# Appendix 1

## PSA structure, item and paper development, exam delivery

### PSA structure

The PSA comprises eight sections, each containing a specific item style reflecting different aspects of the process of prescribing, reviewing and advising about medicines: prescribing (PWS), prescription review (REV), planning management (MAN), providing information about medicines (COM), calculation skills (CAL), adverse drug reactions (ADR), drug monitoring (TDM) and data interpretation (DAT) (Figure 1). The different sections are intended to reflect not only the process of prescribing but also the related skills when supervising patients prescribed medicines by others. The question items are based on 60 patient scenarios that offer a total of 200 marks and candidates have two hours to complete the assessment. The scenarios relate to one of seven clinical settings: General Internal Medicine (MED), General Surgery (SURG), Elderly Care (ELD), Paediatrics (PED), Psychiatry (PSY), Obstetrics & Gynaecology (O&G), and General Practice (GP).

**Figure 1.** Structure of the Prescribing Safety Assessment (PSA).

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Description automatically generated

The detailed breakdown of marks allocated to each section is shown in Table 1. Additional rules of assessment construction are that each PSA ‘paper’ must have a minimum item coverage in the various clinical settings (MED – 8, SURG – 4, ELD – 8, PED – 4, PSY – 4, O&G – 4, GP – 8) and have minimum coverage of high-risk drugs (at least two items on each of the following: opioid analgesics, anticoagulants, insulin, antimicrobials and intravenous infusion fluids). The PSA does not carry negative marks.

**Table 1.** Allocation of question items and marks to each PSA section

|  |  |  |  |
| --- | --- | --- | --- |
| Section | Number of question items per paper | Marks per item | Marks per section |
| Prescription Writing Skills (PWS) | 8 | 10 | 80 (40%) |
| Prescription Review (REV) | 8 | 4 | 32 (16%) |
| Planning Management (MAN) | 8 | 2 | 16 (8%) |
| Providing information (COM) | 6 | 2 | 12 (6%) |
| Calculation skills (CAL) | 8 | 2 | 16 (8%) |
| Adverse drug reactions (ADR) | 8 | 2 | 16 (8%) |
| Therapeutic drug monitoring (TDM) | 8 | 2 | 16 (8%) |
| Data interpretation (DAT) | 6 | 2 | 12 (6%) |

PSA item and paper development

PSA question items are written by trained authors (clinical pharmacologists, other specialty and trainee doctors, general practitioners and pharmacists) who are mainly based in UK medical schools or NHS hospitals. Their question items undergo a strict 5-stage quality assurance process overseen by the PSA Assessment Board. Items that survive each stage of review, including a national peer-review meeting, are used to make four 60-item papers (annually) conforming to the PSA blueprint [https://prescribingsafetyassessment.ac.uk/resources/PSA-Blueprint.pdf].

The papers are then ratified by the Assessment Board (3-day meeting in November), made available for standard-setting (3-day meeting in January) and delivered to the candidates on five assessment days (February to September). It is a collaborative venture involving over 100 contributors who have created and approved over 5000 question items since 2012.

Standard-setting

The pass marks for papers are determined by the Standard-Setting Group comprising representatives from UK medical schools, who have been selected for their knowledge of the appropriate minimum standard expected of Foundation year one doctors. The group uses a modified Angoff method to derive the pass mark for each paper [https://onlinelibrary.wiley.com/doi/full/10.1046/j.1365-2923.2003.01495.x].

Exam delivery

Candidates and medical schools

In 2023, 8,164 final-year medical students from all 34 UK medical schools took part in the assessment. Since 2016, the postgraduate training committee representing the four UK countries stipulated that all new doctors entering postgraduate (Foundation) training, either from UK medical schools or overseas, would be required to take the PSA (those who failed would be expected to participate in enhanced supervision and remediation, and would be required to pass the PSA before the end of their first year of training). So, even though it is not a formal graduation requirement in every medical school, it is a necessary requirement for progression to FY2.

Candidate preparation

All candidates are registered on the PSA online system where they have access to general information about the PSA, information videos and four 1-hour, 30-item, practice ‘papers’ with question-specific feedback. All candidates have access to the online BNF throughout the assessment. Reasonable adjustment requests are dealt with by the host institution for each candidate. Candidates are encouraged to familiarise themselves with the different question types and the assessment environment and to practise finding information in the online version of the British National Formulary (BNF) [https://about.medicinescomplete.com/] , [https://bnf.nice.org.uk/]

Between 2020-2022 there were an average of 9669 practice paper attempts per year (range 9,196-10,588).

Events

PSA assessments are held on five dates per year with first sit and resit opportunities available to all candidates. The assessments are delivered on a web interface which is load tested to host over 3,000 simultaneous users. A total of 6,070 candidates completed their PSA attempt on the first event date of 2023, with a peak of 2,765 simultaneous users. Candidates take the assessment in their university or place of work and are invigilated in person by medical school staff, university invigilators or NHS supervisors. Candidates at overseas campuses take the same assessment as their UK-based peers using this mode of delivery. Due to this flexibility, the PSA continued uninterrupted during the COVID-19 pandemic, when many other high stakes assessments were delayed or suspended.

Assessment centres are provided with administrative and technical support during the events by staff at the MSCA and BPS offices and the technical team (Northgate Technologies).

Candidates’ answers are recorded, automatically marked and scored within the assessment interface. The results are released to medical schools and students within 3 weeks of their assessment event.

Post-assessment review

All prescriptions written by the candidates are scrutinised immediately after the assessment (‘post-assessment review’) to ensure that the answer matrix for the prescribing (PWS) items take into account any creditworthy responses that had not been anticipated and included in the mark scheme. The PSA system automatically identifies all unrecognised drugs and unrecognised drug order sentences provided by candidates during an event. These are carefully reviewed by the PSA Assessment Board and appropriate scores allocated and added to the electronic marking scheme. The marks awarded represent the consensus of academic judgement of the Board. Candidates’ marks are automatically updated and the additions to the answer matrix are carried forward to subsequent uses of the item. The post-assessment review ensures that all candidates are marked in a fair and consistent way across event days. The performance of other item styles are also reviewed at this point for any unexpected answering behaviour. The final PSA results are released to medical schools within three weeks of each event and to the candidates shortly thereafter.

Candidates are provided with their scores in each section and their overall score. Medical schools are provided with the results for all candidates; the mean score and pass rate for their institution. At the end of the diet, medical schools are provided with the psychometric report, which allows them to benchmark themselves against the other medical schools’ performance.

Feedback

After exiting the assessment on their computers, candidates are immediately presented with a standard feedback form designed to explore their views about the relevance and external validity of the assessment, their preparedness for taking it, the quality of the online delivery system and any other free text comments that they might wish to provide. The medical school PSA Leads are provided with a standard feedback form that allows them to describe any administrative or process problems that they encountered.

# Appendix 2

## 2022 psychometric report (Attached)