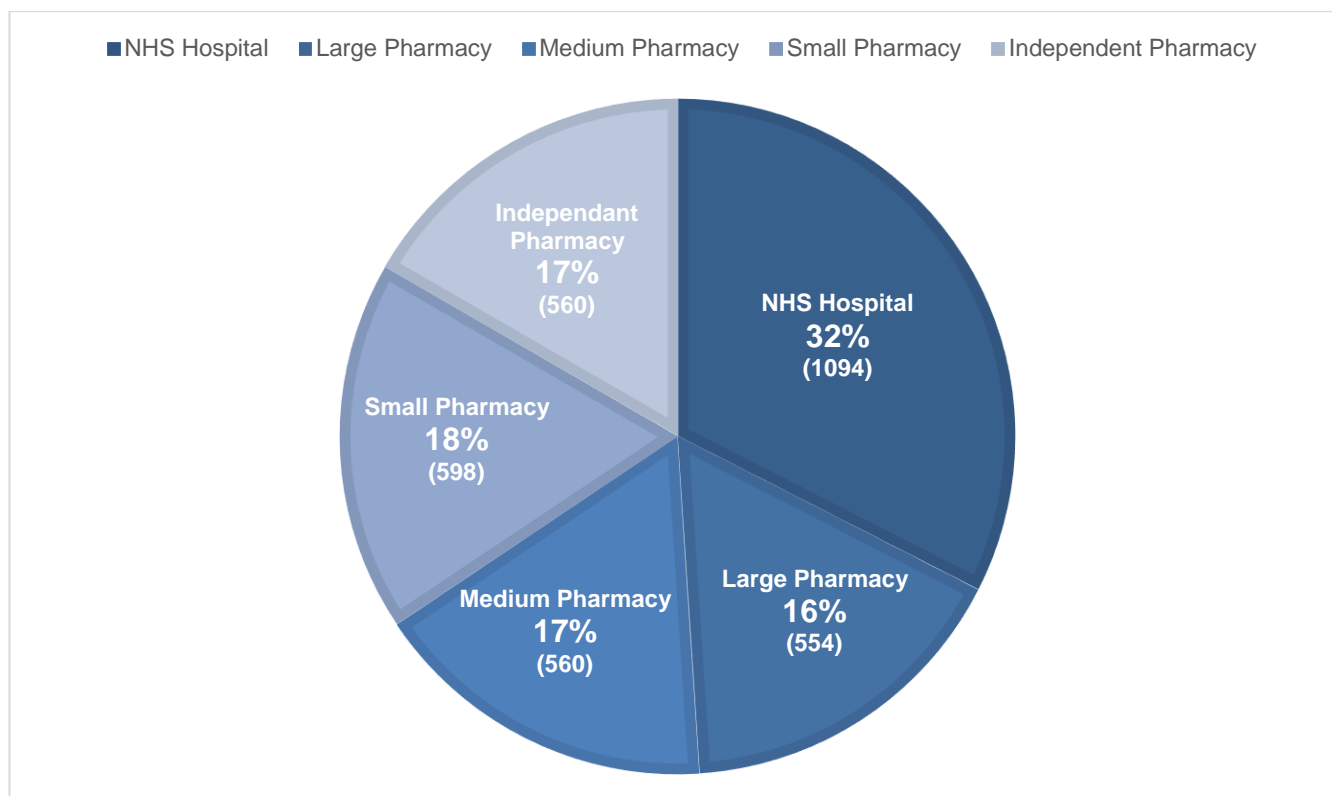
2.4.2 Clearing

Appointable applicants who did not receive an offer in the first round were given the option to enter into a clearing process, which involved re-preferencing against the 383 un-filled programmes (consisting of 534 training places) and re-running the offers algorithm for these through Oriel.

All of the programmes available in clearing were in the community pharmacy sector; 54% (n=208) were in large pharmacies.

234 offers were made to applicants during clearing. Whilst clearing took place, all applicants continued to accept, decline or withdraw their offers. The offers algorithm continued to run in the Oriel system and applicants that had opted into upgrades may have received alternative offers. The process remained fluid until the offers window closed.

2.4.3 Pre-registration pharmacist training place offers

At the end of the recruitment process, after clearing, 88% of appointable applicants (n=1863) had received an offer of a training place. Of these, 64 offers were declined and 84 offers

expired. A further 90 offers were declined following initial acceptance[8]. Overall, 75% (n=1625) of training place offers were accepted by applicants[9].

Twenty-one percent (n=405) of appointable applicants received an offer for their first choice programme; 6% (n=115) received an offer for their second choice and 3% (n=63) received an offer for their third choice. Percentage of overall applicant success in achieving offers progressively decreased along the sequence of their ranked preferences.

Twelve percent (n=251) of appointable applicants were left without a pre-registration programme offer at the end of the process. These applicants fall into the following three categories:

1. 67% (n=163) required a general Tier 2 work visa before beginning the pre-registration training year and either:
   a) did not achieve a score high enough to gain an offer for programme/s offering Tier 2 sponsorship
   b) preferenced programme/s not able to offer Tier 2 sponsorship

2. 32% (n=80) did not achieve a ranking high enough to gain an offer for any of their preferred programme/s. This was common in instances where applicants preferenced very few programmes, both in the first round of preferencing and in clearing. On average, individuals in this category initially preferenced 78 programmes, compared with the overall average of 400 preferences.

3. A very small number of applicants (n=8) withdrew their application prior to receiving an offer.

2.4.4 Fill rates

Despite there being enough appointable candidates to fill 97.8% (n=2114) of the 2161 available training places in the scheme, the recruitment process only achieved a 75% fill-rate overall[10]. This can be attributed to a number of factors including tier 2 visa requirement, poor applicant preferencing and declined, expired or withdrawn offers. Table 15 below provides a breakdown of the overall fill-rate, by the number of training places available within each sector.

Table 15: Summary of fill-rate by sector

	Independent Pharmacy	Small Pharmacy	Medium Pharmacy	Large Pharmacy	NHS Hospital	All Places
Total Training Places Available	324	176	168	759	734	2161
Training Places Not Filled	39.1 % (127)	44.3 % (78)	55.9 % (94)	31.2 % (237)	0 % (0)	24.8 % (536)
Overall Fill-Rate (Training Places Filled)	**60.8 % (197)**	**55.6 % (98)**	**44.0 % (74)**	**68.7 % (522)**	**100 % (734)**	**75.1% (1625)****

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[8] Information correct as of 17th January 2017.
[9] Any further changes to offer acceptance status after this date is managed directly with placement organisations.
[10] Information correct as of 17th January 2017.

**Figures correct as of 17th January 2017.

At the end of the recruitment process, 100% of available NHS Hospital training places were filled and 62.4% of community pharmacy training places. In the medium-sized pharmacy group, more than half of available training places were left unfilled. 11% (n=98) of the unfilled training places in the community pharmacy sector received no preferences from applicants at any stage of the process and therefore no offers could be made for these places. 92% of these were offered by independent pharmacy employers.

Table 16, overleaf, provides a breakdown of programme fill rate by Health Education England region. The ratio of hospital to community pharmacy training places available, particularly in areas that are traditionally hard to recruit to, will have affected regional fill-rates. The south region experienced the lowest fill-rate.

Table 16: Summary of regional fill-rates

HEE Pharmacy Region	HEE Local Area	Places	Offers Accepted	Offers Declined	Offers Expired	Fill Rate (Local)	Fill Rate (Regional)
Midlands and East	East Midlands	146	104	6	5	71.2 %	
Midlands and East	East of England	228	160	3	3	70.1 %	70.0 %
Midlands and East	West Midlands	204	141	11	16	69.1 %	
London and South East	Kent, Surrey and Sussex	197	144	6	9	73.1 %	
London and South East	London	521	441	13	11	84.6 %	81.4 %
North	North East	98	83	3	4	84.6 %	
North	North West	181	157	11	10	86.7 %	
North	Yorkshire and the Humber	164	111	0	8	67.6 %	79.2%
South	South West	150	93	3	8	62.0 %	
South	Thames Valley	78	64	2	2	82.0 %	66.9%
South	Wessex	93	58	6	6	62.3 %	
Wales	Wales	101	77	0	2	76.2 %	76.2 %
	TOTALS	2161	1633**	64	84		

 **Between this data being provided and the data cut-off deadline of 17th January 2017, a further 8 applicants declined their training place following initial acceptance

3. Test report analysis

The SJT, MMI and Numeracy tests have been evaluated against the best practice evaluative criteria[11] in terms of assessment performance, including reliability, validity and fairness. This section provides an overview of the evaluation findings, including test results. 2300 applicants attended interviews across the centres, however a small number of applicants did not complete all elements of the selection process on the day; three applicants did not complete the SJT or numeracy tests and ten applicants did not complete the MMI test. This is reflected in the descriptive statistics reported in test-level results.

3.1 Numeracy

3.1.1 Test level results

The numeracy test was designed to set a minimum standard and a wide difference in scores was not expected. Analysis of numeracy test-level results in Phase 1 of the evaluation was focused on test score distribution, to ascertain whether the test had achieved its purpose.

Distribution of scores

The numeracy test had an overall pass-rate of 98.3%. Each paper had a wide range of scores. A positive skew in score distribution was seen in the cumulative scores, as shown in Figure 6, and this was also mirrored in each individual paper. This highlights that more candidates achieved higher scores which suggests that the test was fit for its intended purpose and is positive feedback for the future GPhC assessment.

Figure 6: Distribution of Numeracy scores for all papers

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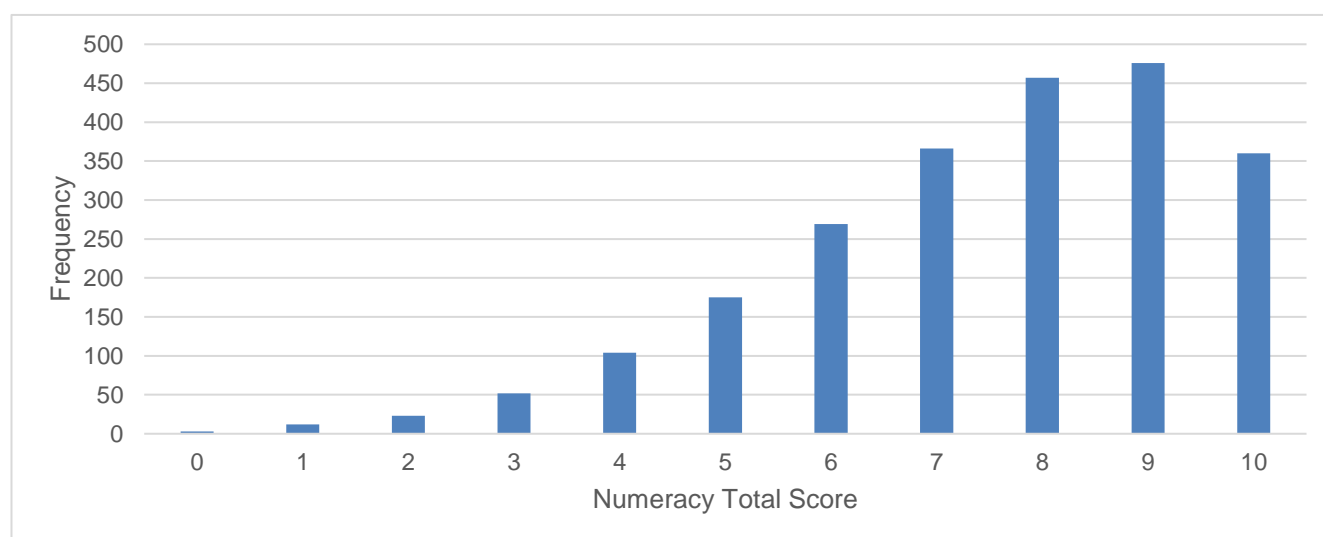
[11] Patterson, F. (2012). Selection Methods. In Cleland, Dowell, McLachlan, Nicholson, & Patterson, *Identifying best practice in the selection of medical students*. Research report to the General Medical Council.

Table 17 reports the descriptive statistics for the ten operational Pre-registration Pharmacist 2017 Numeracy papers, using raw scores.

Table 17: Descriptive Statistics of raw data for Numeracy papers

Paper	A1	A2	A3	A4	A5	B6	B7	B8	B9	B10	Total
Total N	173	151	206	347	299	324	282	317	86	112	2297
Passed	170	148	202	336	298	322	277	312	84	110	2259
Pass Rate %	98.3	98	98.1	96.8	99.7	99.4	98.2	98.4	97.7	98.2	98.3
Mean score	7.3	7.3	7.2	7.3	7.8	8	7.5	7.4	7.4	7.3	7.5
Mean score %	73	73	72	73	78	8	75	74	74	73	75
Range	2–10	0-10	0-10	1-10	2-10	2-10	1-10	1-10	1-10	1-10	N/A
Minimum Possible	0	0	0	0	0	0	0	0	0	0	0
Maximum Possible	10	10	10	10	10	10	10	10	10	10	10

3.2   Situational Judgement Test

3.2.1 Test level results

Table 18 below reports the descriptive statistics for the two operational Pre-registration Pharmacist 2017 Situational Judgement Test (SJT) papers, using raw scores.

Table 18: Descriptive statistics of raw data for Papers A and B

	SJT Paper A	SJT Paper B
Total N	1,185	1,112
Mean score	557.49	566.17
Mean score %	75.44%	76.61%
Standard deviation	36.59	32.08
Range	306-633	310.5-639
Minimum Possible	200.00	200.00
Maximum Possible	739.00	739.00
Reliability (45 items)	0.78	0.76

Test difficulty

The difficulty level for Operational Paper A is 75.44% (i.e. mean score of 557.49 out of a total possible total raw score of 739), while for Paper B it is 76.61% (mean score of 566.17 out of a possible total raw score of 739). This indicates that the two paper versions exhibit comparable levels of difficulty. This level of difficulty is comparable to SJTs used for the selection into other

healthcare roles at similar levels within the career pathway. Scores across the two papers were then equated to account for any slight differences in difficulty.

Reliability

The operational test versions showed acceptable to good levels of internal reliability (α=0.78 for Paper A, α=0.76 for Paper B), with a mean of α=0.77 (good). Within the literature the desired level of reliability for an operational test is exceeding α=0.70[12], however, a reliability level of α=0.70 for an SJT used for selection purposes is satisfactory.

While Paper B has a slightly lower reliability compared to Paper A, there are various factors that can reduce test reliability. Reliability is higher when scores are more spread out over the entire scale, showing greater differentiation amongst applicants. Upon inspection, the standard deviation of the scores for Paper A is slightly higher than for Paper B (SD of 36.56 versus SD of 32.08), therefore it is likely that these differences in the spread of scores between the two test versions explain the small variations in reliability between them.

Distribution of scores

SJT total scores for operational Paper A and B showed a close to normal distribution, although both samples are moderately negatively skewed (see Figures 7 and 8 below). This is consistent with the distribution of SJT scores seen in other healthcare roles.

Figure 7: Distribution of SJT scores in Paper A
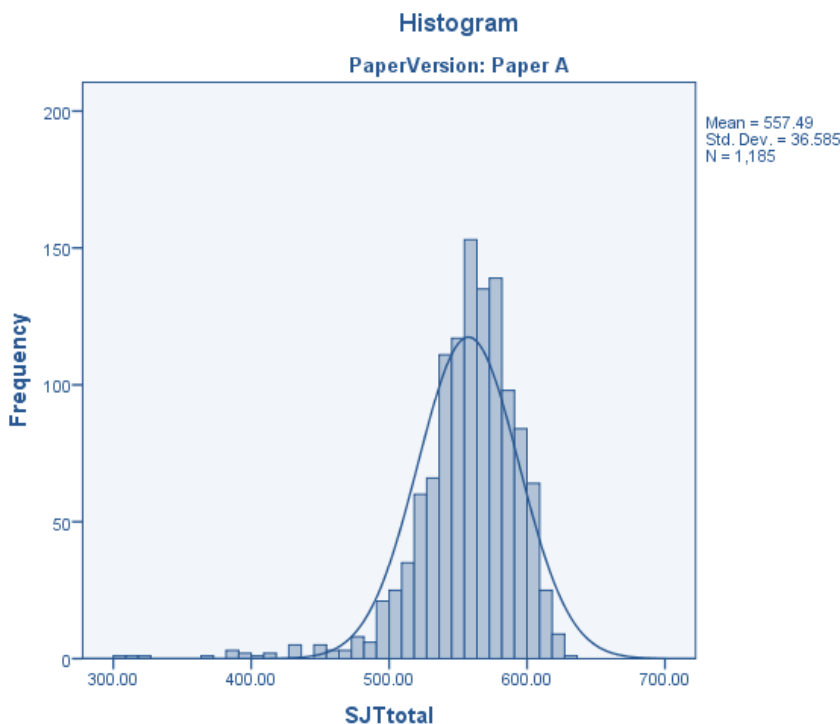
Source: Work Psychology Group

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[12] Kline, P. (2013). *Handbook of psychological testing.* Routledge.
Nunnally, C. (1978), *Psychometric Theory,* 2nd ed. New York: McGraw-Hill Book Company

Figure 8: Distribution of SJT scores in Paper B
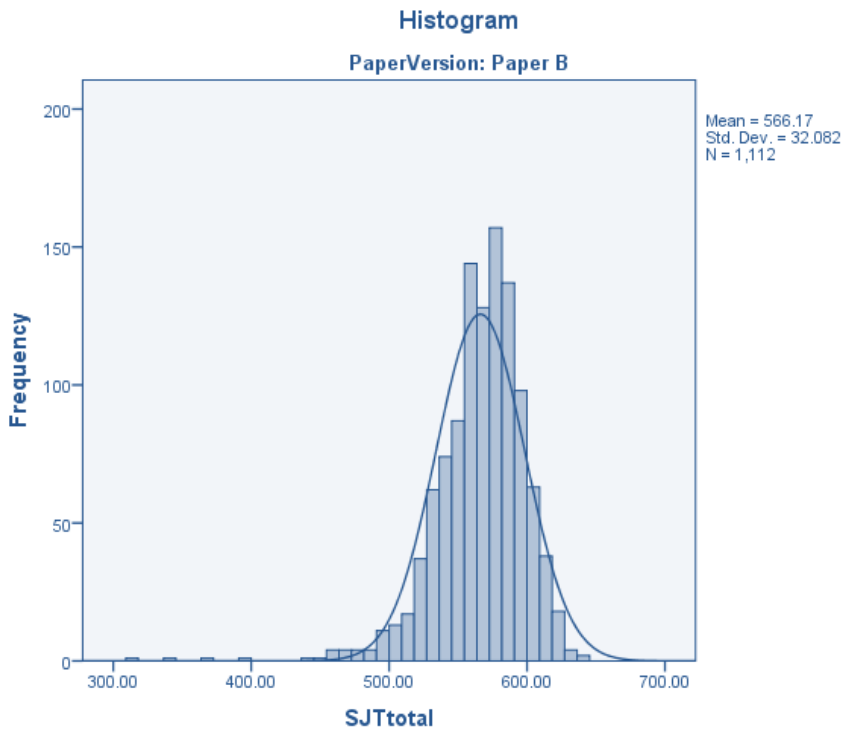
Source: Work Psychology Group

Timing analysis

The time allowed for completion of the SJT was 104 minutes. For the Operational Paper A, 1,086 (91.6%) applicants completed all the operational questions, while 99 applicants (8.4%) did not complete the final item in the test. Of those who did not complete the test, there were 68 applicants (5.6%) who missed between one and four items, and 31 applicants (2.6%) who missed five or more items. For the Operational Paper B, 1,073 (96.5%) applicants completed all the operational questions, while 39 (3.5%) did not complete the final item on the test. Overall for Paper B, there were 27 applicants (2.4%) who missed between one and four items, and a further 12 applicants (1.1%) who missed five or more items.

Overall, these findings give an initial indication that the time allowed to complete the test is sufficient. applicant feedback in terms of time allocation will be provided in the final report.

3.2.2 Item level results[13]

Item analysis was used to look at the facility (difficulty) and quality (discrimination) of individual SJT items. For both versions, all items adequately contributed to test performance.

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[13] The data of a small number of applicants who were extreme outliers are not included within this section of the report.

Item facility

Item facility is determined by the mean score for each item; the item facilities provided below are on a scale of 0-1, with 0 being the highest level of difficulty, and 1 being the lowest.

If an item facility value is low, then the item may be too difficult and may not yield useful information. If the facility value is very high, then the item may be too easy and again, may not provide useful information or differentiate between applicants. Item facilities (including the minimum and maximum facility and proportion of items falling into five categories of difficulty), split by paper version, are shown in Table 19.

Table 19: Item Facility by Paper Version

Paper	Min	Max	Below 20 %	20-39 %	40-59 %	60-79%	80% and above
A	34.0%	88.0%	0.0%	4.4%	17.8%	64.4%	13.3%
B	28.0%	96.0%	0.0%	6.7%	20.0%	46.7%	26.7%

Overall, these results show that item facilities for items included in each version of the test were similar, with the mean facility very close. The results also show that there were few very easy or very difficult questions. There may be scope to increase the number of items that will differentiate in and around the mean score, to create further granularity between applicants.

Item quality

Item quality or discrimination is determined by examining the item partial coefficient, which is the degree of correlation between the item and the overall mean SJT score (that does not include the item itself). Items are classified in terms of their quality as such: good items exhibit a partial above 0.25, satisfactory items between 0.17 and 0.25, moderate items between 0.13 and 0.17, and limited items less than 0.13. Item quality, split by paper version, is provided in Table 20.

Table 20: Item Quality by Paper Version

Paper	Min	Max	Good (%)	Satisfactory (%)	Moderate (%)	Limited (%)
A	.01	.32	13%	47%	16%	24%
B	.02	.34	13%	56%	9%	22%

Those items that were classified as limited did not significantly detract from the overall psychometric performance of the test and were therefore included in an applicant's total score.

A review of the current operational item bank and the existing process for item and test development is recommended prior to future operational delivery of the SJT to maintain and enhance the overall quality of the test. Items classified as being of limited quality are

recommended to be reviewed further, to determine suitability for being re-piloted or excluded from future operational versions of the SJT.

3.3 Multiple Mini Interview

3.3.1 Circuit-level analysis

Table 21 provides a summary of the descriptive statistics for the Multiple Mini Interview (MMI) by circuit. The minimum possible score an applicant could achieve on the MMI is 24 and maximum is 120. Figures 9-12, overleaf, show the distribution of total MMI scores per circuit.

Table 21: Descriptive statistics for MMI total score at circuit level

Circuit	N	Mean	SD	Min	Max	Range
A	452	79.80	17.11	25.00	118.00	93.00
B	664	81.06	16.18	34.00	117.00	83.00
C	603	81.02	16.65	28.00	119.00	91.00
D	571	80.84	16.67	32.00	120.00	88.00

Figure 9: Distribution of MMI scores for Paper A
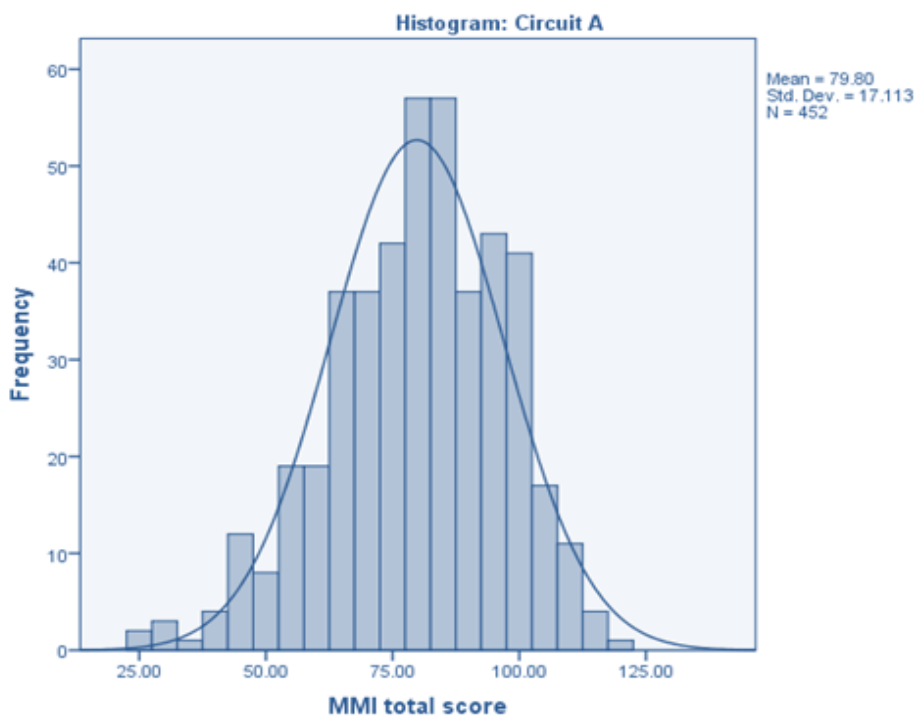
Source: Work Psychology Group

Figure 10: Distribution of MMI scores for Paper B

Histogram: Circuit B

Mean = 81.06
Std. Dev. = 16.176
N = 664
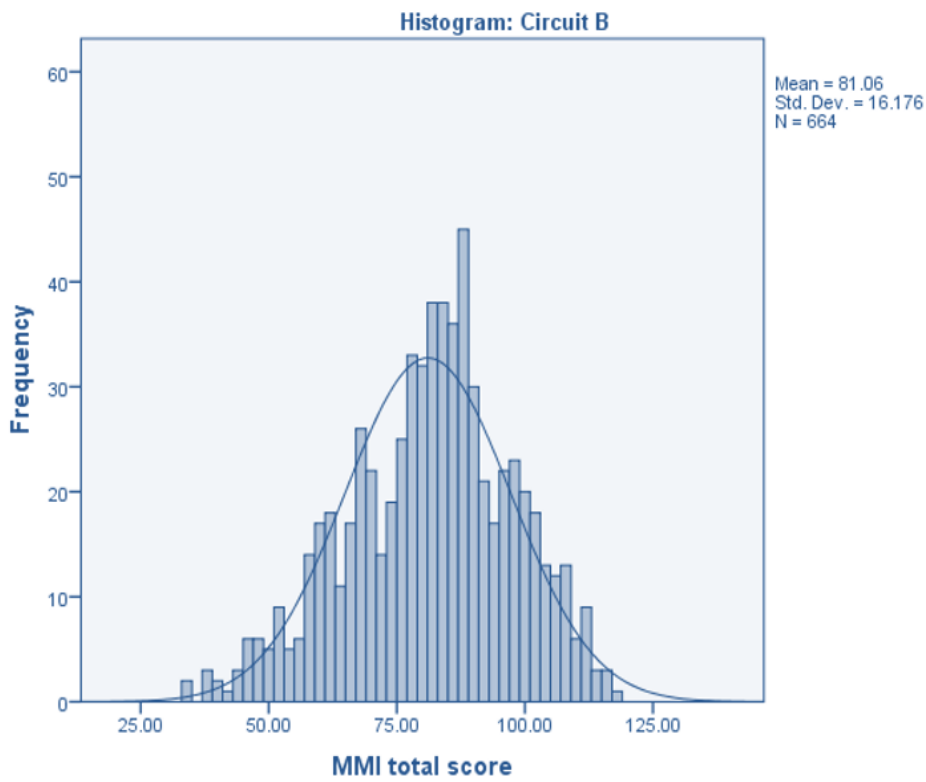
Figure 11: Distribution of MMI scores for Paper C

Histogram: Circuit C

Mean = 81.02
Std. Dev. = 16.645
N = 603
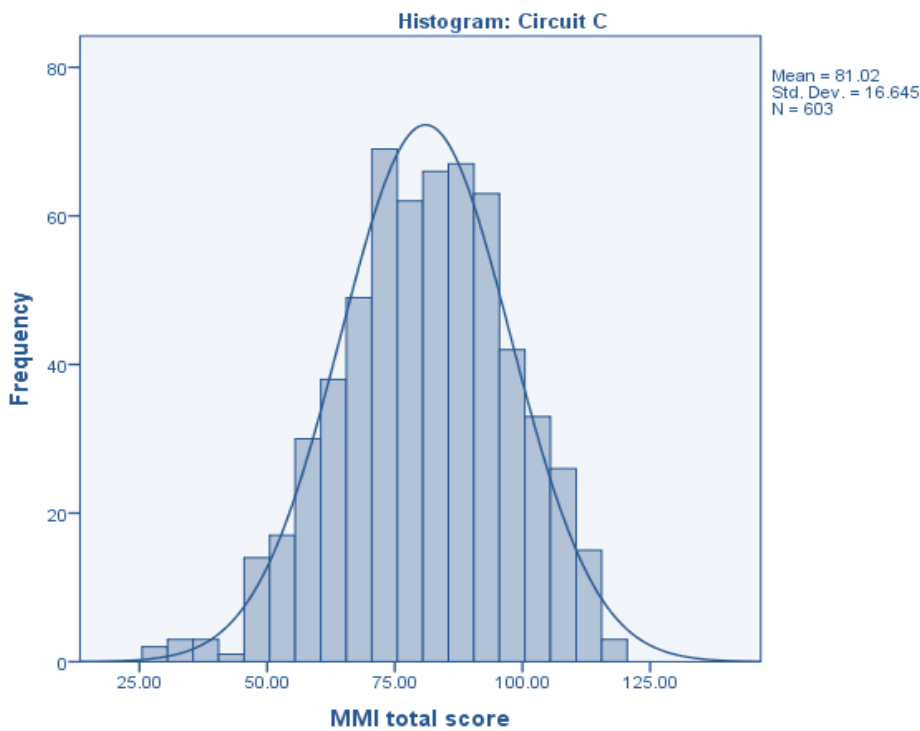
Source: Work Psychology Group

Figure 12: Distribution of MMI scores for Paper D
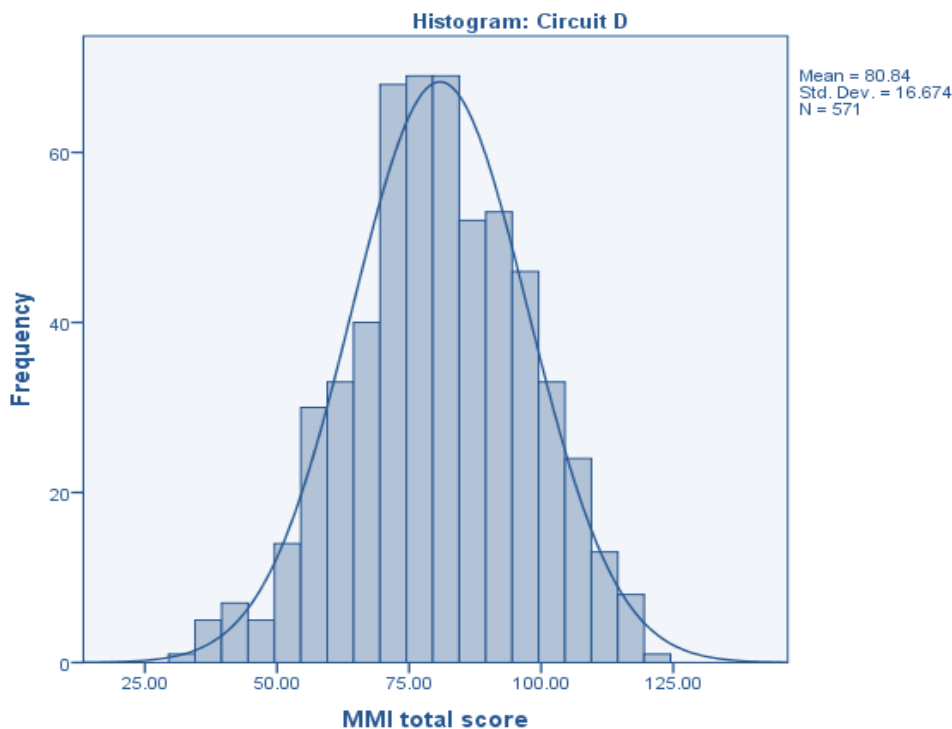
Source: Work Psychology Group

All circuits showed a relatively normal distribution. This indicates that the circuits were generally capable of differentiating between applicants.

An analysis of variance (ANOVA) was conducted to investigate whether there were significant differences in total MMI scores based on circuit. No significant differences in total MMI scores were found between applicants participating in the four different circuits.

3.3.2 Attribute-level analysis

Analysis at the attribute level was conducted to examine whether attributes measured in different circuits using different exercise versions were equivalent. As applicants were randomly allocated a circuit, any differences are likely to be due to the content of the exercises rather than the make-up of the cohort sitting a circuit, although this may not always be the case.

The data shows that there was no statistically significant variability in overall MMI circuit scores, indicating standardisation across the circuits. However, there was some variability when looking at some specific attributes and exercises across different circuits; although these differences are small. These differences found may be due to Interview Panel Member effects[14], learning effects producing a drift of scores, or exercise effects[15].

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[14] Interview Panel Member effects refer to the systematic differences in the pattern of scoring across different Interview Panel Members.
[15] Exercises effects refer to differences in applicant performance due to unintended differences in the exercises, such as level of difficulty.

Person centred care. An analysis of variance (ANOVA) demonstrated statistically differences in mean Person Centred Care scores across the circuits ($F(3,2286)=5.96$, $p<0.001$, $\eta^2 = .01$). Mean scores were found to be significantly lower in circuit A than all other circuits, although the effect size of this difference was small. Descriptive statistics are shown in Table 22.

Table 22: Person centred care

Circuit	N	Mean	SD	Min	Max	Range
A	452	13.11	3.40	4.00	20.00	16.00
B	664	13.83	3.15	5.00	20.00	15.00
C	603	13.88	3.26	4.00	20.00	16.00
D	571	13.78	3.39	4.00	20.00	16.00

Communication & consultation skills. An analysis of variance (ANOVA) revealed no significant differences in scores for Communication & Consultation Skills across the circuits. Descriptive statistics are shown in Table 23.

Table 23: Communication & consultation skills

Circuit	N	Mean	SD	Min	Max	Range
A	452	13.62	3.35	4.00	20.00	16.00
B	664	13.94	3.28	4.00	20.00	16.00
C	603	13.97	3.31	4.00	20.00	16.00
D	571	14.11	3.38	4.00	20.00	16.00

Problem solving, clinical analysis & decision making. An analysis of variance (ANOVA) revealed no significant differences in Problem Solving, Clinical Analysis & Decision Making scores across the circuits. Descriptive statistics are shown in Table 24.

Table 24: Problem solving, clinical analysis & decision making

Circuit	N	Mean	SD	Min	Max	Range
A	452	13.27	3.31	4.00	20.00	16.00
B	664	12.98	3.09	4.00	20.00	16.00
C	603	13.28	3.24	4.00	20.00	16.00
D	571	13.32	3.25	4.00	20.00	16.00

Multiprofessional working & leadership. An analysis of variance (ANOVA) revealed no significant differences in scores for Multi-professional Working & Leadership across the circuits. Descriptive statistics are shown in Table 25.

Table 25: Multi-professional working & leadership

Circuit	N	Mean	SD	Min	Max	Range
A	452	13.54	3.23	4.00	20.00	16.00
B	664	13.29	3.09	4.00	20.00	16.00
C	603	13.58	3.16	4.00	20.00	16.00
D	571	13.35	3.30	4.00	20.00	16.00

Self-directed learning and motivation. An analysis of variance (ANOVA) revealed no significant differences in scores for Self-Directed Learning & Motivation across the circuits. Descriptive statistics are shown in Table 26.

Table 26: Self-directed learning & motivation

Circuit	N	Mean	SD	Min	Max	Range
A	452	13.02	3.29	4.00	20.00	16.00
B	664	13.02	3.27	4.00	20.00	16.00
C	603	13.00	3.28	4.00	20.00	16.00
D	571	12.87	3.38	4.00	20.00	16.00

Professional integrity and ethics. An analysis of variance (ANOVA) demonstrated statistically differences in mean Professional Integrity & Ethics scores across the circuits ($F(3,2286)=7.56$, $p<0.001$, $\eta^2 = .01$). Mean scores were found to be significantly lower in circuit A than all other circuits, however, the effect size of this difference is small. Descriptive statistics are shown in Table 27.

Table 27: Professional integrity & ethics

Circuit	N	Mean	SD	Min	Max	Range
A	452	13.24	3.26	4.00	20.00	16.00
B	664	14.00	3.03	4.00	20.00	16.00
C	603	13.31	3.14	4.00	20.00	16.00
D	571	13.40	3.03	4.00	20.00	16.00

3.3.3 Exercise-level analysis

Analysis at the exercise level was also conducted to examine whether there were any differences in mean scores awarded for the same exercise type across the four circuits.

Exercise 1a. An analysis of variance (ANOVA) revealed statistically significant differences in mean scores for Exercise 1a across the circuits ($F(3,2286)=2.65$, $p<.05$, $\eta^2 = .003$). Scores were found to be statistically significantly higher in Circuit D than those received in Circuit A, although the effect size was small. Descriptive statistics are shown in Table 28.

Table 28: Exercise level analysis - Exercise 1a

Circuit	N	Mean	SD	Min	Max	Range
A	452	13.43	3.84	4.00	20.00	16.00
B	664	13.68	3.73	4.00	20.00	16.00
C	603	13.86	3.91	4.00	20.00	16.00
D	571	14.09	4.07	4.00	20.00	16.00

Exercise 1b. An analysis of variance (ANOVA) revealed statistically significant differences in mean scores for Exercise 1b across the circuits ($F(3,2286)=3.07$, $p<.05$, $\eta^2 = .004$). Scores were found to be significantly higher in Circuit C than those received in Circuit B. Although, the effect size of these differences was small. Descriptive statistics are shown in Table 29.

Table 29: Exercise level analysis - Exercise 1b

Circuit	N	Mean	SD	Min	Max	Range
A	452	13.36	3.60	4.00	20.00	16.00
B	664	13.36	3.43	4.00	20.00	16.00
C	603	13.90	3.65	4.00	20.00	16.00
D	571	13.67	3.84	4.00	20.00	16.00

Exercise 2a. An analysis of variance (ANOVA) revealed no significant differences in scores for Exercise 2a across the circuits. Descriptive statistics are shown in Table 30.

Table 30: Exercise level analysis - Exercise 2a

Circuit	N	Mean	SD	Min	Max	Range
A	452	12.73	3.78	4.00	20.00	16.00
B	664	12.30	3.73	4.00	20.00	16.00
C	603	12.28	3.88	4.00	20.00	16.00
D	571	12.20	4.00	4.00	20.00	16.00

Exercise 2b. An analysis of variance (ANOVA) revealed no significant differences in scores for Exercise 2b across the circuits. Descriptive statistics are shown in Table 31.

Table 31: Exercise level analysis - Exercise 2b

Circuit	N	Mean	SD	Min	Max	Range
A	452	13.66	3.76	4.00	20.00	16.00
B	664	13.29	3.70	4.00	20.00	16.00
C	603	13.33	3.58	4.00	20.00	16.00
D	571	13.17	3.63	4.00	20.00	16.00

Exercise 3a. An analysis of variance (ANOVA) revealed a statistically significant difference in mean scores for Exercise 3a across the circuits ($F(3,2286)=15.63$, $p<.001$, $\eta^2 = .02$). Scores were found to be significantly higher in Circuit B than those received in all other circuits. Scores in circuit C were also found to be significantly higher than those received in circuit A. While the

size of this difference was larger than those in exercise 1a & 1b, the effect size is small. Descriptive statistics are shown in Table 32.

Table 32: Exercise level analysis - Exercise 3a

Circuit	N	Mean	SD	Min	Max	Range
A	452	12.82	4.07	4.00	20.00	16.00
B	664	14.27	3.42	4.00	20.00	16.00
C	603	13.50	3.47	4.00	20.00	16.00
D	571	13.34	3.51	4.00	20.00	16.00

Exercise 3b. An analysis of variance (ANOVA) revealed no significant differences in scores for Exercise 2a across the circuits. Descriptive statistics are shown in Table 33.

Table 33: Exercise level analysis - Exercise 3b

Circuit	N	Mean	SD	Min	Max	Range
A	452	13.79	3.76	4.00	20.00	16.00
B	664	14.17	3.63	4.00	20.00	16.00
C	603	14.15	3.50	4.00	20.00	16.00
D	571	14.36	3.45	4.00	20.00	16.00

3.4   Validity analysis

The following section includes a summary of analysis that has been conducted to evaluate the validity of the SJT and MMI. Validity analysis investigates whether each method is measuring what it claims to measure.

For the purposes of the current section, we are referring to the following:

i. **SJT score** – Total Equated SJT Score (SJT measured four attribute areas including; Person Centred Care, Professional Integrity & Ethics, Multi-Professional Working & Leadership and Problem Solving, Clinical Analysis & Decision Making).

ii. **MMI score** – Total Raw MMI Score (MMI measured six attribute areas across six exercises. Each attribute was measured twice across two exercises. Attribute areas include Person Centred Care, Professional Integrity & Ethics, Multi-Professional Working & Leadership, Problem Solving, Clinical Analysis & Decision Making, Communication & Consultation Skills and Self-Directed Learning & Motivation).

iii. **MMI exercises** – The MMI consisted of six exercises, each exercise measured two attributes (exercises are labelled; 1a, 1b, 2a, 2b, 3a & 3b).

iv. **Attribute scores** – These are the total attribute scores from across the two exercises that each attribute was measured within the MMI.

Throughout the following section, findings in relation to Criterion-Related, Divergent and Convergent validity will be discussed through examining relationships between the SJT, MMI

(including individual exercises) and attribute scores Further interpretations are included throughout each section.

3.4.1 Criterion-related validity

Correlations (using Pearson's correlation coefficient) were conducted to investigate the association between the two core elements of the selection process i.e. the equated SJT scores and total MMI score. This analysis allows us to investigate criterion-related validity (i.e. whether scoring well on one selection method predicts performance on another method).

Correlations were conducted to examine the associations between equated SJT scores and overall MMI scores, as well as scores for the six specific MMI exercises. A significant moderate correlation was found between the equated SJT score and the overall MMI score (r=.43, p<.001). This indicates that applicants who performed well on either the SJT or MMI were more likely to perform well on the other method, providing initial evidence of criterion-related validity.

These results indicate that it is likely that both methods of assessment are measuring similar aspects. However, both the SJT and MMI also appear to be measuring unique variance in performance that is not captured by the other method, thereby making each a useful addition to the selection process.

As well as examining the relationship between the SJT and the MMI overall, the relationship between the SJT and the total attribute scores was also analysed. As shown in Table 34, the equated SJT score had moderate positive associations with all attribute-specific scores indicating a relationship between performance on the SJT and the extent to which an individual possesses specific attributes, as measured in the MMI. All correlations were statistically significant at the 0.001 level.

The cells highlighted in orange in Table 34 indicate where there is overlap in MMI attributes and those measured by the SJT. Whilst these correlations are in line with expectations, it may be expected that there would be lower correlations between the SJT score and Communication & Consultation Skills and Self-directed Learning & Motivation as these were not measured in the SJT. Across the six attributes, there are little differences in correlations with the SJT. This finding is in line with evidence in Table 35 below, which shows that those exercises that assess a common attribute do not correlate more strongly than those exercises that assess different attributes.

The correlations presented in Table 35 also show moderate to strong significant correlations between each of the six attributes measured within the MMI. Whilst small to moderate significant correlations may be expected, these correlations are relatively high, ranging from 0.63 to 0.85. Two correlations which are particularly high are those between Person Centred Care and Communication & Consultation Skills (.85), and Problem Solving, Clinical Analysis and Decision Making and Multi-Professional Working and Leadership (.80). Both these were measured together in the same exercise, potentially indicating that interview panel members may have had difficulty assessing the attributes independently. Given that some attributes were not measured within the same exercises (i.e. Self-directed Learning and Motivation, and Multi-Professional Working and Leadership), a further explanation may be the discrete nature of the content of the attribute itself i.e. it may be expected for there to be some overlap between Person Centred Care and Communication & Consultation Skills.

Table 34: Correlations between equated SJT scores and specific attribute scores

	SJT Score	Person Centred Care	Communication & Consultation Skills	Problem Solving, Clinical Analysis & Decision Making	Multi-professional Working & Leadership	Self-directed Learning & Motivation	Professional Integrity & Ethics
SJT Score	-						
Person Centred Care	.37**	-					
Communication & Consultation Skills	.39**	.85**	-				
Problem Solving, Clinical Analysis & Decision Making	.36**	.63**	.65**	-			
Multi-professional Working & Leadership	.37**	.67**	.69**	.80**	-		
Self-directed Learning & Motivation	.36**	.62**	.66**	.63**	.63**	-	
Professional Integrity & Ethics	.36**	.68**	.65**	.58**	.70**	.69**	-

** Correlation is significant at the 0.001 level (2-tailed).

3.4.2 Relationship between MMI exercises

Correlations (using Pearson's correlation coefficient) were conducted to investigate the associations between performance on different exercises and are presented in Table 35. All exercises are moderately positively correlated, indicating that applicants who performed well on one exercise within the MMI were likely to perform well across the other exercises. For exercises that overlap in one attribute (shaded in green in Table 35), higher correlations may be expected, compared to ones where there is no overlap. However, there is no evidence to indicate that exercises measuring a common attribute have stronger correlations than those that measure unique attributes.

Table 35: Correlations between different MMI exercises

	1	2	3	4	5	6
1. Exercise 1a	1.00					
2. Exercise 1b	.78**	1.00				
3. Exercise 2a	.40**	.39**	1.00			
4. Exercise 2b	.42**	.39**	.69**	1.00		
5. Exercise 3a	.42**	.39**	.35**	.39**	1.00	
6. Exercise 3b	.46**	.42**	.38**	.42**	.74**	1.00

**Correlation is significant at the 0.001 level (2-tailed).

For exercises that were seen versus unseen (1a, 2a and 3a, and 1b, 2b and 3b) the results do not provide any clear pattern emerging due to exercise type. For exercises that were measured simultaneously by the same interview panel members (e.g. 1a and 1b), stronger correlations are observed (exercise 1a and 1b (r = .78, $p<0.01$), 2a and 2b (r = .69, $p<0.01$) and 3a and 3b (r = .74, $p<0.01$)). This suggests that there may be an interview panel member effect evident within the MMI; this will be discussed further in the recommendations section.

3.4.3 Divergent validity

Divergent validity seeks to examine the extent to which two variables that should not be related, are in fact not related. Specifically in this situation, this refers to scores between attributes that are being measured within the same exercise.

Correlations (using Pearson's correlation coefficient) were conducted to investigate the associations between the two individual attributes measured within each exercise. This analysis allows for the investigation of divergent validity; exploring whether supposedly distinct attributes are related. As can be seen in Table 36, all attributes measured within an exercise are strongly correlated, therefore indicating limited divergent validity.

Whilst you would expect to see moderate correlations between attributes being measured within the same exercise, these correlations are higher than the correlations between the same attribute across different exercises (Table 37). This is known as the 'exercise effect', whilst this is an identified issue in the assessment centre literature, it has recently been identified that more evidence is needed in relation to this[16]. These findings provide initial evidence to suggest that how an interview panel member scores an applicant on one attribute is likely to directly influence how they score the applicant on the second attribute; an example of the 'halo' effect; the tendency for an impression created in one area to influence opinion in another area.

Table 36: Correlations between attribute scores measured within an exercise

Attributes	Correlation
Person Centred Care & Communication & Consultation Skills (exercise 1a)	.85**
Problem Solving, Clinical Analysis & Decision Making & Multi-professional Working & Leadership (exercise 1b)	.85**
Problem Solving, Clinical Analysis & Decision Making & Self-Directed Learning & Motivation (exercise 2a)	.66**
Multi-professional Working & Leadership & Professional Integrity & Ethics (exercise 2b)	.84**
Person Centred Care & Professional Integrity & Ethics (exercise 3a)	.78**
Communication & Consultation Skills & Self-Directed Learning & Motivation (exercise 3b)	.78**

**Correlation is significant at the 0.001 level (2-tailed).

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[16] Griffin, B. (in preparation). Coaching Issues in Patterson, F. & Zibarras, L (Eds.) Selection and Recruitment in the Healthcare professions: research, theory and practice. Palgrave: London

3.4.4 Convergent validity

Convergent validity refers to the degree to which two measures of the same attribute (or construct) are related; for the purposes of this report, this is in relation to the same attribute being measured in different exercises.

Correlations (using Pearson's correlation coefficient) were conducted to investigate the association between the same attribute across different exercises. As can be seen in Table 37, there are significant positive correlations between the same attribute when measured in different exercises. These findings provide good evidence of convergent validity; that the same attributes in different exercises, are in fact related. However, given the moderate correlations between exercises as shown in Table 37, this is perhaps not unexpected.

Table 37: Correlations between attribute scores in two exercises

Attribute	Exercises	Correlation
Person Centred Care	Exercise 1a & 3a	.39**
Communication & Consultation Skills	Exercise 1a & 3b	.44**
Problem Solving, Clinical Analysis & Decision Making	Exercise 1b & 2a	.35**
Multi-professional Working & Leadership	Exercise 1b & 2b	.38**
Self-directed Learning & Motivation	Exercise 2a & 3b	.32**
Professional Integrity & Ethics	Exercise 2b & 3a	.35**

**Correlation is significant at the 0.001 level (2-tailed).

3.4.5 Incremental validity

Incremental validity is used to determine whether the addition of a new assessment looking at an applicant's performance (in this case an MMI exercise) will increase the predictive validity beyond that is provided by the existing method of assessment (in this case the remaining five exercises)

Regression analyses were undertaken to ascertain the extent to which each of the six MMI exercises offer a unique contribution in predicting an applicant's total score on the SJT and MMI, i.e. incremental validity. The R-squared (R^2) is reported for each level of the analysis (i.e. each MMI exercise) and is an indication of how much additional variance, in terms of a percentage total of the total variance, is explained by adding each exercise when the remaining five exercises are already in the regression model (i.e. how much variance is explained by exercise 1a above the variance already explained by the other five exercises). Table 38 provides a summary of the R^2 change and F change statistics for each exercise[17]. Six regression analyses were run with each adding a different exercise into the model as the last step. This was to compare the additional variance that each exercise explains over and above all other exercises within the MMI, in relation to an applicant's combined SJT and MMI score.

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[17] For an overview of the attributes measured in each exercise, see Appendix A.

Table 38: Incremental validity of MMI exercises

Exercise	R^2 change statistic	F change statistic
Exercise 1a	2.0%	217.72**
Exercise 1b	1.0%	112.89**
Exercise 2a	2.5%	266.94**
Exercise 2b	1.6%	176.92**
Exercise 3a	1.5%	167.40**
Exercise 3b	1.6%	177.57**

**Correlation is significant at the 0.001 level (2-tailed).

The analysis indicates that, across the six individual MMI exercises, each exercise contributes a significant amount of individual variance to an applicant's total combined score (F change statistics are significant for all six exercises). When looking at the R^2 change statistic, this indicates that each exercise is contributing additional variance ranging from 1% for exercise 1b to 2.5% for exercise 2a, thus providing initial evidence of incremental validity. That is, each exercise is contributing something unique to the overall MMI. This level of additional variance is in the expected range, in particular when considering the high level of multi-collinearity between the exercises (as can be seen in Table 35). The impact of this high multicollinearity means that we can be less precise when looking at the impact that one variable has (i.e. performance on a single MMI exercise) on the outcome variable (total combined MMI and SJT score).

Whilst these results provide some initial evidence of the value of each exercise, it would be expected that all exercises add unique variance. This is due to the predictor (i.e. the exercises) and the outcome variables (i.e. applicant's total score) being related; in other words the MMI makes up 60% of an applicant's total score. Based on this, it is recommended that these initial regression findings are interpreted with caution and future research is conducted to investigate this further. This will be discussed in the recommendations section.

3.5 Group differences at a test level for SJT, MMI and numeracy

To examine fairness issues regarding the use of the SJT, MMI and Numeracy test, group differences in performance within the applicant sample were analysed on the basis of age, gender, university and countries in which universities are based, after outliers (applicants with very low scores and / or high missing data) were removed.

Some group differences on the SJT, MMI and Numerical assessment were found based on age, gender, ethnicity and country of university. Differences for age, gender and ethnicity have been found, but all effect sizes are small. Evaluation also indicated that applicants from UK universities perform better than international applicants on the SJT, MMI and Numerical assessment. Whilst the finding between UK and international applicants is not unexpected, due to the small sample size for the international group[18], these findings should be interpreted with extreme caution.

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[18] Primer, A. P. (1992). Quantitative methods in psychology. *Psychological Bulletin*, *112*(1,155-159).

3.5.1 Age

Pearson's correlations were conducted to examine the relationships between age and scores on the SJT, MMI and Numeracy test.

SJT: A small significant negative correlation (Pearson's r) between age and SJT score was found (r **= -**.26, $p<0.01$)**.** This suggests that, younger applicants typically performed better than older applicants on the SJT.

MMI: A small significant negative correlation (Pearson's r) between age and MMI score was found (r = -.14, $p<0.01$). These findings suggest that, on average, younger applicants performed better than older applicants on the MMI.

Numeracy: A small significant negative correlation (Pearson's r) between age and Numeracy score was found (r = -.29, $p<0.01$). This suggests that, younger applicants typically performed better than older applicants on the Numeracy test.

3.5.2 Gender

Independent t-tests were conducted to examine whether there were significant differences in SJT, MMI and Numeracy test scores based on gender. Descriptive statistics can be seen in Table 39.

SJT: A significant difference in performance on the SJT based on gender was found, indicating that females scored significantly higher than males, although the effect size was small ($t(1333.41) = 8.43$, $p < 0.001$, $d = .39$).

MMI: A significant difference in performance based on the MMI based on gender was found, indicating that females scored significantly higher than males on the MMI, although the difference was again, small ($t(2265) = 6.67$, $p < 0.001$, $d = .30$).

Numeracy: No significant differences in performance on the Numeracy test, based on gender, were found.

Table 39: Gender – descriptive statistics by selection method

		Female	Male
SJT	**N**	1492	733
	Mean	568.03	556.59
	Std. Deviation	28.06	31.02
MMI	**N**	1519	748
	Mean	82.38	77.48
	Std. Deviation	16.27	16.73
Numeracy	**N**	1522	749
	Mean	7.52	7.46
	Std. Deviation	1.97	1.98

3.5.3 Ethnicity

Ethnic backgrounds included: 'White', 'Asian', 'Black', 'Chinese', 'Mixed' and 'Other'. applicants were also given the response option 'Prefer not to say'; these individuals were not included in

the analysis. Analysis of variance (ANOVA) were conducted to investigate whether there were significant differences on the SJT, MMI and Numeracy test, based on ethnicity. Descriptive statistics by ethnicity are shown in Table 40.

SJT: Significant differences in performance between applicants of different ethnic groups were found on the SJT ($F(6,2215)=49.03$, $p < 0.001$, $\eta^2 = 0.12$), with applicants who indicated that they were 'White' performing better than applicants in other ethnic groups, although the effect size was small. applicants in the 'White' group achieved significantly higher scores than those in all other ethnic groups. applicants in the 'Asian' group also scored significantly higher than those in the 'Black' and 'Other' ethnic groups. Whilst those in the 'Mixed' group had a higher overall mean on the SJT than all groups with the exception of the 'White' group, the difference was not statistically significant. This is likely to be due to the smaller sample size within this group[19].

MMI: Significant differences in performance between applicants of different ethnic groups were found on the MMI ($F(6,2215)=40.64$, $p<0.001$, $\eta^2 = 0.10$), although the effect size was small. applicants in the 'White' group achieved significantly higher scores than those in all other ethnic groups, with the exception of the 'Mixed' group. Those in the 'Mixed' group scored significantly better than those in the 'Black', 'Chinese' and 'Other' groups. applicants in the 'Asian' and 'Black' groups also scored significantly higher than those in the 'Chinese' ethnic group.

Numeracy: Significant differences in performance between applicants of different ethnic groups were found on the Numeracy test ($F(6,2261) = 35.57$, $p < 0.001$, $\eta^2 = 0.09$), although the effect size was small. Many differences were found within the applicant groups. The most prominent was that applicants in the 'Chinese' group were found to have significantly better performance on the Numeracy test than those in all other ethnic groups (other than 'Mixed', which may be due to the smaller sample size).

Table 40: Ethnicity - descriptive statistics by selection method

		White	Asian	Black	Chinese	Mixed	Other
SJT	**N**	560	916	301	210	40	134
	Mean	580.96	561.07	553.37	559.58	563.39	552.63
	Std. Deviation	24.13	28.22	31.93	26.25	33.22	29.14
MMI	**N**	561	932	312	216	42	138
	Mean	88.91	79.43	77.66	72.27	85.62	76.78
	Std. Deviation	14.90	15.88	15.34	16.72	15.13	17.83
Numeracy	**N**	563	932	312	217	42	139
	Mean	7.97	7.36	6.54	8.66	7.24	7.00
	Std. Deviation	1.78	2.00	1.97	1.26	1.89	2.16

3.5.4 Primary pharmacy qualification

For the purpose of this analysis, applicants who undertook their primary pharmacy qualification in a university in a country outside of the (UK) were grouped as International. Independent t-

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[19] Primer, A. P. (1992). Quantitative methods in psychology. *Psychological Bulletin*, *112*(1,155-159).

tests were conducted. Descriptive statistics by applicants' country of university are shown in Table 41.

SJT: Independent t-tests revealed significant differences in performance on the SJT, based on country of university ($t(2245) = 9.04$, $p < 0.001$, $d = 1.13$)[20], with applicants who came from a university in the UK performing better. This difference had a large effect size.

MMI: An independent t-test revealed a significant difference in performance on the MMI, based on country of university ($t(2288) = 4.09$, $p < 0.001$, $d = .53$). applicants from UK universities performed better than those who were from an international university. This effect size was moderate.

Numeracy test: An independent t-test revealed a significant difference in performance on the Numeracy test, based on country of university ($t(69.84) = 9.22$, $p < 0.001$, $d = 1.23$). applicants from UK universities performed significantly better than those from a university outside of the UK, the effect size for this difference was large.

Table 41: Country of university - descriptive statistics by selection method[21]

		United Kingdom	International
SJT	N	2185	62
	Mean	565.16	531.42
	Std. Deviation	28.93	30.76
MMI	N	2222	68
	Mean	80.99	72.66
	Std. Deviation	16.60	14.74
Numeracy	N	2226	68
	Mean	7.58	4.97
	Std. Deviation	1.91	2.30

3.6 Difference in performance based on date and time

Findings indicate that applicants perform better on both the SJT and MMI in the afternoon, which may suggest other factors independent of the assessments, such as alertness, energy and motivation are influencing performance. Furthermore, as these two exercises are measuring similar attributes, it may be that there is a learning effect, in that applicants learn something from completing the first assessment that helps them in completing the second one. While differences were found in performance based on date in the SJT and Numerical assessments, the effect size for these differences were small and may be due to a number of factors. For example, location, proximity to pharmacy schools, and the motivation of applicants to book onto certain dates/locations may all influence performance.

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[20] A *d* value of approximately .20 corresponds to a low effect, of about .50 to a medium effect and of .80 to a high effect. Below .20, the effects can be considered insignificant (Cohen, 1988, 1992).
[21] These results should be interpreted with caution due to small sample size of international university and due to the large difference in sample sizes between the two groups.

3.6.1 Time of day assessments were completed

Independent t-tests were conducted to examine whether there were significant differences in SJT, MMI and Numeracy test scores based on the time of day in which applicants completed the SJT, MMI, and Numeracy assessments. applicants who completed the SJT and Numeracy tests in the morning and MMI in the afternoon, were compared with applicants who completed the MMI in the morning and SJT and Numeracy tests in the afternoon. Descriptive statistics can be seen in Table 42.

SJT: A significant difference in performance on the SJT based on the time of day it was completed was found, indicating that applicants who completed the SJT in the afternoon performed significantly better than those who completed the SJT in the morning, although the effect size was small ($t(2293) = 3.83$, $p < 0.001$, $d = .16$).

MMI: A significant difference in performance on the MMI based on the time of day it was completed was found, indicating that applicants who completed the MMI in the afternoon performed significantly better than those who completed the MMI in the morning, although the effect size was again, small ($t(2288) = 4.52$, $p < 0.001$, $d = .19$).

Numeracy: No significant differences in performance on the Numeracy test, based on the time of day it was completed were found.

Table 42: Morning vs afternoon performance: descriptive statistics by selection method

		SJT&Num-AM	SJT&Num-PM
SJT	**N**	1109	1186
	Mean	558.85	564.42
	Std. Deviation	36.85	32.85
MMI	**N**	1105	1185
	Mean	79.13	82.25
	Std. Deviation	16.90	16.19
Numeracy	**N**	1109	1185
	Mean	7.52	7.48
	Std. Deviation	2.02	1.93

3.6.2 Date assessments were completed

Analysis of variance (ANOVA) were conducted to further investigate whether performance differs on the SJT, MMI and Numeracy test based on when applicants go through the assessment process. Analysis focused on whether there were significant differences in performance based on whether applicants completed assessments at the beginning, in the middle, or at the end of the three week testing period. Five groups comprised of three simultaneous days were used in this analysis. Descriptive statistics can be seen in Table 43.

SJT: Overall a significant difference in performance on the SJT based on the date it was completed was found ($F(4,2290)=2.48$, $p < 0.05$, $\eta^2 = 0.004$). The effect size for this difference was, however, small. Furthermore, when comparing specific groups of days, there were no significant differences.

MMI: No significant differences in performance on the MMI based on the date it was completed were found.

Numeracy: Overall a significant difference on the Numeracy test based on the date it was completed was found ($F_{(4,2289)}=22.58$, $p<0.001$, $\eta^2=0.01$), although the effect size was small. When comparing specific groups, analysis revealed that applicants completing the Numeracy test on dates 1 and 3 scored significantly higher than those on date 4.

Table 43: SJT, MMI and Numeracy assessment performance by date of assessment

		Dates 1	Dates 2	Dates 3	Dates 4	Dates 5
SJT	**N**	363	374	669	480	409
	Mean	559.73	559.55	560.33	563.66	565.49
	Std. Deviation	37.39	35.51	37.21	31.29	32.02
	Minimum	310.50	394.00	306.00	389.00	338.25
	Maximum	640.03	624.00	630.92	638.01	623.83
MMI	**N**	363	373	666	480	408
	Mean	81.03	81.49	80.83	80.12	80.41
	Std. Deviation	16.24	16.44	17.35	16.62	15.87
	Minimum	34.00	32.00	25.00	28.00	35.00
	Maximum	119.00	118.00	120.00	119.00	116.00
Numeracy	**N**	363	374	669	480	408
	Mean	7.29	7.59	7.29	7.78	7.60
	Std. Deviation	2.10	1.99	2.03	1.80	1.88
	Minimum	0	1	1	0	1
	Maximum	10	10	10	10	10

4. Acceptability

4.1 Applicant feedback

All applicants who completed the selection centre were asked to complete an evaluation questionnaire regarding their perceptions of the SJT, MMI, Numeracy Test, overall selection process and venue. 2,202 (95.9%) of applicants completed some or all of this questionnaire.

All applicants were asked if they had applied for and been offered any posts outside of the national Pre-registration Pharmacist Recruitment Scheme. Of the applicants who responded to this question, 30.7% reported that they had applied for a post, and 20.5% responded that they had been offered a post outside of the scheme.

Applicants were also asked which selection centre venue they attended; a breakdown of venues attended by applicants who responded to this question is presented in Table 44.

Table 44: Venue attended by applicants

Venue	N	Proportion of Sample
Newmarket Race Course	364	17.8%
Cardiff City Stadium	112	5.5%
Kassam Stadium (Oxford)	431	21.1%
St James' Park (Newcastle)	194	9.5%
KCM Stadium (Hull)	151	7.4%
Etihad Stadium (Manchester	155	7.6%
Stewart House (London)	637	31.2%

4.1.1 Applicant feedback: SJT

Applicants were asked to indicate their level of agreement with several statements regarding the relevance, appropriateness, fairness and difficulty of the SJT, the extent to which it allowed students to demonstrate their ability, the instructions, and logistical details.

Overall, applicants responded positively towards the content of the SJT, with 84.7% agreeing that the content was relevant to the role, and 75.2% agreeing that the content was appropriate for selection into the Pre-registration Pharmacist role. Additionally, 68.8% agreed that the content was fair.

Applicants' perceptions about the extent to which the SJT provided the opportunity to demonstrate their abilities were mixed, with 43.2% agreeing or strongly agreeing, and 31.0% responding neutrally. A quarter of applicants (25.7%) felt that the SJT did not provide opportunity to show their ability.

Regarding the logistics of the SJT, applicants generally responded positively: 75.8% agreed that the instructions were clear and easy to understand, and 62.0% agreed that the length of time allowed to complete the SJT was adequate.

Overall, applicants felt that the SJT was an appropriate level of difficulty, with 61.3% agreeing with this statement.

Applicants were asked how enjoyable they found the SJT to be, as a selection method. On balance, perceptions about how enjoyable the SJT was as a selection method were mixed. Of the applicants that responded, 36.1% agreed or strongly agreed that the SJT was an enjoyable selection method, 32.1% responded neutrally, and 31.7% disagreed or strongly disagreed. This finding is unexpected given that for most, it was a new method of selection.

Applicants were asked whether they had previously completed a similar test as part of a selection process, and of the respondents, 30.3% reported that they had, whereas the majority, 69.7%, had not.

When asked how much time they took to complete the SJT, most applicants reported completing the test, with over half of these applicants doing so within 91-105 minutes (56.8%). 20% of applicants completed the SJT within 90 minutes, 7% within 75 minutes, 5.1% within 60 minutes, and 1.2% completed the test in under 45 minutes. 9.9% of applicants reported that they did not complete the SJT.

Qualitative comments relating to the overall SJT are summarised in this section.

Applicants comments regarding the SJT overall included positive views about the use of SJT as a selection method, with many mentioning that the items encouraged them to consider specific role-related situations. For example, "*It's a commendable method of assessing applicants' ability to resolve or handle situations dealing with people relationships while focussing on clinical duties for the benefit of the patient.*" "*Comprehensive; good addition to Pre-reg recruitment.*" "*This test was very good in terms of assessing our critical thinking.*" "*I believe this test was very effective and allowed me to demonstrate my ability, compared to other tests in the past which only require one answer.*"

Applicants commented on the extent to which they felt they could demonstrate their abilities in the SJT, with mixed views similar to the quantitative findings. Some reflected positive perceptions towards being able to show their ability, whereas others mentioned that they found it challenging to respond using a fixed set of response options and not being able to provide an explanation for their response, or seek further information. For example, "*It's a commendable method of assessing applicants' ability to resolve situations dealing with people relationships while focusing on the benefit of the patient*", "*The test was very good at assessing our critical thinking and how we would respond to certain situations*", and "*Would be better if there was opportunity to give rationale behind decision making*", "*The questions were okay but I feel that it was not enough to demonstrate my ability as a pre-reg pharmacist as I felt limited to the choices provided*" "*Not everyone understands the situation the same…it does not explore a student's rationale for different answers – everything is fixed*".

Overall, applicants' comments about the SJT questions reflected a positive view on the relevance of scenario content to the Pre-registration Pharmacist role, with applicants gaining a realistic understanding of the role "*The scenarios gave me a better understanding of some of the situations I may face as a Pre-registration Pharmacist*", "*I liked that there were relevant and*

actual situations that a Pre-registration Pharmacist would come across in a real-life setting", "*Very practical and relevant to Pre-registration roles and situations.*"

A smaller proportion of applicants commented that they found it challenging to answer the questions from the perspective of a Pre-registration Pharmacist while they were not currently in the role. "*Questions were directed at current Pre-registration Pharmacists, we are still students, so a lot of scenarios were completely new*", "*It was challenging to put yourself in the role of a Pre-registration Pharmacist at times because we haven't specifically experienced the role yet.*"

Several comments focused on the content specifically regarding the pharmacy setting, with the spread across hospital and community pharmacy seen as positive, but that may advantage applicants who had specific work experience in the context. "*It was a fair test which encompassed a variety of pharmacy disciplines*", "*I liked it because it was approximately half-half hospital and community settings*", and "*It would be challenging to respond without some prior workplace experience*" "*Those who completed a community and hospital placement would have an advantage.*"

Further comments on the SJT reflected positive views on the ranking and multiple choice question formats, although some applicants found the format of indicating the appropriateness of different response items challenging, in that it was hard to distinguish between some of the response options where there was no clear 'wrong' or 'right' response. For example: "*Overall it was logical test*", "*It wasn't too easy to rank, so good to distinguish – required thought and consideration.*" but "*The situations were appropriate and relevant, however if there was an opportunity to explain our choices as well, it would have been a better demonstration of our judgment*". "*I felt some questions were too ambiguous to make a clear distinction.*" "*It was difficult to decide between certain answers as I believe different circumstances in the work environment would affect what I would do*".

Reflecting on the level of difficulty overall, applicants commented that the level of difficulty was appropriate, "*It was of sufficient difficulty and questions were varied*", and "*The level of difficulty was fair*". Some felt that without prior experience, some of the scenarios were more difficult to answer, for example: "*It was difficult to determine what the relationship would be like between the pre-reg and tutor as I have never been in that position before*", "*It was difficult to decide on delegation aspects as we have not experienced this before.*"

Regarding timings, applicants presented mixed views on the length of time allocated to complete the SJT, with some applicants commenting that the length of time was too long, others that it was too short. Some comments referred to needing time to read the instructions: "*A long passage detailing how to answer the questions was inside the test booklet. Many applicants will have spent imperative exam time reading the information, while others will have skipped this due to prior knowledge of the test and could save time. The information should be present on the front*", "*May benefit from having less questions as it was quite time consuming*" "*The time provided was too long*", and "*The paper was split well, enough time allocated*".

Relatedly, there were multiple comments regarding overall test length, with most of these comments indicating that the SJT was long, and they would have preferred a shorter test. "*There were too many questions to read; it got a bit tiring and felt repetitive*". Similarly, comments on the paper based format included that applicants found the task of colouring in circles on the answer sheet time consuming, and some suggested a digital format may be

easier. "*Colouring in circles took too long*", "*This test should be computerised.*" "*I would prefer an online/computerised format for this test.*"

4.1.2 Applicant feedback: MMI

Applicants were asked to indicate their level of agreement with several statements regarding the relevance, appropriateness, fairness and difficulty of the MMI, the extent to which it allowed students to demonstrate their ability, the instructions, and logistical details.

Applicants responded positively overall regarding the content of the MMI. 75.4% agreed that the content of the MMI was relevant to Pre-registration Pharmacy, 71.4% agreed that the content was appropriate for selection into the role, and 63.6% agreed that the content of the MMI was fair.

When asked their perceptions of the level of difficulty of the MMI, 58.4% of applicants agreed that the difficulty level was appropriate.

On balance and in line with perceptions in relation to the SJT, applicants' perceptions were mixed about the extent to which the MMI provided an opportunity to demonstrate their abilities: 44.7% agreed, 23.7% responded neutrally, and 31.6% disagreed.

Overall, applicants responded positively towards the instructions and delivery of the MMI, with 73.6% agreeing that the instructions were clear and easy to understand, and 65.5% agreeing that the MMI was well run and delivered.

Applicants generally felt that they had been provided an adequate amount of time for the MMI, with 64.7% agreeing or strongly agreeing with this.

Applicants were also asked whether they found the MMI to be an enjoyable selection method; responses were balanced across the scale, with 46.6% agreeing that the MMI was enjoyable, 27.2% responding neutrally, and 26.3% disagreeing.

Qualitative comments relating to the overall MMI are summarised in this section.

Overall, applicants' comments on the MMI as a selection method were positive, with many noting that the MMI format was an enjoyable and effective way of assessing relevant abilities in multiple interviews: "*Very good*", "*Fair way to interview as there's a variety of interviewers*", "*Multiple interviewers allow you to show your potential*", "*I thoroughly enjoyed the MMI as it gave me the freedom to say what I would do in a particular situation*", and "*MMI is a good and effective way of testing a person*".

Comments regarding the content of the MMI were generally positive, with applicants stating the MMI content was relevant to the Pre-registration Pharmacist role, and the interview gave them an opportunity to demonstrate their abilities: "*Was a good way to demonstrate one's ability as a Pre-registration Pharmacist.*", "*The scenario was based on a real-life complication*", "*The different scenarios were reflective of a role as a Pre-registration Pharmacist*", "*The clinical scenarios were best as they allowed me to demonstrate my logical thinking and problem solving.*" Some applicants noted that they found it difficult to "*sell their skills as a Pre-registration Pharmacist*" in the context-specific format of the MMI scenarios. Further comments reflected views that the content was not as relevant to clinical knowledge, ("*I felt as if it didn't test enough clinical knowledge*", "*The questions did not allow you to draw on academic or placement*

knowledge") and were uncertain as to the best response for the 'unseen' scenarios, "*Some of the questions were closed meaning that there were limited examples I could draw on*" "*Was interesting but difficult to come up with a response in time, may not show if I'm a good pharmacist or not.*"

Applicants commented on the level of difficulty of the MMI questions, with some positive comments stating the difficulty was appropriate, e.g. "*Questions were challenging enough to make you think, but not so hard that you couldn't respond*" whereas others found the content more difficult; "*Some of the case scenarios were difficult for a Stage 3 Pharmacy student*", "*Some of the questions were a bit unclear*". Overall, comments reflected that applicants found it easier to prepare an effective response for the first scenario, i.e. the 'seen' scenario, compared to the 'unseen' scenario. "*It was good that we were given one scenario prior to going into the room*", and regarding the second scenario: "*It was a lot of information to take in and process in 3 minutes*".

Regarding logistics and the running of the MMI, applicants' comments were overall positive, noting that the MMI was well organised and run: "*The explanations and instructions were very clear*", "*Overall the session ran well*" "*Well executed, enjoyable to move from one scenario to the next in a fast-paced environment*". Some comments mentioned delays in the running of their interviews, "*Interview was running late*", "*the delay was confusing*", "*was late, but well run*".

In terms of timings, applicants' comments generally reflected a sense of having a short amount of time in which to read and prepare for the MMI questions, with several stating that more time would have been helpful. "*The scenarios took time to read, leaving little time for preparation.*", and "*having a little more time would allow more in-depth answers*".

4.1.3 Applicant feedback: numeracy test

Applicants were asked to indicate their level of agreement with several statements regarding the relevance, appropriateness, fairness and difficulty of the Numeracy test, the extent to which it allowed students to demonstrate their ability, the instructions, and logistical details.

Applicants responded positively towards the content of the Numeracy test: 84.4% agreed that the content was relevant to the Pre-registration Pharmacist role, and 82.4% agreed that the content was appropriate for selection into the role. Additionally, 76.4% of applicants agreed that the content of the Numeracy test was fair.

Overall, applicants reported that they perceived the Numeracy test to be an appropriate level of difficulty, with 74.3% agreeing with this, and 65.9% of applicants agreed that the Numeracy test allowed an opportunity for them to demonstrate their ability. Only 42.3% of respondents agreed that the length of time provided to complete the Numeracy test was adequate, with 45.8% disagreeing.

Interestingly, this balance in applicant perceptions of difficulty, relevance, and opportunity to demonstrate ability across the SJT and MMI (as outlined above) was not consistent with perceptions towards the numeracy test. For example, 69.5% of applicants felt they had the opportunity to demonstrate their ability. It may be that the link between a numeracy test and

numerical elements of the pre-registration pharmacist role is potentially more tangible and therefore opportunity to demonstrate ability more salient, as well as the link between the task and the criterion being measured.

Qualitative comments regarding the Numeracy test are summarised below.

Overall, applicants felt that the Numeracy test was appropriate for Pre-registration Pharmacist selection and a fair method. "*Fair questions*", "*Good test – challenging*" "Enjoyed this bit". Other applicants commented that they had expected the Numeracy questions not to be clinically related, based on the applicant handbook: "*The handbook said basic, not very clinical focused questions – this was not the case.*", "*I prepared for it as a numeracy test with less clinical content, but I believe it was a proper pharmaceutical calculation test.*"

Regarding test content, overall applicants commented that it was relevant and at an appropriate level of difficulty: "*Very relevant questions*", "*Questions were appropriate*", "*Right level of difficulty*", "*I thought it was fair and reflective of a real-life situation in a clinical setting*" with some requesting a more diverse range of content "*More questions on dilutions, infusion rates, etc would have been better*"

Applicants comments on the format of the Numeracy test were mixed, with some noting the test was structured well ("*Well laid out*"); whereas several others noted that they had missed the last questions due to not realising where the test finished: "*There was no PTO on the second page – I missed 2 questions on the back.*", "*It was not clear that there was a question on the back page.*" applicants also noted that they would have preferred more space to complete their working out during their calculations for each response. "*Please provide extra paper to do rough calculations.*".

Timings were mentioned in applicants' comments, predominantly from the perspective that there was not enough time to complete the Numeracy test. "*While I think the level of difficulty was appropriate, the constraint of time might result in unnecessary mistakes.*", "*There was not enough time to complete the test.*", "*More time was needed as some questions were very wordy or needed significant time to calculate.*", "*Another 5 minutes would have been preferable to allow 2 minutes per question.*"

4.1.4 Applicant feedback: selection process overall

Applicants were asked to indicate their level of agreement with several statements regarding the communication throughout the selection process. Statements related to the applicant handbook, ORIEL and online systems, the extent to which it allowed students to demonstrate their abilities, and logistical details.

Overall, applicants had mixed views towards the level of communication they received throughout the selection process: 55.5% agreed that there was enough communication from HEE, and 54.0% agreed that was enough communication from their school. applicants reported that the information provided in the applicant handbook was clear and helpful, with 70.7% of applicants in agreement with this statement.

Regarding the online application system, Oriel and interview booking systems, applicants' perceptions again were mixed, with many applicants responding neutrally to these statements. 52.7% agreed that the Oriel system was easy to navigate and use, and 55.6% agreed that the preferencing system was easy to understand and use. 53.4% agreed that the interview booking

system was easy to use. applicants' views on the query resolution system were more mixed, with 43.0% agreeing that it was easy to understand and use, 37.1% neither agreeing nor disagreeing, and 20.0% disagreeing with this statement.

Regarding the extent to which applicants felt that the selection process gave them the opportunity to demonstrate what they can do, responses were also mixed: 38.3% agreed that the overall selection process gave them this opportunity, whereas 29.5% responded neutrally, and 32.2% disagreed.

Qualitative comments regarding the selection process overall are summarised below.

Overall, applicants reported positive experiences throughout the selection process. Comments on their experiences reflected an enjoyable process, which was interesting and contained much content that felt relevant to the Pre-registration Pharmacist roles for which they were applying. "*Thank you for a pleasant day*", "*Overall it tested my ability well*", "*The overall process was fair*" "*It was challenging but enjoyable overall*", "*The selection process overall was a good system*".

A large portion of comments centred around the timings of the selection centre, with some reflecting positive perceptions, ("*Very well organised, friendly guidance*", "*The time given to us was sufficient*", "*Well organised, I felt totally guided throughout*"), and a significant group of applicants commenting that the timings could have been managed more effectively. "*There was a long wait between assessments*" "*The day ran slightly late*". Relatedly, for applicants who had far to travel, comments noted that delays in the selection centre resulted in a later finish than expected and applicants missed return trains as a result. "*Was delayed for the MMI and SJT which meant I left 1 hour later than expected*", "*I ended up missing my train due to finishing late*".

Regarding the venues, on balance, applicants' comments were positive, noting useful venues and facilities. A number of comments referred to there not being a venue available in the Midlands (particularly in the East Midlands and Birmingham) or sufficient capacity in London. "*Would have preferred more choice as limited options in the Midlands*", "*Was surprised there were no options in Birmingham*". Many noted that it would have been preferable to have venues nearby to pharmacy schools, as many applicants needed to travel considerable distances to attend the selection centre. "*Please can you use selection centres close to schools of pharmacy*", "*More venues needed in cities like London and Manchester*".

Several comments mentioned the booking process, with a focus on the timings between the invitation email and closing time. More notice regarding when booking opened would have been preferable "*I was at work and missed every slot in London, had to go to Newmarket*", "*It was not fair that the London bookings closed within 10 minutes of opening*", "*We were told 10 minutes before that bookings were opening and I missed my preferred location.*"

4.1.5 Applicant feedback on individual selection centres

Applicant feedback was gathered on the seven venues used to deliver the operational MMI. There were some differences in how applicants rated the facilities, based on the geographical venue they attended. Overall, applicants responded positively in relation to the appropriateness of the facilities and venue, and were satisfied with their treatment during the selection process.

Slightly less favourable responses were recorded for the Newmarket and Oxford venues, particularly in relation to the accessibility of the venue.

4.2 MMI interview panel member feedback

All Interview Panel Members who participated in the operational delivery of the MMI were asked to complete an evaluation questionnaire regarding their perceptions of the MMI stations that they had assessed. 341 Interview Panel Members completed the questionnaire, representing a 41.8% response rate.

4.2.1 Panel member feedback on MMI test method

Interview Panel Members were asked to indicate their level of agreement with several statements regarding the relevance and appropriateness of the MMI, the extent to which it allowed students to demonstrate their qualities, the guidance, probing questions, scoring criteria, and logistical details.

Overall, Interview Panel Members responded positively towards the instructions and delivery of the MMI, with 80.0% agreeing that the instructions provided to the applicants were clear and easy to understand, and 76.0% agreed that the instructions for the interview panel were also clear.

Interview Panel Members also indicated that for most purposes, timings were adequate, with 67.5% agreeing that the length of time given to Interview Panel Members to familiarise themselves with the content was adequate, 83.7% agreed that the applicants were given adequate time to complete the exercises, and 43.0% agreed that the length of time allocated for scoring the applicants was sufficient. The adequacy of time allowed for scoring is reflected in comments below.

The Interview Panel Members were also asked for their views on the extent to which the system used to score applicants was easy to use. 87.0% agreed that tablets were easy to use, and 79.4% agreed that it was easy to provide scores using the software on the tablet.

Qualitative comments relating to the overall MMI, or that were relevant to all venues, are summarised in this section. Qualitative comments pertaining to specific venues are summarised in the corresponding separate venue-specific feedback in the sections below.

Overall, Interview Panel Members' comments regarding the questions themselves were positive. Some commented that this form of assessment was an effective and useful way to assess key competencies for Pre-registration Pharmacists, noting that the format and content was relevant. *"I felt that overall the assessment centre was a robust method of recruitment and more reliable overall than other methods I have used in the past." "I felt that it was a fair and effective process." "The format was very good and gave the applicants a nice insight into the role of a Pre-registration Pharmacist."*

A few comments remarked that the exercises were appropriately challenging and able to differentiate between applicants' performance; *"The questions were challenging so allowed me to differentiate between strong and weak applicants". "The MMI provided insight into applicants that other assessments are not able to provide."* Others commented that some exercises were difficult, specifically, a few Interview Panel Members mentioned that applicants may not know

some of the language used in the exercises, such as "rapport" and "downplayed". Others reflected that there was a large amount of information to take in, and that allowing more time for this would be beneficial.

Some reflections centred around the delivery mode, noting that following a "rigid" scheduled process, Interview Panel Members were encouraged not to converse with applicants outside of the specified assessment exercise material, which resulted in some perceiving the process as feeling "robotic". *"applicants need to be warned that they will not be engaged with in dialogue so they are not left feeling that the interviewers were rude." "I found it hard to get the best from the applicants in the timescale and restrictions on prompting and having time to put them at ease to get the best out of them."*

Regarding timings, some comments noted the MMI was efficient and well-organised *"Very well structured and run".* A large number of other comments identified two common themes, focused on scheduling and breaks. First, it was noted that most assessment days started around 10am, which meant that sessions continued into the evening, and in cases where delays had been experienced, this resulted in both applicants and Interview Panel Members having a very long day. Several comments identify that starting the day earlier would have been preferable, in order to finish nearer to 5pm instead of 6-7pm. Secondly, several Interview Panel Members mentioned that time allocated for breaks was often usurped by time needed to complete scoring or 'washing up' following applicants, or to make up time following a delay. A sizeable portion of these comments referred to not being able to take a full lunch break, or refreshment breaks as a result. *"Three minutes between applicants to score and provide feedback was not enough. Felt it was rushed and unable to constructive feedback due to lack of time."*

4.2.2 Interview panel member feedback on individual stations

Station 1 (Exercise 1a and 1b)

Overall, Interview Panel Members who assessed Station 1 (exercise 1a and 1b) responded positively towards the content of the MMI, with 95% agreeing that the content of the MMI was relevant to those applying for Pre-registration Pharmacy and 93% agreeing that the content was appropriate for selection into the Pre-registration Pharmacy role.

Interview Panel Members were also asked for their views on the extent to which the MMI allowed participants to demonstrate their abilities. 78.8% agreed that applicants had sufficient opportunity to demonstrate their abilities.

Station 2 (Exercise 2a & 2b)

Overall, Interview Panel Members who assessed Station 2 (exercise 2a and 2b) responded positively towards the content of the MMI, with 96% agreeing that the content of the MMI was relevant to those applying for Pre-registration Pharmacy and 89.7% agreeing that the content was appropriate for selection into the Pre-registration Pharmacy role.

Interview Panel Members were also asked for their views on the extent to which the MMI allowed participants to demonstrate their abilities. 72.8% agreed that participants had sufficient opportunity to demonstrate their abilities.

Station 3 (Exercise 3a & 3b)

Overall, Interview Panel Members who assessed Station 3 (exercise 3a and 3b) responded positively towards the content of the MMI, with 92.1% agreeing that the content of the MMI was relevant to those applying for Pre-registration Pharmacy and 85.9% agreeing that the content was appropriate for selection into the Pre-registration Pharmacy role.

Interview Panel Members were also asked for their views on the extent to which the MMI allowed participants to demonstrate their abilities. 68.2% agreed that participants had sufficient opportunity to demonstrate their abilities.

4.2.3 Interview panel member feedback on individual selection centres

Interview Panel Members' feedback was gathered with regards to the seven venues used to deliver the operational MMI. Overall, there was strong agreement from panel members that venues and management of the MMI was appropriate. Panel member feedback will be utilised by the Pharmacy National Recruitment Office to inform operational planning of future recruitment events.

5. Summary of key findings and next steps

This evaluation set out to explore the immediate impact of the new national pre-registration pharmacist recruitment scheme, with a particular focus on the reliability, validity, fairness and acceptability of the selection methods used.

Overall, findings suggest that the pre-registration pharmacist recruitment scheme is effective, fair and supports all applicants who meet minimum competency requirements to stay in the selection process. Below is a summary of the key evaluation findings:

5.1 Key findings

5.1.1 Applications and recruitment outcomes

Overall, the data shows that there was **no statistically significant variability in the appointability and offer outcomes for any group** suggesting that the pre-registration pharmacist recruitment process was free from adverse impact or bias. Analysis of applicant pools within each demographic area demonstrated that comparable percentages were progressed through each stage of the selection process and received a training place offer. However, lower ranking due to test-level differences identified for some demographic groups (see 5.1.2) may have resulted in lower satisfaction with the final training place offer amongst these applicants.

Applicant feedback suggested that **the booking process used for interview slots affected some applicant's ability to gain a slot in their preferred location,** meaning they had to seek alternative venues with available slots. This is likely to have been a major contributing factor for the higher than expected percentage of applicants that failed to attend their booked interview slots across centres, particularly at the Hull and Newmarket venues.

Twelve percent of appointable applicants were left without a pre-registration programme offer at the end of the recruitment process. Two thirds of these applicants required Tier 2 sponsorship to undertake their pre-registration training year. The places available to these applicants were limited and popular with all applicants. The remaining third of these applicants had simply not preferenced enough programmes.

Community pharmacy programmes received, on average, fifty percent less applications (preferences) per programme than available hospital programmes, with the lowest preferencing and fill-rates for the community pharmacy sector found the traditionally hard-to-fill areas – South West and Wessex. Overall, medium sized pharmacies experienced the lowest fill-rates.

The recruitment process achieved an overall fill-rate of 75% (1625 of 2161). Approximately 60% of all pre-registration pharmacist posts in England and Wales that will commence in August 2018 were filled via the National Recruitment Scheme (1625 of approximately 2800). This includes 100% of hospital pre-registration pharmacist places.

5.1.2 Test report analysis

A positive skew in score distribution was seen in the cumulative scores for the numeracy test, and this was also mirrored in each individual paper. This suggests that the numeracy test was fit for its intended purpose of identifying extreme poor performers, with only two percent of applicants failing to achieve the cut-score. Further test-level analysis is planned to support ongoing development of this selection method (see 5.2.2).

The psychometric analysis presented within this report provides evidence that **the SJT is a reliable tool that is able to differentiate sufficiently between applicants**. Test-level analysis demonstrated that the difficulty level of the two different versions of the test was broadly similar, however, test equating techniques were undertaken to ensure equivalence in scores across the two SJT versions.

Item level analysis indicated a **good level of item quality and difficulty across the items selected for use within the two operational SJT versions**.

Psychometric analysis revealed that **the MMI had a close to even distribution across the four circuits, with each demonstrating its ability to differentiate amongst applicants**. Furthermore, the shape of this distribution indicates an appropriate level of difficulty with very few applicant scores falling at the top or the bottom of the distribution. Whilst some small differences were found between the measurement of some attributes across the MMI exercises and in relation to individual exercise scores, these differences were small. These initial evaluation findings suggest that the MMI circuits were comparable; therefore, there was **no impact on applicant scores depending on circuit completed**.

Whilst there is a degree of shared variance between the two methods (i.e. performance on one measure is linked to the other), **both the SJT and the MMI add unique variance to the overall selection process**. When investigating the relationship between the SJT and MMI, in line with expectations, a moderate significant correlation was observed. In addition, analysis was conducted to explore the relationship between the MMI exercises and the six attributes measured within the MMI. Findings were in line with those found within the broader selection literature. Exercises assessed by the same interview panel member exhibited particularly high correlations, indicating that how an interview panel member scored an applicant on one exercise influenced how they score the same applicant on the other exercise.

Analysis conducted to investigate any differences in performance on each selection method based on demographic group, indicated **small significant differences in relation to age (younger applicants performing better than older applicants) and ethnicity (White applicants performing better than BME applicants) across all three selection methods. Small significant differences were also observed on the SJT and MMI dependent on an applicants' gender (females performing better than males).** Moderate to large effect sizes were found between UK and non-UK applicants across all three methods[22].

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[22] Due to small number of applicants within the non-UK group, these results must be interpreted with caution.

Analysis investigating differences in performance due to the time of day each test was sat, indicates that **for the SJT and MMI, applicants perform better on the test that they complete in the afternoon**. This could be due to a number of different factors including learning effects (from completing one assessment previously that day) and motivation (i.e. if you perform well in the morning this will give confidence for the afternoon). No difference in performance was observed for the Numeracy test in relation to time of day.

Whilst ANOVA analysis revealed that there may be a difference in performance on the SJT and Numeracy test depending on the date an applicant sat them within the three-week testing window, further analysis between the five different groups of dates indicates no significant differences in overall scores. No differences were found in relation to MMI score.

5.1.3 Acceptability

Applicants

On balance, applicants reported mixed views in relation to the overall systems processes. **A majority of applicants responded positively towards the Oriel preferencing system and the interview booking system being easy to use**. A large proportion of applicants, however, responded neutrally towards the query resolution system being easy to use.

Overall, **applicants' perceptions of the MMI, SJT and Numeracy tests were generally positive regarding the content as relevant and appropriate** as part of the Pre-registration Pharmacist selection process. A number of applicants felt that more time to prepare their responses for the MMI test would be beneficial, especially for the 'unseen' exercises.

Applicant feedback highlighted a **perception that prior workplace experience, particularly in the hospital sector, may have offered applicants an advantage in the SJT test**, resulting in better test outcomes for those applicants.

Applicants generally responded positively in relation to the appropriateness of the facilities and venue, and were satisfied with their treatment during the selection process. Slightly less favourable responses were recorded for the Newmarket and Oxford venues, particularly in relation to the accessibility of the venue.

Interview panel members (MMI only)

Overall, **Interview Panel Members had positive perceptions regarding the content of the MMI being relevant and appropriate as part of the Pre-registration Pharmacist selection process**, and for providing applicants with the opportunity to demonstrate their ability. Further, whilst Interview Panel Members felt that applicants were given sufficient time to prepare for each exercise, many would have liked additional time to familiarise themselves with the exercises and to score each applicant.

Interview Panel Members generally responded positively in relation to using the tablets and software to score applicants. **Many had positive perceptions regarding the usefulness of the training they had received**, however, a large proportion responded neutrally when asked

whether the query resolution system was helpful. This may be due to a large number of Interview Panel Members not using this system.

Overall, Interview Panel Members responded positively in relation to the appropriateness of the facilities and venue, as well as the facilitation and invigilation on the assessment days; although slightly less favourable responses were provided for the Cardiff and Newcastle venues.

5.2 Next steps

The following next steps have been identified as a result of this evaluation and lessons learned from 2017. Many of these are already underway, overseen by PPROG, in preparation for the next round of pre-registration pharmacist recruitment taking place in 2018.

5.2.1 Recruitment process

Programme information

Employers, particularly those in community sector, are asked to review the information they make available to applicants regarding their training programmes, to ensure the programme description gives a clear picture of the experience and is attractive to applicants. These employers may also find it beneficial to engage with their local higher education institutions to raise awareness of their pre-registration training offering.

Community pharmacy employers are being encouraged to consider offering tier 2 sponsorship, particularly in hard-to-recruit areas i.e. South West, to help reduce the number of un-filled places in the community sector and widen access for around 100 applicants who perform well in interview but who are outcompeted by their peers for the limited training places currently offering visa sponsorship,

Applicant preferencing

With the aim of allowing applicants' more flexibility to amend their programme preferences, enhanced applicant preferencing has now been introduced for 2018. Previously, applicants were only able to positively preference programmes in a three-week window in August, with no changes allowed after this deadline. Enhanced preferencing will enable amendments to preferencing until a deadline in October 2018.

Selection centres

With a view to improving applicant access, **a review of selection centre locations for 2018 is being undertaken**. Further to this, interview slots will now release on a staggered basis for booking, with the aim of reducing the surge in online activity and rapid booking of popular selection centres i.e. London and Manchester.

A review of the red flag policy is being undertaken to support reduced duplication of concerns raised by Interview Panel Members and those already identified through agreed thresholds in selection criteria.

Increased use of panel members from a BME background on MMI selection test panels in future recruitment rounds will be explored as part of the ongoing equality impact assessment process and to support an ethnic composition of panel members that is reflective of the applicant population across all centres.

5.2.2 Selection methods

Numeracy Test

To support ongoing development of the numeracy test, further analysis of test-level results is planned for Phase 2. This will include analysis of variance to establish any differences in performance across the ten paper versions. Findings with regards to test difficulty and test reliability will be published as an addendum to this report.

SJT and MMI assessment specifications

Based on the positive findings of both the operational SJT and MMI, the current specifications, will continue to be used and monitored in future cycles i.e. content, settings, assessment attributes, response format and scoring methodology (including cut-score processes).

SJT and MMI content development

SJT item development will continue following the two pilots in 2017, to ensure that the bank of items continues to grow. It is important that individual SJT items are not over-exposed and therefore, where possible, the item bank should remain fresh and varied.

The evaluation findings indicate that the MMI content was appropriate and was able to differentiate between applicants. **It is intended that any future MMI content development follows a similar format to 2017.**

Future operational implementation SJT and Numeracy Test

With the aim of improving the applicant experience and improving efficiency, the SJT and Numeracy Test will move from a paper-based format to computer delivery in 2018. Whilst the evaluation of the SJT demonstrated acceptable levels of reliability[23], it is recommended that this is monitored.

Further information on the types of questions that would be asked in the numeracy test will be provided to applicants to support with preparation and management of expectations. This information will therefore be added to the applicant handbook for 2018.

Interview panel member training

Discussions are already underway regarding **updates to the Interview Panel Member training module following feedback received during the 2017 training process** (including better

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[23] Kline, P. (2013). *Handbook of psychological testing.* Routledge. ; Nunnally, C. (1978), *Psychometric Theory,* 2nd ed. New York: McGraw-Hill Book Company

quality calibration exercises and inclusion of additional guidance regarding the red flag process and global scoring system). However, the evaluation indicated that interview panel members appeared to have a tendency to score based on exercises overall rather than individual attributes. Therefore, it is also planned that **additional training materials and guidance are developed to support interview panel members in scoring applicants based on the specific indicators within the attributes**.

5.2.3 Evaluation phase two

Guided and approved by the evaluation steering group, **the next phases of evaluation activity will focus on obtaining a deeper understanding of stakeholder engagement with the recruitment process and the longer-term impact on education, training and placement quality**. The following key areas of focus have already been identified, based on the findings of this phase one evaluation:

- Qualitative study into applicant behaviour through the recruitment process, for example student participation, preferencing behaviour and subsequent decisions about training place offers, in order to identify influencing factors and possible interventions to motivate behaviour change.
- Quantitative analysis on applicant preferencing patterns i.e. by locality
- Correlation analysis to identify relationship between work experience and applicant test scores
- Test-level results analysis for numeracy test

The next phase will also begin to engage with employers for their perceptions of the recruitment process. Progression of this longitudinal study will involve validation study (see section 6.3) and qualitative exploration of employers and pre-registration pharmacists' views and experiences once they have taken up their pre-registration training positions.

6. Further recommendations for consideration

The following further recommendations are highlighted for ongoing consideration and determination by the PPROG as part of their ongoing planning and review of the national pre-registration pharmacist recruitment scheme.

6.1 Future operational implementation MMI

The design of the 2017 MMI meant that whilst an applicant completed six exercises, these were grouped together into three stations with the same interview panel members assessing two exercises simultaneously. **The findings from the MMI evaluation indicate that this design is likely to have impacted on applicant's scores, with their performance in the first exercise being linked to their performance on the second with the same interview panel members.** Whilst it is understood that this design was due to logistics, it is recommended that this is reviewed to look at the feasibility of each exercise being assessed by a unique pair of Interview Panel Members. Further Interview Panel Member training to emphasise the risks of a carry-over effect should also be implemented.

6.2 Monitoring group differences

Whilst findings around group differences in performance are in line with differences observed in other selection processes for similar professions, it is recommended that group differences at a test/assessment level continue to be monitored in future delivery cycles. Additionally, future psychometric evaluation could seek to investigate differences based on demographic group at an item/exercise level. This would help to understand the type of questions that are more likely to lead to a difference in performance. Understanding this can help to inform operational test construction (i.e. ensuring a balance of items are presented within the SJT/MMI to ensure one group is not knowingly being disadvantaged) and to inform new item/exercise development based on a review of any items/exercises that are flagged as disadvantaging a group.

Moderate to large effect sizes in performance across all aspects of the selection process were evident for UK versus non-UK universities. As part of the second phase of the evaluation of the selection process, it may be useful to investigate this difference further. For example, the difference could be due to a number of factors such as language ability or cultural background. Understanding this further can help to support future assessment development.

6.3 Validation study

In addition to completing the on-going evaluation analysis of the selection methods as part of operational delivery (as presented in this report), it is recommended that a validation study is undertaken, in accordance with best practice. applicants who successfully make it through the selection process and are allocated a Pre-registration Pharmacist place can be tracked through their training to examine the predictive power of the SJT and MMI. This is done through identifying a relationship between applicant's scores on the SJT and MMI and their performance in training. Importantly, validation evidence can be useful in defining a

suitable cut-score for the SJT, if it is deemed appropriate to remove applicants from the process ahead of the MMI. Further, it can be used to validate the cut-score put in place for the MMI.

Furthermore, whilst the results outlined within the regression analysis section provide some initial evidence to suggest that all exercises within the MMI are adding individual variance to an applicant's overall score; as 60% of this overall score is made up of the MMI exercises, this finding is expected. If it is of interest to investigate further the extent to which each element of the selection process is adding individual variance, and is valuable to include going forwards, another external outcome measure would be needed to evaluate this.

6.4 SJT practice paper

Whilst a small number of scenarios were made available to applicants prior to the 2017 operational delivery of the SJT, as a large majority of applicants have never completed an SJT previously, **it is recommended that a practice paper is developed and made available to applicants to help with preparing and familiarising themselves with the SJT.** The provision of a short practice paper containing example scenarios and supporting rationale for the responses can enable applicants to better understand the format and content of the SJT and ensure that all applicants are being provided with equivalent information ahead of the selection process. This may help respond to some applicant feedback that some applicants may be unfairly disadvantaged by having completed or seen an SJT test before.

Appendices

Appendix A. Pre-registration Pharmacist Recruitment Operational Group (PPROG) membership

Member Name	Region (if applicable)	Representing
Gail Fleming	National	Pharmacy Dean/Lead for Recruitment
Mark Bellaera	National	Recruitment
Wendi Lee	National	Pharmacy
Alana Martinez	National	MDRS
Alastair Paterson		BPSA
Alex MacKenzie		Lay Rep
Saffron Mawby	LaSE	Employers - Hospital
David Miller	North	Employers - Hospital
Bethan Crawley		Employers - CCA
Raminder Sihota		Employers - CCA
Ian Cubbin		Employers - AIM
Tim Rendell		Employers - AIM
Helga Mangion		Pharmacy Voice/AIM
Frances Stops		Industry
Laura McEwen-Smith		Evaluation
Helen McKee	Midlands & East	Recruitment
Trevor Beswick	South	Pharmacy
Marc Miell	South	Pharmacy
Rachel Stretch	LaSE	Pharmacy
Rosalyne Cheeseman	Midlands & East	Pharmacy
Sue Hamshaw-Thomas	North	Pharmacy
Michele Sehrawat	Wales	Pharmacy
Jonathan Silcock	University of Bradford	HEI-s - sandwich
Kay Wood	Aston University	HEI-s - OSPAP
Alison Littlewood	North	NHS training provider
Amanda Kemp	Midlands & East	NHS training provider
Adele Bunch		NHS Employers
Marc Terry	LaSE	Recruitment
Steven Parr	LaSE	Recruitment
Clare Kennedy	HEE	MDRS
Tim Swanwick	LaSE	Evaluation
Martin Foster	North	Recruitment
Mairi Hills	South	Recruitment
Alan Haines	LaSE	Recruitment
Chris Cutts	Northg	Dean

Appendix B. Assessment matrix

	SJT	MMI Station 1		MMI Station 2		MMI Station 3	
		Exercise 1a	Exercise 1b	Exercise 2a	Exercise 2b	Exercise 3a	Exercise 3b
Person-Centred Care	■	■				■	
Communication & Consultation Skills		■					■
Problem-Solving, Clinical Analysis & Decision Making	■		■	■			
Self-Directed Learning & Motivation				■			■
Multi-professional Working & Leadership	■		■		■		
Professional Integrity & Ethics	■				■	■	

Appendix C. Assessment specification of the SJT

ASSESSMENT SPECIFICATION AREA	DETAILS
Purpose:	Based on information gathered from the multi-method role analysis, the specification for a Situational Judgement Test (SJT) is outlined below. The SJT will be used alongside a Multiple Mini Interview (MMI) to allocate pharmacy students into their placement for their pre-registration pharmacy Year.
Level:	The initial SJT will be piloted on pharmacy students in their final year of pharmacy school. Once piloted the SJT will be sat by fourth year pharmacy students applying for their pre-registration pharmacy placement.
Target Competencies:	It is recommended that the SJT is deigned to assess four professional attribute domains, identified from the Pre-registration Pharmacist role analysis: ***Person Centred Care:*** *Demonstrates empathy and seeks to view the situation from the individuals' perspective; places the person who is receiving the care first, in everything they do; Accurately assesses, takes into account and is sensitive to the person's current and longer-term expectation, needs, situation and their wider social circumstances; Shows genuine interest in, and compassion for, the individual; making them feel valued; Works collaboratively with individuals, empowering and guiding every person to make an informed choice in their care* ***Problem Solving, Clinical Analysis & Decision Making:*** *Draws all knowledge together and builds upon what they have learnt to benefit the person receiving care; Undertakes a holistic approach to problem solving and decisions making, integrates and assimilates information about the individual from different sources to ensure a patient centred outcome; Explores multiple options when problem solving and making decisions; weighs up pros and cons associated with all options; Critically appraises information, applies a questioning approach and seeks to further understand and explore rather than taking things at face value; Undertakes a logical and systematic approach to problem solving; methodically working through an issue or problem.* ***Multi-Professional Working & Leadership:*** *Understands, values and respects all roles (including their own) within the immediate and wider team, as well as team members' skill sets and knowledge; Builds and maintains meaningful and trusting relationships with team members and other health and social care professionals outside of the immediate team; Demonstrates an awareness of other team members' workloads and pressures and adapts their interactions accordingly; Works collaboratively, provides assistance, support and guidance to other members of the team for the benefit of the person receiving care; Demonstrates willingness and ability to actively learn from others.* ***Professional Integrity & Ethics:*** *Takes responsibility for self and is accountable for ones' own actions or lack of actions; Demonstrates honesty and trustworthiness; Is open and honest about the mistakes they have made or when things have gone wrong; Is reliable and dependable in carrying out work duties and responsibilities; Recognises and values equality and diversity, treating everyone with courtesy, dignity and respect; Is prepared to challenge poor practice or behaviours, or speak up when errors or oversights are observed.* Although the items will be mapped against these domains for the item development and test construction purposes, due to the nature of SJTs as encompassing complex, realistic work scenarios, each item does not exclusively measure any single domain. Therefore, the SJT should not be viewed as assessing four individual constructs, with the benefits of this being that not only does the complexity of the item increase, but the possibility of a 'template answer' being provided by applicants is avoided.

	The content must be fair to all applicants; it must not advantage those, for example, have had placements in either a hospital or community pharmacy previously. This will be achieved by avoiding scenarios that focus on clinical or procedural knowledge. Scenarios should <u>not</u> depend on any knowledge of a healthcare setting that the applicants may have, but rather the applicant should be able to draw on their own experience and judgements in answering the items.
Context:	It is suggested that scenarios are set within the context of the pre-registration pharmacy year and are likely to be set in a Community, Hospital or General Practice setting. This ensures the relevance of the situations presented within the test and of the response options that the test taker is required to consider. In our experience of SJT in healthcare, WPG have found that situations set within a direct healthcare context, such as an interaction with a patient about their current medication, work well in terms of both actual and face validity.
Perspective:	It is recommended that scenarios are presented in a second person perspective, e.g. '*You* are working in a team', whereby applicants are required to place themselves at the centre of the scenario and make a judgement about the situation.
Response Format:	It is recommended that two types of response format are used within the SJT; ranking and multiple choice. The rationale for this being that the nature of some scenarios and the possible responses to them lend themselves to ranking items (requiring the ability to differentiate between singular actions in response to a scenario that vary in appropriateness) whereas some scenarios lend themselves to multiple choice items (when it is necessary to do more than one thing/tackle more than one aspect in response to a scenario). Using both response formats enables a fuller range of item scenarios to be used, rather than forcing scenarios into a less appropriate item type and potentially reducing item effectiveness. Based on evidence from the literature, a knowledge based response instruction ('what should you do') is recommended for the SJT rather than a behavioural based response instruction ('what would you do'). Knowledge based instructions are more appropriate for high stakes selection contexts where faking and coaching are potential threats.
Language:	The test content will be written in English.
Test Length (No. of Items):	For operational SJT, it is proposed that that two test versions are created consisting of 45 operational items and 7 pilot items. To provide the opportunity for the two test papers to be equated (therefore ensuring and equivalent level of difficulty across the papers), a small number of items will appear in both SJT versions.
Test Length (Time):	The paper consisting of 45 operational items and 7 pilot items will have a test time of 105 minutes, allowing approximately two minutes per item. This is consistent with previous evidence and experience which has demonstrated good reliability. The testing time will be continually monitored to ensure that the SJT is not speeded.
Delivery/Administration:	Paper-based delivery
Piloting:	Prior to operational use, five pilot papers consisting of 30 items in each paper will be piloted on final year pharmacy students in March 2017 across five universities within England and Wales. Once piloted and evaluated, only items performing well will be used within the operational test versions in September 2017.
Scoring:	A 'near miss' scoring convention will be utilised, where the test taker is awarded credit relative to how aligned their response is to the answer key (rather than an

	'all or nothing' scoring approach). The student's final SJT score will be combined with their MMI score to determine each student's final ranking.	
Key Dates: *(Detailed Timescales are provided in the Project Plan)*	Project Commencement:	November 2016
	Piloting of SJT items:	March 2017
	Delivery of Operational SJT:	July 2017

Appendix D. Assessment specification of the MMI

ASSESSMENT SPECIFICATION AREA	DETAILS
Purpose:	Based on information gathered from the multi-method role analysis, the specification for a Multiple Mini Interview (MMI) is outlined below. The MMI will be used alongside a Situational Judgement Test (SJT) to allocate pharmacy students into their placement for their pre-registration pharmacy Year.
Level:	The initial MMI will be piloted on pharmacy students in their final year of pharmacy school. Once piloted the MMI will be sat by fourth year pharmacy students applying for their pre-registration pharmacy placement.
Target Competencies:	It is recommended that the MMI is designed to assess six professional attributes, identified from the Pre-registration Pharmacist role analysis as being most important for applicants to have at the point of selection: *Communication & Consultation Skills: Adapts approach, language or communication style for audience and across a variety of contexts; identifies and interprets non-verbal cues from others, effectively uses non-verbal communication; seeks confirmation of understanding when communicating, clarifying where necessary; elicits accurate and relevant information from individuals; instils confidence through communication style; effectively builds report with individuals, asks open questions and facilities two-way dialogue; breaks down complex information in a way that is easily understood by others; actively listens to others and is attentive to what they have to say; exhibits suitable level of confidence and assertiveness when communicating.* *Person Centred Care: Demonstrates empathy and seeks to view the situation from the individuals' perspective; places the person who is receiving the care first, in everything they do; Accurately assesses, takes into account and is sensitive to the person's current and longer-term expectation, needs, situation and their wider social circumstances; Shows genuine interest in, and compassion for, the individual; making them feel valued; Works collaboratively with individuals, empowering and guiding every person to make an informed choice in their care* *Problem Solving, Clinical Analysis & Decision Making: Draws all knowledge together and builds upon learnings to benefit the person receiving care; Undertakes a holistic approach to problem solving and decisions making, integrates and assimilates information about the individual from different sources to ensure a patient centred outcome; Explores multiple options when problem solving and making decisions; weighs up pros and cons associated with all options; Critically appraises information, applies a questioning approach and seeks to further understand and explore rather than taking things at face value; Undertakes a logical and systematic approach to problem solving; methodically working through an issue or problem.* *Multi-Professional Working & Leadership: Understands, values and respects all roles (including their own) within the immediate and wider team, as well as team members' skill sets and knowledge; Builds and maintains meaningful and trusting relationships with team members and other health and social care professionals outside of the immediate team; Demonstrates an awareness of other team members' workloads and pressures and adapts their interactions accordingly; Works collaboratively, provides assistance, support and guidance to other members of the team for the benefit of the person receiving care; Demonstrates willingness and ability to actively learn from others.* *Professional Integrity & Ethics: Takes responsibility for self and is accountable for ones' own actions or lack of actions; Demonstrates honesty and trustworthiness; Is open and honest about the mistakes they have made or when things have gone wrong; Is reliable and dependable in carrying out work duties and responsibilities; Recognises and values equality and diversity, treating*

	everyone with courtesy, dignity and respect; Is prepared to challenge poor practice or behaviours, or speak up when errors or oversights are observed. ***Self-directed Learning & Motivation:*** *Demonstrates curiosity, commitment and a desire to learn; shows enthusiasm for the role; takes ownership for identifying own learning gaps and development needs; seeks advice, support and feedback to assist own learning and development; undertakes reflective practice, evaluates how things may be done differently; demonstrates awareness and acknowledgement of own limitations in relation to knowledge and competence; is a self-starter, demonstrates proactivity and willingness to take on opportunities and learn.* Each MMI exercise will be developed to measure two of these domain areas, with each domain being measured twice (in two exercises) across the MMI. The content must be fair to all applicants; it must not advantage those, for example, have had placements in either a hospital or community pharmacy previously. This will be achieved by avoiding exercises that focus on clinical or procedural knowledge. Exercises should <u>not</u> depend on any knowledge of a healthcare setting that the applicants may have, but rather the applicant should be able to draw on their own experience and judgements in responding to the exercise.
Context:	It is suggested that exercises are set within the context of the pre-registration pharmacy year and are likely to be set in a Community, Hospital or General Practice setting. For some MMI exercises, they may be developed more as an interview question and therefore will be neutral to the role. When developing exercise content, WPG will be mindful to ensure the relevance of the exercises presented to applicants within the MMI.
Language:	The MMI content will be written in English.
MMI Length (No. of Exercises):	The MMI will consist of 6 exercises (within 3 stations). Four versions of the MMI will be developed for operational delivery in September 2017.
Test Length (Time):	applicants will have 5 minutes to complete each exercise within the MMI. Two exercises will be held consecutively within a single room. Prior to entering each new room, applicants will have 3 minutes travel/preparation time. A circuit of the MMI will last 39 minutes.
Piloting:	Prior to operational use, six versions of each MMI exercise will be piloted on final year pharmacy students in March 2017 across three universities within England and Wales. Once piloted and evaluated, the final four circuits to be will be used in September 2017 will be selected. This will be based on feedback received during the pilot and ensuring equivalence across the four circuits.
Scoring:	Two domains will be measured within each exercise with each being scored on a scale of 1-5. The range of scores will therefore be 12-60.

Key Dates: *(Detailed Timescales are provided in the Project Plan)*	Project Commencement:	November 2016
	Piloting of SJT items:	March 2017
	Delivery of Operational MMI:	July 2017

Acknowledgements