Review Article

What Skills are Tested in the New PACES Examination?

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Abstract

The MRCP(UK) PACES examination has been sat by almost 40,000 candidates in 10 countries around the world since its introduction in 2001. The examination assesses skills of relevance to the practice and delivery of high quality clinical care and is the leading international postgraduate summative assessment of this kind. In 2009, the examination was revised, and this article describes those revisions, focussing on the clinical skills assessed.

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Introduction

Despite the continuing emergence of sophisticated technology to aid diagnosis, many experienced clinicians continue to believe that bedside clinical skills relating to communication and physical examination remain fundamental to the practice and delivery of high quality patient care.[1] Patients also regard doctors with a good "bedside manner", as better doctors, and may benefit from feeling that the doctor, through measured history-taking and relevant physical examination, truly sees their problems within their own unique personal context.[2]

The Federation of Royal Colleges of Physicians of the United Kingdom has, for many years, believed that assessment of knowledge alone should not determine a trainee's readiness to progress to higher specialist training and has included a summative clinical skills examination as part of the MRCP(UK) examination. The purpose of the MRCP(UK) examination is to provide trainees in medicine with the opportunity to demonstrate the attainment of the necessary knowledge, skills, behaviours and attitudes for the practice of General Internal Medicine. The PACES (*Part 2 Clinical*) examination forms 1 of the 3 parts of the MRCP(UK) examination and assesses *core clinical skills* of relevance to such practice. The other 2 parts are computer marked knowledge-based examinations. *Part 1* comprises 2 papers, taken over 1 day, totalling 6 hours. It has 200 test items in the format of one-best-answer-from-five. The *Part 2 written* examination comprises 3 papers, taken over 2 days, totalling 9 hours. It has 270 test items, almost all in the format of one-best-answer-from-five, although some questions are two-best-answers-from-ten. This examination, taken during core medical training (CMT), is a mandatory requirement for progression to higher training and consultant status. The clinical component of the examination has evolved through various forms, and in 2001, a structured standardised assessment known as PACES (Practical Assessment of Clinical Examination Skills)[3] was introduced in the UK and all international centres hosting the examination, including Singapore. Since then, around 38,000 candidates have sat PACES worldwide.

Workplace-based assessments, including assessment of clinical skills using the mini clinical examination exercise (mini-cex), were also introduced into CMT in the UK several years ago. However, these assessments are primarily regarded as formative assessments that cannot provide the reliability, independence of assessment, uniformity of assessor training, consistency of standard setting, and control and standardisation of content required of a high-stakes assessment. For these reasons, PACES continues to have a key role in the identification of trainees who are ready to progress to higher training.

In 2009, the PACES examination was revised and this paper describes the clinical skills now assessed and the rationale for their inclusion in the assessment.

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Background

The Revised PACES Examination

Full details of the PACES format are available elsewhere[4] and the basic carousel is shown in Figure 1. In 2009, 2 major revisions were made.

Firstly, one of the 5 stations was restructured such that candidates, for the first time, demonstrate *integrated* history taking, communication and physical examination skills. The other 4 stations continued to focus on the demonstration of either physical examination skills, or communication, or history-taking skills.

Secondly, the means by which examiners awarded marks had changed. Instead of making a single judgement of "overall clinical competence" at each patient encounter, examiners were required to make explicit judgements about performance in each of 7 core clinical skills, but no composite judgement of performance on the encounter overall.

The purpose of this change was to improve the standardisation of examiners' assessments, minimise inter-examiner variation in the relative weighting accorded to different performance domains, clarify the assessment domains for candidates and focus learning on the acquisition of the core skills assessed, improve feedback on performance, and most importantly, develop a pass-fail standard in which candidates could only pass the examination overall if they attained the required standard in all of the skills assessed. In old PACES, there had been concern that some candidates who might be weak in important clinical skills (such as communication) were passing the examination via compensation from better performance in other clinical skills.

Curricula Drive Assessments

No assessment can stand alone from its curricula, and the content of the MRCP(UK) examination is defined by the content of the curricula relevant to core medical training (CMT) in the UK. The key curricula are the Foundation Programme Curriculum,[5] *The Physician of Tomorrow – Curriculum for General Internal Medicine* and *the Generic Curriculum for the Medical Specialties* (which in 2009 was integrated into the Curriculum for General Internal Medicine[6]), all of which are underpinned by the competencies delineated in the General Medical Council's *Good Medical Practice*.[7] These curricula have evolved significantly in recent years and recent changes in the examination reflect those changes. In particular, as all the new curricula are competency-based, the revisions of the examination ensure that distinct competencies can be assessed. In these documents, competencies are typically defined as the combinations of knowledge, skills, attitudes and behaviours required for the effective practice of medicine.

Several hundred distinct competencies are described, and the challenge for the assessment programme, comprising

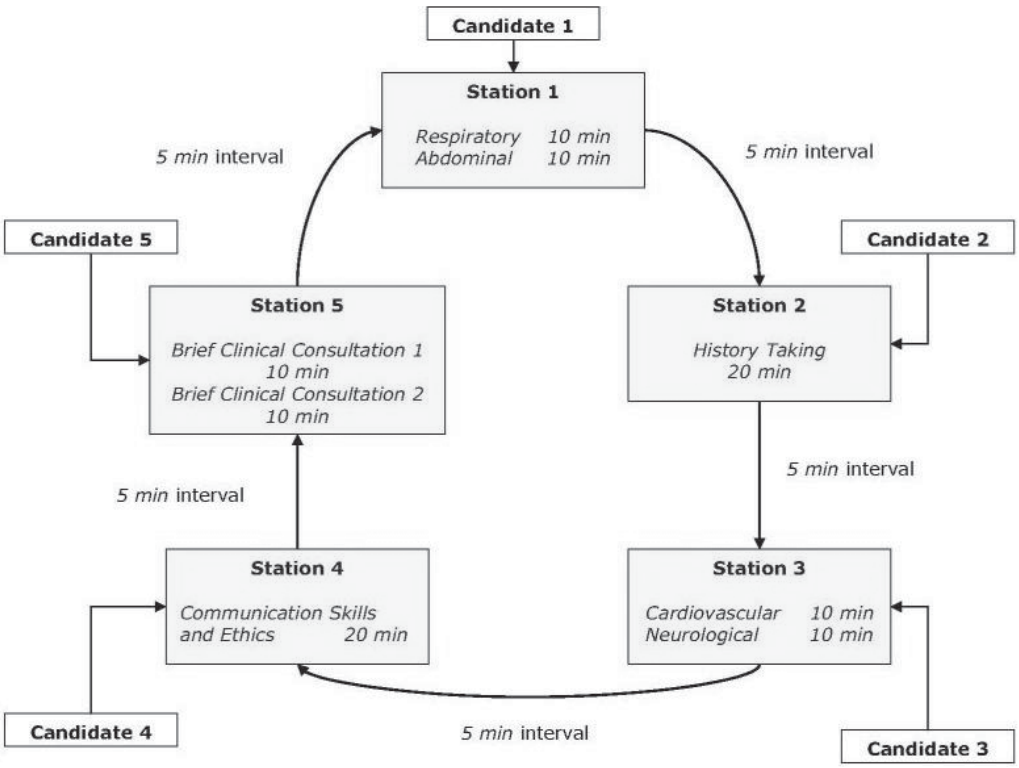

Fig. 1. The PACES carousel.

a variety of mandatory workplace assessments and the MRCP(UK) examination, is to ensure that all can be assessed appropriately at some stage during the training programme. Practical limitations dictate that all of the clinical competencies of the curricula cannot be assessed in a summative clinical assessment such as PACES. Given this, how many competencies should be assessed in such an examination, and if not all, which should be selected? Are some more important than others? Are all the competencies discrete, independent and separately measurable? Although the medical literature abounds with research relating to the most appropriate means of assessing clinical skills, there is comparatively little work that defines discrete and measurable clinical skills or to help answer these and other relevant questions.

MRCP(UK) chose a pragmatic approach and devised a model in which a relatively small number of composite clinical skills, of direct relevance to the day to day practice of medicine, easily recognisable to patients, trainees and assessors, and clearly identifiable within the generic competencies of the core curricula above, are assessed. This approach had also characterised previous formats of the examination. The original PACES examination, introduced in 2001,[3] defined in its "anchor statements" a series of clinical performance domains, but did not require examiners to assess them all explicitly. These formed the basis for those defined for use in the modified examination of 2009.

It should be noted that, given the currency of the term "clinical skills" and the inclusion of the word "skills" in the PACES acronym, we have chosen to retain the use of the word "skills" when referring to the PACES examination, but to refer to "competencies" when referring to the curricula. We regard the use of these two words, in this context, as interchangeable in their meaning.

What Skills are Assessed in PACES?

The PACES examination assesses 7 core clinical skills, fundamental to the effective care of adult patients of any age, with *disease, symptoms, presentations or problems* relating to any organ system, or combination of systems, and presenting in *acute or chronic, in-patient or out-patient*, clinical care settings. These 7 core clinical skills are outlined in Table 1 and described in more details below.

A. Physical Examination

This skill is assessed in 12 judgements across 6 encounters, at Stations 1, 3 and 5. It is important that trainees are practised and fluent ('slick') in the method of physical examination.

Table 1. The Seven Core Clinical Skills in the PACES Examination

	Core Clinical Skill	Skill Descriptor	Encounters at which the skill is assessed	Number of judgements made about this skill
A	Physical Examination	Demonstrate correct, thorough, systematic, (or focused in Station 5 encounters), appropriate, fluent, and professional technique of physical examination.	Respiratory, Abdomen, CVS, Nervous System, Brief Clinical Consultation (x2)	12
B	Identifying Physical Signs	Identify physical signs correctly, and not find physical signs that are not present.	Respiratory, Abdomen, CVS, Nervous System, Brief Clinical Consultation (x2)	12
C	Clinical Communication	Elicit a clinical history relevant to the patient's complaints, in a systematic, thorough (or focused in Station 5 encounters), fluent and professional manner. Explain relevant clinical information in an accurate, clear, structured, comprehensive, fluent and professional manner.	History, Communication, Brief Clinical Consultation (x2)	8
D	Differential Diagnosis	Create a sensible differential diagnosis, which includes the correct diagnosis, in a patient that the candidate has personally clinically assessed.	Respiratory, Abdomen, History, CVS, Nervous System, Brief Clinical Consultation (x2)	14
E	Clinical Judgement	Select or negotiate a sensible and appropriate management plan for a patient, relative or clinical situation that the candidate has personally clinically assessed.	All	16
F	Managing Patients' Concerns	Seek, detect, acknowledge and address patients' or relatives' concerns. Listen to a patient or relative, confirm their understanding of the matter under discussion and demonstrate empathy.	History, Communication, Brief Clinical Consultation (x2)	8
G	Maintaining Patient Welfare	Treat a patient or relative respectfully and sensitively and in a manner that ensures their comfort, safety and dignity.	All	16

Candidates are required to demonstrate comprehensive and correct method in each of the 4 major system examinations (cardiovascular, neurological, abdominal, and respiratory) and, at Station 5, a focussed examination, to support analysis of a clinical problem that may cross system boundaries. The system content of station 5 is broad, and candidates may for example have to demonstrate adequate fundoscopic technique, or examination of the joints or thyroid. The inclusion of Physical Examination as a distinct skill allows a distinction to be made between candidates who examine correctly (or appear to do so) but miss or find incorrect signs, and those who examine incorrectly but find correct signs. In the new marking scheme candidates who consistently underperform in either of these skills across the PACES carousel, will fail the examination overall.

B. Identifying and Interpreting Physical Signs

This skill is assessed in 12 judgements across 6 encounters, at Stations 1, 3 and 5. Assessment in patients with disease of the four major organ systems is mandatory, but a broad range of systems can be encountered in Station 5. The emphasis is on the candidates' ability to correctly identify the physical signs that 2 examiners have identified and agreed as important in the assessment of the case during the calibration process. It is also important that candidates do not invent signs to fit a pattern perhaps suggested by another finding (e.g. a slow rising pulse in a patient with a systolic murmur). Early analysis of the new system suggests that this skill is the most difficult for trainees to attain.

C. Clinical Communication Skills

This skill is assessed in 8 judgements at Station 2, 4 and 5. It includes the ability to gather information from a patient via history-taking, in a structured and systematic manner in Station 2 and in a targeted, focussed manner in the two Station 5 encounters. It also includes the ability to transmit information effectively to a patient or relative, in a detailed manner in Station 4, and a focussed and targeted manner in Station 5.

D. Differential Diagnosis

Fourteen judgements are made about this skill, at Stations 1, 2, 3 and 5. The ability to construct a differential diagnosis "on one's feet", using clinical information gathered from the candidate's own clinical assessment of a patient, and a limited amount of information available in the associated encounter scenario or introductor, is assessed. This skill includes anatomical differential diagnosis, for example locating the lesion correctly in a neurological case, and pathological differential diagnosis, as for instance in ranking the likeliest pathological causes of a spastic paraparesis in a patient of a given age with a brief clinical history.

E. Clinical Judgement

This skill, which is assessed in all encounters, making of total of 16 judgements, includes assessment of the other elements of clinical thinking, other than differential diagnosis, that are typically relevant and discussed in a problem based clinical skills examination. The focus is on the candidates approach to investigation of a patient with the presentation and clinical findings of relevance, and the subsequent treatment of one or several aspects of their problem. Examiners may also include their evaluation of a candidate's deeper knowledge of the significance of or pathophysiological basis of physical signs in their judgement about this skill.

F. Managing Patient's Concerns

Eight judgements in total are made about this skill, at Stations 2, 4 and 5. This skill was included, distinct from skill C (Clinical Communication skills) as it was felt important that candidates were assessed in their ability to respond accurately and sensitively to a patient's questions, concerns or challenges, and demonstrate empathy in such interactions. As part of this assessment, all scenarios at Stations 2, 4, and 5 contain "patient challenges" which the surrogate patient is trained to ask as a part of the encounter. The inclusion of this skill further extends and emphasises the importance of communication skills in the examination and in real life clinical practice.

G. Maintaining Patient Welfare

This skill is assessed in every encounter, and 16 judgements are made in total about each candidate's performance. The assessment of this skill affords examiners the opportunity to ensure that the candidate is courteous, caring of and sensitive to the needs of the patient and their physical and emotional welfare during the examination itself. In addition, candidates who persist during discussion in suggesting a course of action that would be unsafe for a given patient would be awarded an unsatisfactory grade. Examiners can also evaluate and comment on concerning attitudes or behaviours. MRCP(UK) would expect that the vast majority of candidates attain a very high standard in this skill, and the pass mark for this skill is accordingly substantially higher than for the other skills. In the early diets of the new examination, that was indeed the case, with over 96% of candidates attaining satisfactory judgements for this skill on all 16 assessments.

How are the skills assessed?

The PACES Carousel and Assessment Methodology

MRCP (UK) PACES is a competence-based ("*can do*") examination in which candidates are required to "*show how*" they undertake clinical assessments and apply clinical knowledge to clinical problem solving.

- The PACES assessment carousel includes 5 Stations, 2 comprising a single 20-minute Encounter, and 3 of which accommodate two 10-minute Encounters, providing a total of 8 assessment Encounters, each with a different patient.
- Two expert clinician assessors (examiners) observe each candidate directly at each encounter. The time available for interaction with the patient varies between 6 and 14 minutes, and the time for interaction with the examiner varies from 2 to 5 minutes (Table 2). In all encounters, one of the two examiners is responsible for leading the interaction with the candidate and ensuring that the relevant skills are assessed. Each examiner makes an independent assessment of the candidate, and do not discuss the candidate's marks until marksheets are submitted.
- Before any candidates are assessed each examiner must examine the patients (at encounters in which physical examination is to be assessed) or review the clinical history or communication problem through rehearsal with the 'expert patient'. Examiners record agreed clinical findings on standardised sheets and agree the criteria for the award of a satisfactory grade in each of the skills assessed. This process is known in PACES as calibration and is a fundamental part of standard setting in the examination.
- Patients at Stations 1, 3, and 5 will normally be "real" patients with abnormal physical signs although it is possible to use patients without signs at Station 5. The communication exercises at Stations 2 and 4 will normally use surrogate patients.

Four of the encounters place emphasis on the assessment of clinical skills relating primarily to physical examination (Stations 1 and 3), two of the encounters the assessment of clinical skills relating primarily to communication (Stations 2 and 4), and two of the encounters the assessment of integrated communication and examination skills. The encounters, and therefore the assessment of the core clinical skills, are set in a variety of clinical contexts, as summarised in Table 3.

Full details of the marking methodology and standard setting (current and proposed) are out with the scope of this article and can be found at

http://www.mrcpuk.org/Examiners/Pages/PacesGuideNotes.aspx

Conclusion

PACES continues to be an examination in evolution. The basic 5 station format has proven itself to be easily deliverable in multiple centres in the United Kingdom and 9 international centres. The inclusion of real patients ensures that examination skills are tested at a level appropriate to the positioning of the examination in training. Reliability

Table 2. Stations, Encounters and Core Clinical Skills Assessment in the MRCP(UK) PACES Examination

Station	Encounter	Duration (min)	Time for candidate-patient or candidate-surrogate interaction (min)	Time for candidate-examiner interaction (min)	Specific Core Clinical Skills assessed (n)
1	Respiratory	10	6	4	A:B:D:E:G (5)
1	Abdomen	10	6	4	A:B:D:E:G (5)
2	History	20	14	5	C:D:E:F:G (5)
3	Cardiovascular	10	6	4	A:B:D:E:G (5)
3	Nervous system	10	6	4	A:B:D:E:G (5)
4	Communication	20	14	4	C:E:F:G (4)
5	Brief Clinical Consultation (1)	10	8	2	All (7)
5	Brief Clinical Consultation (2)	10	8	2	All (7)

Table 3. Setting the Assessment of Core Clinical Skills in Context

		Clinical Contexts
		Symptom – The Top 20 Acute presentations (Mandatory) Other presentations from the GIM curriculum (Optional)
		System – Respiratory; Abdominal; Cardiovascular; and Nervous Systems; (Mandatory) Endocrine; Rheumatology; Eyes; Dermatology (optional)
		Setting – Acute (ARU, Ward) or Chronic(OPD)
Core Clinical Skills	A : Physical Examination	• Assessed in 6 encounters. (Stations 1/3/5) • Must be assessed in an Acute setting at least once. • Must be assessed in 2 of the Top 20 symptom presentations. • Must be assessed in the 4 mandatory systems, and in one of the 4 optional systems.
	B : Identifying physical signs	• Assessed in 6 encounters. (Stations 1/3/5) • Must be assessed in an Acute setting at least once. • Must be assessed in 2 of the Top 20 symptom presentations. • Must be assessed in the 4 mandatory systems, and in one of the 4 optional systems.
	C : Clinical communication	• Assessed in 4 encounters (Stations 2/4/5) • Must be assessed in an acute setting at least once. • Must be assessed in one of the Top 20 symptom presentations. • Must be assessed in one of the mandatory and one of the optional systems
	D : Differential diagnosis	• Assessed in 7 encounters. (Stations 1/2/3/5) • Must be assessed in an Acute setting at least once. • Must be assessed in 2 of the Top 20 symptom presentations. • Must be assessed in the 4 mandatory systems, and in one of the 4 optional systems.
	E : Clinical Judgement	• Assessed in all 8 encounters (Stations 1/2/3/4/5) • Must be assessed in an Acute setting at least once. • Must be assessed in 2 of the Top 20 symptom presentations. • Must be assessed in the 4 mandatory systems, and in one of the 4 optional systems.
	F : Managing patients' concerns	• Assessed in 4 encounters.(Stations 2/4/5) • Must be assessed in an acute setting at least once. • Must be assessed in one of the Top 20 symptom presentations. • Must be assessed in one of the mandatory and one of the optional systems
	G : Maintaining patient welfare	• Assessed in all 8 encounters. (Stations 1/2/3/4/5)

and fairness are enhanced by the pairing of examiners, providing a total of 10 independent assessments of each candidate over the carousel. Standardisation of content has been enhanced by the central production of scenarios for the communication skills stations, and standard setting improved by the development and formalisation of the calibration process.

The restructured format and new assessment methodology permit a clearer link to the new competency based curricula and have now been successfully implemented worldwide. The detailed information derived from the new 7 skills methodology is already of interest, and clearly demonstrates that trainees have more difficulty attaining the required standard in identifying physical signs (Skill B) than in

other skills. Over 3000 candidates have been assessed in the revised examination and, at the time of writing, MRCP(UK) is poised to introduce an uncompensated pass standard into the examination, which will enable passing candidates to clearly demonstrate that they have attained the required standard across the range of clinical skills assessed. Further development of PACES will continue, focussing on the content and structure of the encounters, the appropriate "weighting" of marks derived from each skill and encounter and further enhancements to examiner training and performance monitoring.

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