How well are graduates prepared for practice when measured against the latest GMC recommendations?

This article investigates the perspectives of University of Liverpool graduate foundation doctors and their consultants on their preparedness for professional practice.

In the UK, undergraduate medical education aims to produce competent foundation doctors according to the expectations of the General Medical Council (GMC) contained within the updated version of *The New Doctor* (GMC, 2007). After reform of the Liverpool curriculum in 1996, an evaluation of the programme took place measuring graduates' competencies as first year postgraduates according to the GMC recommendations in the original *The New Doctor* (GMC, 1997) and *Tomorrow's Doctors* (GMC, 1993) (Watmough et al, 2005, 2006a,b).

This article investigates the views of University of Liverpool graduate foundation doctors and their consultants on their preparedness to undertake skills and competencies expected of new doctors in relation to the latest GMC recommendations (GMC, 2007) in a postgraduate setting underpinned by changes generated by Modernising Medical Careers (Department of Health, 2004). These findings will contribute to a review of the undergraduate programme and will also inform other medical schools as they develop their own curricula in accordance with the expectations of the GMC.

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Undergraduate medical curriculum

The University of Liverpool undergraduate medical curriculum has problem-based learning as the main learning activity for the first 4 years of the programme, supported by increasing clinical contact and skills training. Support for problem-based learning is facilitated through plenary sessions and a human anatomy resource centre. Students learn communication skills throughout their 5 years, and are introduced to clinical skills training in a specially designed resource centre from year 1 where they learn history taking, examination skills and practical procedures (Bradley and Bligh, 1999). About 30% of clinical attachments take place in the community. Students also have a range of topics to engage in depth through a range of special study modules.

The final year is an apprenticeship designed to prepare students for postgraduate work. It involves five clinical attachments consisting of 'shadowing' foundation doctors, an accident and emergency placement, a community placement and two specialist attachments which are chosen by the students themselves. Final exams take place at the end of the fourth year, and the fifth and final year assessments comprise of portfolio and professional education and training appraisal interviews.

Methods

Two cohorts of University of Liverpool graduates currently working within the Mersey Deanery region were surveyed. All University of Liverpool students undertake undergraduate clinical attachments in Mersey Deanery hospitals and the majority of Liverpool graduates undertake foundation training in Mersey. Foundation year 1 (F1) doctors and foundation year 2 (F2) doctors were asked to reflect on their preparedness for the F1 year. Consultants were asked to give their view on the competencies of their current F1 doctors who are recent graduates from the University of Liverpool. Ethical approval for the survey was granted from NHS North West Research and Development Committee and the School of Medical Education, University of Liverpool.

F1s, F2s and consultants each received a tailored questionnaire. F1s and F2s were asked to consider their perceived competencies in broad areas, as identified by *The New Doctor* (GMC, 2007). Answers were rated on a 5-point Likert scale ranging from 'generally very competent' to 'generally not at all competent', with 'generally quite competent' as the middle value. Using the same variables and scale consultants were asked to rate the competencies of University of Liverpool F1 doctors they last supervised. Some of the questionnaire variables are summarized in *Tables 1* and *2*. Open-ended questions asked participants to identify elements of the undergraduate curriculum that could be improved.

Questionnaires were distributed to all 1217 consultants and all 400 Liverpool graduate doctors across all 16 NHS trusts in the Mersey Deanery region. The questionnaires were administered electronically with an email (consultants were contacted via Trust email addresses) from the Dean of the medical school in November 2008. Respondents completed the survey on-line. Some consultants do not work directly with foundation doctors so could not comment on competencies (110 emailed the research team to explain they did not work directly with foundation doctors). The study population were sent two e-mail reminders as a follow up in December 2008.

Descriptive statistics were undertaken to analyse the questionnaire data (Oppenheim, 1992; Corston and Colman, 2003). Qualitative free text responses were analysed using thematic framework analysis (Ritchie and Lewis, 2003). To ensure

inter-rater reliability free text comments were analysed independently by three of the authors (JB, SW and MC).

For ease of presentation the questionnaire results have been summarized into the upper two points (more than generally quite competent), the mid point (generally quite competent) and the lower two points (less than generally quite competent).

Quantitative results

Ninety-one (45.5%, *n*=200) F1 doctors, 95 (47.5%, *n*=200) F2 doctors and 345 consultants (28.3%, *n*=1217) responded to the study. *Table 1* shows the graduates' and consultants' ratings of broad competencies using a portfolio, and *Table 2* shows their ratings of specific skills. Details of the graduate and consultant ratings on broad competencies are available at www.liv.ac.uk/sme/review/Appendix06.pdf.

Foundation doctors rated themselves as being particularly strong at being aware of limitations, keeping accurate records, following the GMC guidelines on good medical practice, understanding and being sensitive to the needs of patients, working and respecting health-care professionals, communicating effectively, identifying their own educational needs, venepuncture, arterial puncture in an adult, injections, asking for help, recognizing the importance of continued professional development and self-directed learning, taking a history and examination. They felt less competent at using medicines safely and effectively, demonstrating knowledge of treatment options, performing and interpreting a spirometry and peak flow, catheterization and nasogastric tube insertion.

The consultants rated the F1s as being most competent at keeping accurate records, recognizing and respecting patients rights and upholding confidentiality including understanding cultural beliefs, communicating, working with other health-care professionals, history taking, managing their educational needs and reflection and for practical skills venepuncture and administering different injections. They were seen as being weaker (but not incompetent) on demonstrating knowledge of evidence behind treatment options, establishing a differential diagnosis, performing and interpreting spirometry and peak flow, nasogastric tube insertion, performing and interpreting an electrocardiogram.

Qualitative findings

Positive views of the course

In all, 206 consultants, 48 F1s and 53 F2s outlined positive aspects of the curriculum which are highlighted in key themes below.

Table 1. Graduates' and consultants' ratings of broad competencies using a portfolio: 'Please rate your competency/the Liverpool F1 doctors' competencies in the following: Demonstrate a portfolio including a variety of evidence to demonstrate...'

Item		More than quite well prepared	Quite well prepared	Less than quite well prepared
Achieved requirements in guidance including workplace-based assessments	F1	50.0 (31)	41.9 (26)	8.1 (5)
	F2	68.2 (45)	31.8 (21)	0.0 (0)
	Consultant	42.1 (67)	51.6 (82)	6.3 (10)
Ability to identify, document and meet own educational needs	F1	54.8 (34)	40.3 (25)	4.8 (3)
	F2	66.6 (44)	30.3 (20)	3.0 (2)
	Consultant	40.9 (67)	47.0 (77)	12.2 (20)
Learning through reflective practice	F1	56.5 (35)	35.5 (22)	8.1 (5)
	F2	66.6 (44)	27.3 (18)	6.1 (4)
	Consultant	36.0 (54)	47.3 971)	16.6 (25)
Knowledge of theory of audit, including change management	F1	45.1 (28)	38.7 (24)	16.1 (10)
	F2	59.1 (39)	36.4 (24)	4.5 (3)
	Consultant	32.9 (53)	42.2 (68)	24.8 (40)

Early clinical experience

Both F1s and F2s rated early clinical experience as beneficial in learning practical procedures, such as physical examination, history taking, clinical diagnosis and performing procedures:

'I was confident and prepared for history taking, examination, clinical diagnosis and procedures' (F2 5).

Ward 'shadowing'

This was identified as an essential element of the final year as it allowed preparation for practice as an F1, preparation for hospital-based teaching and early clinical contact:

'Having some skills makes transitions from student years to working life easier' (F1 10).

Learning and research skills

Most foundation doctor respondents commented on the positive input to their development through self-directed learning or research skills:

'You have to seek things out for yourself most of the time which prepares you for life after Uni' (F1 6).

Communication

Development of communication skills was frequently mentioned:

'The communication skills course. I feel I am very good at team working and communicating with patients' (F2 27).

Several F1 and F2s also mentioned that skills that may have not seemed to be of use when being taught were frequently used in clinical practice:

'I have also fallen back on a number of skills that I learnt in communication skills lessons that at the time I felt I did not need but now I use regularly' (F2 21).

Structure of final year

Generally, study participants reported that the final examinations in the fourth year and clinical placements and portfolio-based assessment in the fifth year were a strong element of the course for preparing graduates for clinical practice. This allowed repeated practice of clinical skills in order to cement learning:

'It's good having finals out of the way in 4th year' (F1 1).

'The course, and particularly during the 5th year does well to promote good clinical practice, managing acutely ill patients and day to day work required as a house officer' (F2 40).

Views of course improvements

A total of 219 consultants, 50 F1s and 53 F2s highlighted how the course could be improved. Key themes are reported below.

Clinical skills sessions

Both F1 and F2s raised concerns regarding the amount of clinical skills sessions timetabled later in the course and also the application of clinical skills in a 'real life' setting rather than in the Clinical Skills Resource Centre:

'Further clinical skills needed as F1' (F1 19).

'Clinical skills, taught in hospitals by clinicians' (F1 6).

Structured teaching

The need for more structured teaching, particularly in basic sciences such as anatomy, physiology and pharmacology emerged as a recurrent theme, with this teaching occurring early on in the course to allow for this knowledge to be built upon while on clinical placement. More time scheduled to use the human anatomy resource centre was also raised as a concern for both F1s and F2s:

'I think more lectures would be a good balance between problem-based learning and old-style didactic teaching' (F2 3).

'Compulsory human anatomy resource centre sessions: it was a fantastic resource that nobody used' (F2 3).

Basic scientific knowledge

Many consultants perceived that there was a need to improve F1s' basic science knowledge. Noticeable gaps were reported for specific areas of knowledge, such as anatomy, pharmacology and prescribing, physiology and pathology, with patient management and infection prevention and control also frequently highlighted:

'Their knowledge of basic physiology, pathophysiology, anatomy and pharmacology could be much better' (C24).

F1 and F2s also identified the need for more basic scientific knowledge teaching, especially in areas such as anatomy, physiology and pathology:

'More structured teaching and examination in basic principles such as anatomy, physiology, pharmacology and biochemistry' (F2 18).

Consultants expressed concern about the apparent limited exposure of medical students to these issues via the undergraduate curriculum:

'I think some education about basic anatomy, physiology, biochemistry and pharmacology should be taught in a more formal way' (C115).

Table 2. Graduates' and consultants' ratings of specific skills: 'Please rate your competency/the Liverpool F1 doctors' competencies in the following...'

Item		More than quite well prepared	Quite well prepared	Less than quite well prepared
Venepuncture and intravenous cannulation	F1	**90.3 (56)**	**8.1 (5)**	**1.6 (1)**
	F2	96.9 (64)	3.0 (2)	0.0 (0)
	Consultant	54.3 (94)	33.5 (58)	12.1 (21)
Use of local anaesthetics	F1	48.4 (29)	38.3 (23)	13.3 (8)
	F2	75.4 (49)	18.5 (12)	6.2 (4)
	Consultant	27.1 (32)	37.7 (44)	35.6 (42)
Arterial punctures in an adult	F1	88.3 (53)	10.0 (6)	1.7 (1)
	F2	94.0 (62)	6.1 (4)	0.0 (0)
	Consultant	36.0 (45)	37.6 (47)	26.4 (33)
Injection: subcutaneous, intradermal, intramuscular and intravenous	F1	72.5 (45)	25.8 (16)	1.6 (1)
	F2	78.7 (52)	21.2 (14)	0.0 (0)
	Consultant	40.5 (49)	34.7 (42)	24.8 (30)
Preparation and administration of intravenous medicines	F1	53.3 (32)	28.3 (17)	18.3 (11)
	F2	68.2 (45)	15.2 (10)	16.7 (11)
	Consultant	38.0 (43)	36.6 (41)	25.7 (29)
Intravenous infusions (including prescriptions of fluids, blood and blood products)	F1	80.0 (48)	16.7 (10)	3.3 (2)
	F2	86.4 (57)	10.6 (7)	3.0 (2)
	Consultant	41.4 (60)	33.8 (49)	24.8 (36)
Perform and interpret electrocardiogram	F1	56.4 (35)	35.5 (22)	8.1 (5)
	F2	80.3 (53)	15.2 (10)	4.5 (3)
	Consultant	25.7 (34)	43.9 (58)	30.3 (40)
Perform and interpret spirometry and peak flow	F1	41.9 (26)	33.9 (21)	24.2 (15)
	F2	53.0 (35)	33.3 (22)	13.6 (9)
	Consultant	15.3 (16)	42.9 (45)	41.9(44)
Urethral catheterization	F1	51.7 (31)	33.3 (20)	15.0 (9)
	F2	81.8 (54)	16.7 (11)	1.5 (1)
	Consultant	36.7 (47)	43.8 (56)	19.5 (25)
Airway care including simple adjuncts	F1	56.9 (33)	37.9 (22)	5.2 (3)
	F2	83.3 (55)	15.2 (10)	1.5 (1)
	Consultant	26.9 (39)	50.0 (54)	23.1 (25)
Nasogastric tube insertion	F1	46.7 (28)	38.3 (23)	15.0 (9)
	F2	78.8 (52)	16.7 (11)	4.5 (3)
	Consultant	20.9 (22)	41.9 (44)	37.2 (39)

Recommendations

Many consultants recommended a back-to-basics approach, covering in-depth knowledge of basic scientific principles:

'There needs to be a substantial increase in final basic med science teaching in the first two years' (C101).

An integration of problem-based learning with more structured, formal programme covering basic anatomy, physiology, pathology and pharmacology in initial training emerged as a recurrent theme:

'Toning down of hardcore problem-based learning into a hybrid system of problem-based learning/didactic teaching seems to be the most sensible way forward' (C119)

'While I support problem-based learning, I strongly oppose the model where the tutor has no medical background' (C21).

More emphasis on clinical decision making with a combination of continuous assessment and factual knowledge exams was consistently recommended:

'More frequent assessment (per term) in order to support learning' (C26)

'Insist on clinical exposure… return to firm based attachments… increase exposure to surgical attachments' (C36).

Discussion

This study has focused on the perceived competencies of F1s after graduation from University of Liverpool medical curriculum. The vast majority of F1 and F2s rated their perceived level of competence as higher than or equal to the minimum competency level of 'quite well prepared' (Jones et al, 2001, 2002). Generally, consultants rated the competencies of F1s as lower than the trainees' perceived level of competence, yet the majority of consultants rated F1 doctors as higher than or equal to the minimum competency level of 'quite well prepared' (Jones et al, 2001, 2002).

The self-rating of skills by junior doctors may be biased as a result of over-estimation of skills (Barnsley et al, 2004; Watmough et al, 2006a,b). Nevertheless, the high percentage of junior doctors rating competencies at midpoint and above demonstrates that they feel prepared for professional practice and the F1 role (GMC, 2007).

A limitation of this study is that the exact number of consultants who work directly with foundation doctors across the Mersey Deanery **cannot be calculated.** Therefore, the consultant survey response rate of 28.3% represents the number of responses received from the total population of consultants rather than those directly supervising doctors.

It should be noted that foundation doctors were rating their own skills as individuals whereas the consultants may be giving an opinion based on experience of supervising a number of doctors. The F2s rated themselves as more competent than the F1s. Periods of transition can be characterized by natural feelings of uncertainty which in turn can lead to new doctors reflecting on their practice and re-examining their role (Wilkie and Raffaelli, 2005). It is not surprising, therefore, that F2s rate themselves higher than F1s given their extra experience in making the transition into professional practice.

Consultants rated the F1 doctors as being strongest at keeping accurate records, communicating, working in a team, organizing their own learning, history taking and venepuncture. These can be triangulated with emergent themes from the qualitative section on the questionnaire which showed that most F1 and F2 doctors felt that they were very well prepared for the day-to-day aspects of being a junior doctor.

In contrast, concerns regarding the scientific knowledge of foundation doctors were raised by both foundation doctors and consultants. The present study found repeated criticisms of basic scientific knowledge, notably in anatomy, physiology, pharmacology and pathology. However, another study found no differences between traditional and problem-based learning Liverpool graduates in success rates for the Royal College of Anaesthetists membership exam (Bowhay and Watmough, 2009) which has a significant basic science content.

There is mixed evidence from the questionnaire variables which pertain to knowledge base. For both the foundation doctors and consultants, variables such as 'knowledge of treatment options' and 'establishing a differential diagnosis' were rated lower than the other variables on the questionnaire. Despite these concerns, Liverpool students are assessed on diagnosis and management skills in the final year portfolio and in objective structured clinical examination stations earlier in the curriculum and if consultants express concerns about this in the final year portfolio then students will not graduate from the course. Other variables relating to knowledge such as 'understanding patient safety when prescribing controlled drugs', 'interpretation and obtaining results of investigations' and 'recognition and management of acutely ill patients' received higher ratings at generally quite competent and above.

Local findings may in fact be pertinent to other medical schools as they adhere to new, national GMC guidelines. Problem-based learning was identified as being a useful way of giving self-directed learning skills to medical graduates but both foundation doctors and consultants felt that more structure was needed within the programme to assist basic science knowledge acquisition. This 'structure' alongside the problem-based learning to assist basic science acquisition includes requests for more didactic lectures, an increase in tutor-led tutorials and more timetabled sessions for students in the human anatomy resource centre. The danger of this might be that Liverpool graduates lose some of their self-directed learning skills if there is too much 'structure' which might lead to a reduction in these skills – skills which are seen as strength of the current

KEY POINTS

- Foundation doctors felt they were well prepared for the day-to-day aspects of being a junior doctor.
- Concerns regarding the scientific knowledge of foundation doctors were raised by both the junior doctors themselves and their consultant supervisors.
- Consultants and foundation doctors felt that more structure was needed within the undergraduate medical curriculum to assist basic science knowledge acquisition.
- This model of assessing competencies using current national guidelines as a reference point could potentially be used by other medical schools to inform the development of their medical undergraduate programmes.

undergraduate curriculum. However, Maastricht medical school, since introducing their problem-based learning based programmes, have also made structural changes while retaining their problem-based learning philosophy (Maastricht University, 2009). This model of assessing competencies using current national guidelines as a reference point could potentially be used by other medical schools to ultimately inform future initiatives to develop and improve undergraduate medical education. **BJHM**

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