How prepared are medical graduates to begin practice?

A comparison of three diverse UK medical schools

September 2008

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This report was written in September 2008 by the Newcastle team with contributions from Carol and Beate, and with comments on drafts by Jill Morrison, Neil Johnson, Maggie Allen and Ed Peile.

Executive summary

Background

Previous work has suggested that many medical graduates feel unprepared to start work, and that preparedness varies substantially between medical schools.

Aim

The present study aimed to explore the extent to which different medical schools prepare their graduates for the workplace.

Methods

This was a multi-method, prospective, cross-sectional study. The primary research sample was drawn from new graduates of three medical schools with differing curricula and cohorts: Newcastle (systems-based, integrated curriculum); Warwick (graduate entry) and Glasgow (problem-based learning or PBL).

This sample was stratified on the basis of academic MTAS (Medical Training Application System) score, with five students from each school initially sampled from each MTAS quartile. Purposive substitution was then made if necessary, to ensure representation of the demographic range of students, in terms of age, sex, ethnicity and disability. Focus groups held at each site with Foundation Programme doctors fed into the development of interview schedules. Sixty five of the primary sample graduates were then interviewed before starting their first placement as part of Foundation Year 1 (F1). Fifty five were re-interviewed at the end of their first placement, and forty six again at the end of the F1 year. A cohort questionnaire to assess perceptions of preparedness was devised and administered to each university cohort during the shadowing period before starting F1.

Qualitative triangulating data was collected from nearly 100 clinicians (undergraduate tutors, educational supervisors, key managers and members of clinical teams) to provide another perspective on preparedness. Some of these interviews informed a triangulating questionnaire completed by members of clinical teams who work with F1s.

Secondary data was examined in the form of assessment data from learning portfolios at the end of the first placement, to identify procedures on which new F1s chose to be assessed early. Newcastle and Warwick F1s also completed a safe prescribing assessment during F1.

Results

Results are based on over 250 interviews, 479 completed cohort questionnaires, 78 triangulating questionnaires, 420 F1 prescribing assessments and learning portfolio data.

When first interviewed the primary sample were looking forward to starting F1, and having a role at the end of four or five years of study. They felt prepared for basic clinical tasks including history taking, and were confident in their communication skills. They did however have concerns about skills which they felt could only really be acquired on the job, such as dealing with acutely ill patients, prescribing, managing workload, and being on call. There was some concern about the practical procedures required in F1, with some respondents having performed very few clinical procedures on real patients at medical school.

Preparedness was affected by a number of factors. These included internal factors such as the graduate's personality and learning style, but the majority of references were to external factors such as undergraduate clinical placements, shadowing, induction and the support of others, both in the workplace and at home.

Follow-up interviews highlighted that the new doctors were not able to predict some areas in which they were under-prepared, as these only became apparent after working. These included adapting to hospital procedures, clarifying the role of an F1, and understanding the boundaries

of that role. In some practical areas there was a feeling that they had been better prepared than anticipated, although this was in part due to the sheer number some procedures such as cannulations they had to perform in the earliest days of F1. The view from triangulating interviews was that generally the new F1s were capable and got 'up to speed' very quickly. However, there was a general view that they were not arriving with sufficient ward experience, and that on-the-job experience would increase confidence.

Interviews with the primary sample at the end of F1 found that initial problems in practice had mostly been resolved quickly, although some issues related to heavy workloads remained. The main view at the end of the F1 year was that more exposure to acute patients, and the clinical judgment and decision making involved in their management, would have been useful. The primary sample felt their medical school training would remain relevant as they moved on to F2, with some feeling that they would need to refer more to the clinical knowledge they developed as undergraduates with the greater responsibility of F2. There were negative views of the learning portfolios in use in England and Scotland, with F1s and senior clinicians finding them time-consuming, and in many cases doubting the validity of assessments which may be completed without assessors directly observing procedures.

There was a consistent thread, from primary sample data throughout the year, and from triangulation data, of under-preparedness for prescribing. Weaknesses were identified both in the pharmacological knowledge underpinning prescribing, and the practical elements of calculating dosage, writing up scripts, drug sheets, etc. While there was some feeling from triangulating data that F1s were prepared for prescribing, pharmacists did identify severe gaps. Prescribing was also the main area of practice in which errors were reported by respondents, indicating a significant potential risk. Risks were reduced, but not removed, by support from colleagues, with F1s speaking particularly highly about the help received from pharmacists.

There were few differences between the medical schools. There was a suggestion that Glasgow graduates were more confident about seeking information, possibly related to the PBL course, and that graduate entry graduates were more confident in complex communication, due to their age and relative maturity. However these may be attributions based on expectation, and there is no strong evidence that graduates do differ in their behaviour.

Conclusion and implications for policy

The conclusion is that undergraduates' preparedness to begin Foundation Programme will be improved by having more experiential learning in clinical practice in their undergraduate programme. To do this the providers who host placements need to encourage the development of a learning culture in which all staff contribute to the development of new doctors as an explicit part of day-to-day working. Priorities for the General Medical Council to facilitate this should include:

1. Ensuring that undergraduate clinical placements have more structure and consistency, with experiential learning across a range of specialities.

2. Ensuring medical students are given a greater role in medical teams, with due regard to patient safety. Clinical placements should move the student systematically to a more central role before they take on the responsibilities of an F1.

3. Establishing fuller, more prescriptive guidelines on the structure and content of shadowing, and aiming to ensure, rather than recommend, that new F1s have shadowed their own job. Foundation schools should be encouraged to ensure induction events do not take shadowing trainees' time from wards.

4. Addressing perceived weaknesses in prescribing by supporting the development of ward-based teaching of prescribing as a skilled procedure which is subject to the time pressures and contingencies of all clinical skills.

Contents

1. Introduction

Fundamental to the mission of each UK medical school is the preparation of doctors competent to start work on the Foundation Programme. Diversity of curriculum approaches in medical schools is encouraged, although each school has a responsibility to ensure that the outcomes specified in the General Medical Council's (GMC) *Tomorrow's Doctors* are attained by students on graduation[1]. However, there is evidence that graduates of different medical schools vary in their preparedness for their first post. Goldacre et al[2] reported in 2003 that over 40% of UK medical graduates did not feel prepared and found large differences between graduates of different schools. A more recent survey showed that preparedness had increased yet there was still wide variation[3]. The longer-term relationship between medical school and career progression is demonstrated by findings that performance in certain postgraduate examinations can vary with place of graduation[4].

The GMC is reviewing its standards and recommendations for basic undergraduate medical education and this report, of a study examining the preparedness of graduates from three different medical schools, contributes to this process.

1.1 The transition from undergraduate to junior doctor

The transition from student to doctor is challenging and stressful, but is also a rewarding experience[5]. While practical skills may be developed and evaluated in medical schools, there are substantial differences when the trainee becomes an autonomous doctor, not only in terms of skills but also in responsibilities and others' perception of their status and role[6, 7]. Relationships change, new coping strategies are required, and the importance of skills and knowledge seen as irrelevant during undergraduate years may become apparent[8].

1.2 Comparing the effects of different medical schools

Several studies have compared graduates of a traditional curriculum with those who had gone through a problem-based learning (PBL) course[9, 10, 11, 12]. Findings indicated that PBL programmes were more effective at preparing trainees for their first medical jobs, from both trainee and supervisor perspectives. Benefits included an ability to deal with complex clinical problems, working in a team, and being aware of limitations and knowing when to ask a senior for help (behaviour which has been identified as a primary indicator of a trainee's competence[13]). However, although PBL was found to improve practice in preventive care and continuity of care it made no difference to diagnosis and disease management[14]. Furthermore, one study suggested that differences may be more to do with admissions policies rather than curriculum effects[15], and a recent systematic review did not provide conclusive evidence of an effect of PBL[16].

Accelerated graduate-entry medical education has grown in the UK in recent years, from the first such programme in 2000, to fourteen in 2008. These programmes have necessarily different curricula, as well as differences in their entering cohorts. Literature looking at the impact of these programmes is yet to emerge – the current research constitutes one of the first such studies. Of course, traditional five year medical degrees have always been open to graduate entrants: a study using data collected between 1999 and 2002 reported few differences between graduate and non-graduate entrants' feelings about how well they had been prepared by their medical schools for starting as a doctor[17]. The differences were not related to clinical areas, but to more personal areas such as time available for family, social and recreational activities, working hours, pay, and living conditions.

1.3 Preparedness to practise

Previous work has identified differences in graduates' preparedness for the workplace in different areas of practice. One early study[18] carried out before the reforms of *Tomorrow's Doctors* found that while a majority felt their education had met their needs for practice and they

had developed sufficiently in personal attributes, they did not feel that they had acquired enough skills and knowledge.

Some difficulties may arise because of a mismatch between the prescribed outcomes of undergraduate education and actual requirements in clinical practice[19], while others arise from changes in working patterns such as adapting to shift-work[20]. Learning medicine in a closely supervised context is not the same as taking direct responsibility for patient care. It is of note that previous generations of UK medical students had more opportunities to take such responsibility, for example through working as locum house officers whilst they were senior students, thereby experiencing some of the pressures of real practice. There is an indication that it is not the work *per se* which leads to problems with the transition, but the changed context, for example a culture in which patient-centred care as taught in medical schools could be perceived as 'working too slowly'[5] and a lack of support and supervision leading to greater amounts of administration[19] or feelings of overwork[21].

Concerns have been expressed that curricula have moved away from teaching and learning clinical skills, to 'softer', communication skills. In a recent report on the implementation of *The New Doctor*[22], educational supervisors and managers felt that some changes to the undergraduate curriculum had been detrimental and did not prepare trainees well enough. Prescribing is a specific area of concern, and an evaluation of a new final year programme[23] found that new doctors felt they were lacking in competence for safe prescribing.

Paice *et al*[21] looked at the causes of stress, and interventions to help reduce it in newly qualified doctors. A questionnaire asked doctors at the end of their first year in practice about a stressful incident during the year, and how they had dealt with it. The majority of incidents were caused by factors related to the organisation rather than individual characteristics, for example overwork, being unsure where to go for help and being given too much responsibility, too early and without adequate supervision. Legislation such as the European Working Time Directive[24] may have improved working conditions, but may also have increased tension between juniors and seniors who perceived juniors as less committed[22].

1.4 Aim of the current study

This study aims to consider how the above factors relate to the preparedness, and perceived preparedness, of medical graduates entering the workplace. It has the strengths of being multi-method and cross-sectional, avoiding the criticisms of narrow methodology and parochialism which have been directed at medical education research[25, 26, 27]. It identifies implications for policy which may be considered in reviewing *Tomorrow's Doctors* and beyond.

The study looks at the experiences and perceptions of graduates of three medical schools which differ in curriculum and/or entry cohort:

1. Newcastle medical school – systems-based, integrated curriculum
2. Glasgow medical school – wholly problem-based learning, undergraduate entry
3. Warwick medical school – graduate entry

A summary of entry requirements to each school is given in Appendix A.

2 Methods

The study used a mixture of qualitative and quantitative methods, to provide a broad and triangulated view of new medical graduates' preparedness.

The primary research sample was drawn from new graduates of three medical schools with differing curricula and cohorts. This sample was stratified on the basis of the academic MTAS

(Medical Training Application System) scores generated by each medical school. Five students were sampled from each MTAS quartile, to ensure a range of undergraduate abilities was included. Following selection purposive substitution was made if necessary, to ensure representation of the range of students, in terms of age, sex, ethnicity and disability.

The primary sample was interviewed three times: once before starting work as an F1, once at the end of their first placement (4 months), and once at the end of the F1 year (12 months). Focus groups were held with F1s and F2s to inform the initial interview schedule, with subsequent interviews being developed to elaborate findings from previous stages and establish the effects of further experience.

Triangulating data was collected in interviews with 92 clinicians over the three sites. In total 28 undergraduate tutors, 29 educational supervisors and 17 key managers were interviewed and three focus groups conducted with senior clinicians who assess learning portfolios. Further triangulating data was examined in the completion of learning portfolios, while Newcastle and Warwick F1s also took part in a prescribing assessment during the first placement.

Quantitative data was collected in the form of two questionnaires: one completed by the graduating cohort of each medical school prior to starting F1, and the other by a triangulating sample from clinical teams who work with F1s. Both questionnaires looked at perceived preparedness of new F1s in different areas of practice. The cohort questionnaire was devised with reference to the GMC's *Tomorrow's Doctors,* an existing questionnaire used at Warwick University, relevant literature, input from experts and from focus groups with F1s and F2s. The triangulation questionnaire was devised following the initial interviews with the primary sample and informed by interviews with a range of clinicians who worked with F1s. Total numbers of interviews at all stages are summarised in table 1.

Table 1. Total number of interviews completed across all three sites (PS = primary sample)

Site	PS initial interviews	PS follow-up at 4 months	PS follow-up at 12 months	U/Graduate Tutors	Educational Supervisors	Key Managers	Clinical teams (questionnaire development)	Total
Newcastle	21	20	19	8	9	6	10	93
Warwick	24	21	16	10	10	5	2	88
Glasgow	20	14	11	10	10	6	6	77
Total	65	55	46	28	29	17	18	258

2.1 Development of the analysis

The theoretical approach adopted for the qualitative part of this study was grounded theory[28], an iterative approach which aims to develop theory from the data. Analysis of the first interviews identified a number of themes including feelings of preparedness in different areas of practice and factors influencing preparedness. These then fed into the questions asked in subsequent interviews, and further analysis refined the themes, identifying common associations and relationships between them.

3 Results: Quantitative data

3.1 Results from the cohort questionnaire

The cohort questionnaire was distributed to new graduates during pre-shadowing sessions which the majority of the F1 cohort were expected to attend. Analysis includes only responses from graduates of the participating sites.
Numbers of responses are given in table 2 (this is not a response rate per se as not all graduates were present when questionnaires were distributed – high response rates were obtained at each site, but the proportion of the cohort is a better indicator of

Table 2. Frequencies of responses from the three sites

	Total cohort	Questionnaires returned	% of cohort
Newcastle	304	226	74%
Warwick	154	123	80%
Glasgow	239	131	55%
Total	698	480	69%

representativeness). The sample demographics did not differ from their cohort populations on dimensions of age, gender, disability and ethnicity. The samples reflected the slightly older profile of the Warwick graduate entrants, although there are very low numbers of people over 30 graduating at any site. The frequencies of male and female respondents reflected national figures, with around two thirds of graduates being female. Approximately eighty percent of respondents at all locations described themselves as white (a slight over-representation for the Warwick population), and very few reported having a disability.

3.1.1 Validity of responses

All questionnaire items showed a distinct skew to the upper (prepared) end of the scale, but the lower half of the scale was used for all but one item ("Working with colleagues with different lifestyles, backgrounds or religions"), suggesting the scale has discriminant validity. High face and content validity, indicating items' intelligibility and relevance, are indicated by high completion rates — no scale items had more than seven missing values. High construct validity, meaning that items are being interpreted as they were intended, is indicated by an exploratory factor analysis. This identified eleven easily interpretable factors which explained 63% of the variance in the data. These factors can be distinguished as broadly clinical or non-clinical, in line with established findings in the literature[29, 30]. A two-factor confirmatory factor analysis explaining 40% of the variance reinforced this.

3.1.2 Variation in preparedness

The striking feature of the results was the variation in preparedness for different areas of practice, with a difference in between highest and lowest mean score of 1.79 (on a 5-point scale). There was a great deal of agreement between the rankings of questionnaire items for each cohort, with eight of the 'top 10' ranked items common to the three cohorts. These common perceptions of greater preparedness were related to working as part of a team (q47-49), probity (q43), communication skills (q21-22) and clerking (q1-2). The two items not shared by all schools were 'Employing a patient-centred approach' which was replaced by 'Identifying your own learning needs' in Glasgow's ranking and 'Managing your health in order to protect patients and colleagues' which was replaced by 'Identifying appropriate situations in which to seek help from a senior colleague' in Warwick's.

The 'bottom 10' items showed more variation between schools, but five were the same, relating to prescribing (q15-16), carrying out complex practical procedures (q7), dealing with challenging patients (q25) and applying knowledge of the NHS (q31). A full list of items and means for each site is included in Appendix B.

3.1.3 Effect of medical school on perceived preparedness

There were differences between medical schools in the perceived preparedness of graduates, but the differences between schools were smaller than the variation between items identified above. No single school had the monopoly on high preparedness, with each scoring highest on some areas, although it may be that particular areas of perceived strength or weakness can be related to particular aspects of each course (for example Glasgow graduates' higher ratings on 'Identifying your own learning needs' and 'Managing your own time effectively' may be related to the PBL programme). The largest differences between sites are in preparedness for paperwork, specifically death certificates and cremation forms. These are followed by several clinical tasks, including calculating drug dosages and carrying out basic respiratory function tests.

3.1.4 Summary of cohort questionnaire

The cohort questionnaire was administered to medical graduates at each site before starting work as a F1. The questionnaire identified their perceptions of their preparedness for practice. High preparedness was reported mainly in the areas of history taking and communication skills, while the areas they were least prepared for were prescribing and complex procedures.

3.2 Triangulation questionnaire

A questionnaire was sent to members of the clinical teams who worked with the new F1s, including medical and nursing staff, and pharmacists. These individuals work most closely with F1s and see their day-to-day practice, and so should be aware of any issues which present at the earliest stages of F1, even if they are quickly resolved in practice. Following initial structured interviews with clinicians, two questionnaires were developed, with a version for pharmacists covering more details of prescribing behaviour than the general clinicians' version.

3.2.1 Response rates

Eighty questionnaires were returned from all sites. Table 3 summarises the frequencies of responses from medical and nursing professions, and pharmacists. Respondents reported working with between 1 and 20 F1s in a given placement, with the majority working with fewer than eight. The majority of respondents (84%) had daily contact with F1s, with none having contact less frequently than monthly. Demographics were comparable for each site: the modal age group overall was 40-49 (though all age groups were well represented), and 38 respondents (61%) were female.

Table 3. Numbers of responses from different professional groups

	F2	Staff nurse	SpR/ST	Sister	Cons.	Nurse cons.	Pharm.*	Other**	Total
Newcastle		8	3	6	3	0	4	2	26
Warwick		5	2	3	2	1	5	3	21
Glasgow	1	6	4	3	10	1	8	0	33

* These pharmacists completed the separate questionnaire

** Including one nurse practitioner, one pharmacist, and three nurse specialists

3.2.2 Preparedness in clinical skills

There was again variation in the perceived preparedness of graduates in different areas, from a mean of 93% of respondents across the three sites reporting new F1s were prepared for history taking, to only 14% reporting preparedness for naso-gastric tube insertion. As with the cohort questionnaire, the variation within each location was greater than the differences between them. Appendix C includes these figures for all items. Additional items on the questionnaire confirmed that the majority of F1s are seen as being well prepared in communication skills.

However, medical and nursing respondents see F1s as prepared for prescribing, which is inconsistent with the findings of the cohort questionnaire, and responses to the pharmacist-specific questionnaire which identified unpreparedness in a number of elements of prescribing. The responses to the cohort and triangulation questionnaires may differ in part because they are using different reference points; one providing data on anticipated performance, the other on how well F1s actually perform during a placement.

There were some differences between sites, although these are hard to interpret from this small sample. It is possible that some variation was due to differences in the proportions of different professional groups at the three sites (there were far more consultant respondents in Glasgow), and biases in their responses – the data showed consultants are more likely to give 'unprepared' responses.

Respondents were asked if they had witnessed mistakes or near-misses committed by F1s. A minority of doctors and nurses in Newcastle and Warwick reported witnessing mistakes or near misses, although a majority did in Glasgow (again, possibly an artefact of a lower threshold on the part of consultants). The majority of pharmacists in all locations reported witnessing mistakes and near misses. It is worth noting that there are no areas of prescribing in which pharmacists say F1s never make mistakes or never have near misses, although several doctors and nurses said mistakes are not made in prescribing.

3.2.3 Summary of triangulation questionnaire

The triangulation questionnaire was given to members of the clinical teams who work with F1s. There were some areas of agreement with the cohort questionnaire. On preparedness these were history taking, examination and team working, on lack of preparedness these were prescribing (pharmacists) and more complex clinical procedures such as catheterisation.

3.3 Safe prescribing assessment: Warwick and Newcastle graduates

Data from a safe prescribing assessment was used to provide additional data on F1s' preparedness for prescribing. The assessment, developed by King's College London, was adopted by the Northern Deanery in 2006-2007, and repeated in 2007-2008. It was extended to Warwick for the purpose of this study. The assessment consists of a written paper of eight questions addressing different aspects of practical prescribing, and is marked by pharmacists. To pass the assessment F1s must score 100%. The assessment is repeated during the F1 year until all F1s have passed. Where particular problems emerge remedial action may be taken.

The data compared here come from the first rounds of the assessment for the Northern Deanery Foundation School (NDFS) and Coventry and Warwick Foundation School (CWFS), run in October 2007 and December 2007/January 2008 respectively. Exactly the same assessment paper and marking scheme were used in each location. The NDFS group had undergone a specific safe prescribing course during the shadowing period, while the CWFS group had only an hour's session with a senior pharmacist. CWFS did however conduct the test two months later into their F1 year than NDFS, so would be expected to have gained a little more prescribing skill and experience.

Of the Newcastle graduates, 19% passed the first round (answering all eight questions correctly) – this is marginally better than for the entire cohort including F1s who did not graduate from Newcastle. Of the Warwick graduates, 16.4% passed this first round – this is a little worse than their F1 cohort. These are low figures, but there was a common feeling from senior clinicians that the assessment was difficult.

There are differences between the results of the two groups, with Newcastle graduates scoring higher on all questions, but this may be related to the impact of targeted prescribing teaching which was introduced by NDFS following the first year of the assessment. The questions on which Newcastle students performed better than Warwick related to situations which novice prescribers are less likely to have encountered as a student, and for which the teaching may have better equipped the Newcastle sample. Despite disparities, the rank order of the questions is similar, suggesting there are common strengths and weaknesses in prescribing for a large proportion of F1s.

3.3.1 Summary of safe prescribing assessment

Data from the safe prescribing assessment administered by the foundation schools at Newcastle and Warwick was incorporated into this study to provide additional information about prescribing skills. The results focus on the first round of assessment, which 19% of Newcastle and 16% of Warwick graduates passed. Assuming that this is a fair and appropriate test of prescribing at the level of an F1, it highlights a weakness in prescribing.

3.4 Portfolio completion during the first placement

Portfolio data was reviewed from each Foundation School to identify which, if any, portfolio assessments had been completed by the end of the first placement. This was based on the assumption that F1s would complete assessments first for the competencies for which they felt most prepared.

Due to different structures and processes at the three sites, different information was available. Figures for Newcastle refer to the entire Newcastle-graduate cohort in the Northern Deanery Foundation School in 2007-2008, those for Warwick refer to the Warwick graduates in Coventry and Warwick Foundation School, and for Glasgow (using different tools), figures were available for the primary sample only. Overall frequencies of completion of assessments at each location were comparable, with the majority of F1s completing three or fewer of each assessment.

The main indicator for preparedness was the completion of assessments on the observation of specific procedures – in England DOPS (Direct Observation of Procedural Skills), in Scotland WPA (Work Place Assessment). The overall frequency of completion of these for different procedures gives a view of the 'popularity' of each procedure across the sample (Scottish and English versions were matched as much as possible).

Relative frequencies indicated some procedures tended to be completed in the first placement more than others. Venepuncture/cannulation, arterial blood sampling and catheterisation account for around 50% of all procedures assessed in Warwick and Newcastle, and 30% in Glasgow. Airway care, IV infusions and NG tube insertion on the other hand together account for just 12% at each site. This variation may reflect the preparedness of F1s to perform these tasks as an assessment and so their confidence in their ability (they may be performing them much earlier, but they choose when to be assessed). However, most of the F1s and many of the educational supervisors also referred to practical difficulties in finding members of the team who had time to observe the procedures and complete the necessary assessment forms, making completion of the assessments more difficult, a finding also reported elsewhere[31].

3.4.1 Summary of portfolio assessments

Learning portfolio data was reviewed to identify which assessments had been completed by the end of the first placement. It was assumed that F1s would complete assessments for competencies which they had acquired first and felt more prepared for. Some procedures were assessed far more frequently than others, some of which (e.g. venepuncture and cannulation) followed high preparedness scores on the cohort questionnaire. Others (e.g. catheterisation) scored low on the questionnaire, suggesting they were learned in practice during F1 rather than during medical school.

3.5 Summary of quantitative data

The quantitative data presents a mostly coherent picture of high preparedness in some areas, particularly history taking, examination and team working. Simple procedures also seemed well prepared for, and F1s opted to have them assessed early on. F1s were less prepared for complex procedures, but did become practised in some early on in the first placement.

Perception of prescribing varies, with clinical teams mostly regarding it as an area of preparedness, but the F1s themselves, and more significantly the pharmacists who have most direct contact with F1 prescriptions, see it as an area of weakness. This is borne out by the safe prescribing assessment completed in two of the study sites.

There are some differences between the reported preparedness of graduates of the different medical schools, but there are also substantial differences within medical schools. The most important finding from the questionnaire data is that graduates feel distinctly unprepared for routine elements of the F1 role such as prescribing, and some complex, but routine, procedures, regardless of the medical school they have attended.

4 Results: Qualitative data

Analysis of initial interviews with the primary sample identified themes around the level and focus of their perceived preparedness, and the influences on that preparedness. Subsequent interviews with the primary sample, and triangulating interviews with educational supervisors,

undergraduate tutors and education managers were analysed using these themes, which were extended where appropriate to fully understand the data. This section summarises these themes in five main areas: (1) the process of transition, and the experience of becoming a doctor and the change of status from being a medical student; (2) the practical aspects of doing the job and being a doctor, including clinical tasks and practical procedures; (3) the continued need to learn, and the demands of being a trainee in a clinical workplace; (4) the stress of F1, and how respondents coped with it, and (5) respondents' suggestions for ways in which undergraduate training could be improved.

4.1 Transition – 'Becoming a doctor'

The change from medical student to F1 doctor is a significant one. The transition involves a significant step up in responsibility, and taking on a new role and professional identity. Elements of this reported by respondents were as simple as being called 'doctor' by other staff and patients, and being 'the person people ask'. A telling comment from many new graduates was that they were looking forward to 'being useful', implying that they had not felt useful in their undergraduate and shadowing placements. There was also a strong sense that starting work was the culmination of four or five years of medical training (and for some graduate entrants seven or eight years of continuous study), and they were looking forward to putting that learning into practice. Having contact with patients and being part of an organisation were seen as particular rewards, although getting paid was also something they were looking forward to. At the same time, they were aware that they would be beginning a new phase of learning and development, and there was uncertainty about what that would involve. A common feeling was that 'you can't do the job until you do the job', so they could not gauge their level of preparedness. Generally the clinicians in the triangulation data tended to agree that new F1s were prepared for some aspects of their role but not all.

At the four-month follow-up, the majority of respondents said they did 'feel like a doctor', although some commented on the relatively limited role they had as an F1. This was reiterated by some at the end of the year. There was a sense in some of the 12 month follow-up interviewees that F1 was a discrete stepping stone between medical school and F2, and they were looking forward to applying more of their knowledge, having more responsibility and being in control – in essence becoming more of a doctor. Some reflected on their development over the year, with a few feeling they had exhausted available learning experiences over the year. However, some were still finding challenges in the F1 role at the end of the year. For a small number interviewed just after starting F2, their development was thrown into relief when faced with new F1s.

4.1.1 The F1 role and team work

Before starting work the primary sample had reported having some knowledge of the F1 role – what their responsibilities would be, and where they would fit into hierarchies, but many of their apprehensions related to uncertainty about what they would be required to do. After shadowing and four months of working as an F1 they were much clearer about their role and areas of responsibility, including how they related to the multi-disciplinary team and other specialities. Working as part of a team was generally a positive experience, but varied with local structures and individual colleagues. Some teams would provide more guidance and support, while others were less clear.

The boundaries of roles are an issue that needed further clarification with regard to how far F1s can go before calling for help, and when they should ask other members of a multi-disciplinary team to carry out a task. At the time of the four-month follow-up some F1s felt clearer about this, although some uncertainty persisted even until the end of the year. Again, evidence from all interviews was that on-the-job experience provided this clarity of role, although again there was a large degree of local variation in the extent to which individuals and locations enabled this. The changing clinical workforce was a factor in this, with tasks that were once the domain of doctors taken on by a more highly skilled nurse workforce, and dedicated support staff such

as phlebotomists. The variability in the nursing workforce was mentioned by several respondents, with uncertainty over which nurses are qualified to do which clinical tasks – nurses of the same grade may have wide variations in qualification. It was noted that nurse practitioners may be performing tasks which could constitute learning opportunities for F1s.

4.1.2 Factors that have an impact on preparedness

Primary sample interviews identified factors which affected the move from student to doctor. These may be viewed as internal, such as an individual's personality and learning style, and external, such as the structure and environment in which they work.

Respondents in primary and triangulating samples identified that some individuals are more inclined to seek learning opportunities, being enthusiastic and asking to observe or practise tasks, staying later on wards, volunteering to spend night shifts or on-calls with an F1. It is not necessarily that they are more conscientious learners, but they may be more confident in asking a senior if they can do something. Personal interests may also aid preparedness – those who have had electives in acute care may be better prepared than those who have taken their electives away from wards. There may also be internal factors in the profile of student cohorts – there were some suggestions that the relative maturity of graduate entrants (mainly at Warwick, though also at the other schools) may have aided their preparedness and adaptability, while some Glasgow graduates said they had been attracted to the PBL course because of their personality and learning preference.

External factors seemed to be more ubiquitous, with the extent to which a new graduate is prepared and able to make the transition to the workplace dependent to a very large extent on local structures (particularly at trust/hospital and ward/department levels) and staff. Some respondents had found variability in the way their placements had been run, and thus what they had gained from them. This was largely down to the F1 they were placed with, but senior medical staff and nurses also played a considerable role. Helpful placements were those where the student was able to perform tasks, rather than just 'stand in a corner', but the feeling was that such placements were not common. It seemed some hospitals were better at providing useful placements.

Overall, experience gained helped preparedness – experience of different specialties, of different elements of the F1 job, and exposure to common clinical situations. The shadowing period at the beginning of F1 should provide some of this experience, regardless of undergraduate clinical placements. While *Tomorrow's Doctors* recommends a shadowing period of at least a week, the feeling was that this was too short, and that several weeks was the minimum needed to grasp the role and to feel sufficiently part of a team to perform a useful function. Newcastle and Glasgow students also felt that their week's designated shadowing was effectively shortened further with half-days taken up with hospital and Foundation School induction. Warwick did have a longer shadowing period, but it did not run directly onto the start of F1, diluting its usefulness for some. *Tomorrow's Doctors* also suggests, and respondents agreed, that shadowing the job a new graduate will actually take on would be most beneficial, but it seemed this was not always the case. Nevertheless, shadowing was generally seen as a useful and essential element of the transition, although some felt its actual execution could have been improved.

4.2 Practice – 'Being a doctor'

Interviews identified a number of areas which constituted the actual practice of working as a junior doctor. These included obvious clinical skills such as practical procedures and prescribing, and communication with colleagues and patients, and less explicitly clinical but equally important elements of the job, such as learning about hospital procedures and paperwork, adjusting to shift working, learning to prioritise in a busy clinical environment, and simply adapting to the way a ward team works. Some explicit knowledge gaps were also identified.

4.2.1 Experience of different teams/specialties

Interviews at the end of the F1 year showed that the majority of respondents had moved around frequently during the year, with each placement involving working in more than one ward or department. Some felt that too short a time with a team meant they did not settle in and learn beyond superficial contact, while others felt that working with lots of teams gave a good overview, seeing more varied clinical presentations, and provided more opportunities to experience different teams and 'not be stuck' with seniors or a team who were less effective, for example in teaching and providing educational opportunities. Working with a number of teams also provided greater knowledge of the organisation, and made referrals and other inter-departmental contacts easier in subsequent placements.

Some F1s felt more prepared for some placements due to more exposure as a student or the demands and nature of the job (e.g. feeling more prepared for a medical placement than a surgical one). Some F1s commented that a demanding first placement prepared them well for the next one, although others felt that working across several wards was more difficult in the first placement when they needed to get to know different ways of working.

Many of the primary sample found medicine easier than surgery, with greater responsibility and less support in surgery as seniors would be in theatre, while others found medicine more challenging because patients were sicker and had multiple problems compared to surgical patients. Some felt that a focus on medicine in final exams helped preparation for medical placements. Personal interest in a specialty also affected what respondents got out of a placement, as did the culture of a department – some being positive and enthusiastic towards trainees, some being more judgmental.

4.2.2 Clinical and practical skills

Generally there was some concern about several areas of clinical practice, with a steep learning curve for the development of skills[32]. At each medical school there were some students who had graduated having performed very few clinical procedures on real patients, having practised more on simulators and mannequins – particular references were made to catheterisation and cannulation. However, the majority did seem to make the adjustment to real patients reasonably well, a finding also reported elsewhere[10, 12]. After four months most F1s felt that they had been better prepared than they had expected, albeit with help and support from other staff, and that any deficiencies in the most common procedures were quickly rectified by the sheer number of procedures they had to do. However, there were some who found themselves with less support than they would have liked, feeling it was 'sink or swim'.

The triangulating sample's perspective was that generally new F1s are capable and if they were lacking they got 'up to speed' very quickly. However, there was a general view that they were not getting as much on-ward experience as was the case in the past and that more experience was helpful.

4.2.3 The acutely ill patient

All data sets from all medical schools indicated that new F1s are prepared for receiving patients, clerking and taking a medical history. However, there were concerns from some F1s from each medical school about making clinical decisions and patient management. Particular concerns were expressed about taking immediate steps with acutely ill patients, although this was seen as tied to the inescapable change in responsibility which comes with being a doctor, and which cannot be directly prepared for. Being the first doctor to deal with a sick patient was an area of concern that remained at the end of F1, although some felt confident dealing with common situations such as cardiac arrests if they had gained sufficient experience over the year. There was agreement that the best way to learn how to deal with these events was to be there when they happened.

Early exposure to ill patients, including during out of hours/night shifts when an F1 is most likely to be responsible for initial management and decision making, would mean they were introduced to the complex application of clinical knowledge, such as diagnosis and immediate action, rather than performing isolated tasks. Teaching acute management in a classroom cannot compensate for the learning gained in a real context. However, some Newcastle F1s reported in the end of year interview that having to deal with an acutely ill patient before senior help arrived had implications for patient safety. Students therefore need to be encouraged to spend as much time as possible on acute wards to ensure they can recognise how to respond to an acutely ill patient. A related concern from some F1s was that they were not always able to recognise signs that a patient may be seriously ill at admission.

4.2.4 Anatomy

A potential knowledge gap reported by some graduates in the first interview was that they had not covered anatomy in depth, and could potentially be out of their depth at times. There was a suggestion that this perception came in part from opinions expressed by seniors during clinical placements. However, the first follow-up interview after four months suggested that they found they did have sufficient knowledge for the role they were fulfilling, and while assisting in theatre would require more knowledge, this had not so far occurred.

4.2.5 Prescribing

There was a general consensus that there is a lack of preparedness for prescribing. Prescribing is one of the biggest steps in the transition from student to F1. Previous research has also reported prescribing as a weak area[23, 33, 34, 35, 36, 37]. Prescribing was described as consisting of two related but distinct areas: the basic science and pharmacological knowledge required to understand drug effects and interactions, and the actual mechanics of prescribing, such as calculating dosage, and writing up a prescription and drug chart. One relates to a knowledge base, the other to procedural skills, although both are equally important in the development of skilled practice.

Areas of weakness included a range of knowledge and skills related to prescribing. Some pharmacists interviewed in the development of the triangulating questionnaire expressed severe concerns about junior doctors' prescribing, both in terms of their pharmacological knowledge and their understanding of the practical elements of prescribing. They complained of a lack of understanding of the importance of taking and checking a complete drug history, and ensuring drug charts were completed properly. There were also concerns about the simple arithmetic of some juniors in calculating dosages etc. It is also of note that the major source of error was related to prescribing, although most of the mistakes were minor and were recognised by nurses or pharmacists and corrected. Due to the potential for such errors to do harm, however, this constitutes a significant potential risk.

At the same time, there was agreement that prescribing is a very complex task which requires not only the application of other skills (history taking, examination, clinical judgment), but then selecting the right drug, considering drug interactions and potential side effects and contraindications, and then calculating the correct dosage. Prescribing is a very high order task and one that is difficult to teach (and learn) in a classroom setting. In the past there were more opportunities for students to observe doctors writing up prescriptions before they had to prescribe themselves. Some respondents in Newcastle commented in the third interview that the prescribing exam had highlighted areas of weakness, raising their awareness of error and how to minimise error.

In the third interview at the end of the year F1s reported that, with experience, their confidence, knowledge and ability had improved. This was linked to increasing familiarity with commonly prescribed drugs and experience of more complex drug interactions, as well as teaching during F1. Reference materials were also used, such as the British National Formulary (BNF), Trust guidelines, online protocols and, in one locality in Scotland, a prescribing book detailing

common doses and interactions. The helpfulness of colleagues, particularly pharmacists, was stressed at all three sites. Problems with prescribing were felt to be more related to practicalities such as transcribing, or errors made under time pressure, than to knowledge gaps. While many F1s felt that they were under-prepared in their pharmacological knowledge, there was a common feeling that being more aware of common prescribing scenarios, and common dosages, would have been more immediately useful than more pharmacology.

4.2.6 Communication skills

Communication skills are a key part of clinical practice. Doctors have to manage communication with colleagues and patients in a variety of contexts. The data from all datasets indicated that communication, with patients and with other staff was an area for which new F1s are prepared (also found in previous research[9,10,12, 23, 38]). While there was some uncertainty expressed about the limits of their role (see above), F1s also said they were prepared to ask seniors and other colleagues for help, in contrast with a recently published study[39] which identified a desire to present competence as a barrier to asking for help. However, this study took place before the changes of the Modernising Medical Careers programme which introduced the Foundation Programme and the F1 grade. It may be that current F1s are made more aware of their role and the limitations they are expected to have, and are so more comfortable with acknowledging areas where they perceive themselves to be weak.

However, there was some evidence from both the primary sample and the triangulation interviews that 'higher order' skills, such as breaking bad news, needed to be practised in the workplace to be further developed, a finding that has also been reported elsewhere[2]. By the end of the year some F1s still felt that dealing with bad news was challenging. Some also commented at this stage about problems dealing with poor staff communication and staff conflict, which had not emerged earlier.

Communication skills are sometimes flagged up critically by older doctors trained following earlier curricula. Comments often focus on F1s being good at communication skills, but at the expense of more 'useful knowledge' or skills. However, knowledge gaps might be more amenable to learning later 'on the job' when required, while communication skills do not always have the time to develop, and so are better honed in advance of having to deal with the natural and unplanned expressions of emotion and anger that might be part of supporting a patient and their relatives. Added to this is the knowledge that communication skills' training is evidence-based. If skills are taught they improve over time, and with ongoing teaching and assessments are less likely to decay[40, 41, 42].

There was a suggestion that the older graduate-entry F1s may have more maturity and life experience to deal with more complex communications.

4.2.7 Other duties of a doctor

The main non-clinical area about which respondents expressed concern was simply gaining experience on the wards and becoming familiar with hospital practices and administrative issues. There was a limitation to the extent to which aspects of work learned or rehearsed in a classroom setting could be transferred to the clinical setting. These included working nights and being on call, dealing with paperwork and hospital policies, managing acutely ill patients and learning how to prioritise and manage time. The increase in administrative work and the need to learn how to prioritise workload has also been reported elsewhere[8].

4.2.7.1 Prioritising work

When interviewed at the end of their first placement F1s were worried about clinical prioritisation – knowing which patient to see first when called to see several ill patients, and being faced with being on-call or night duties so early on in their job, for which they felt unprepared. This was not just because of the clinical judgment required, but the responsibility it entailed. There can be less senior help available at these times and simultaneously more

responsibility and pressure to respond and prioritise quickly. More exposure to on-call and night duties as a medical student would have been beneficial.

4.2.7.2 Time management

The primary sample had mixed expectations of how they would deal with time management demands, but the experience of having to manage their time proved to be challenging for most. However, at the end of the F1 year there was a consistent feeling from F1s that their time management had improved, with better work-life balance, and feeling they had more personal time, although several still talked of a high workload. Much of this improvement came from simple practice and becoming quicker at procedures such as referral (through developing local knowledge of who to contact), and at processes such as looking up drug dose and interactions.

4.2.7.3 Managing paperwork

At the end of their first placement, some respondents reported difficulties with the administrative side of their work, such as ordering investigations and tests, as this varied between trusts and hospitals. Some expressed concerns over paperwork such as writing in patients' notes, writing discharge summaries, cremation forms and death certificates, whilst others felt that they had learned quickly. There was some suggestion that paperwork could be given more attention at medical school, for example the appropriate drafting of referral letters and clinical paperwork such as preparing blood forms.

4.2.7.4 Knowledge of the NHS and legal and ethical issues

Some knowledge gaps were identified, particularly with regard to legal and ethical issues, and an understanding of the NHS. Although knowledge of the NHS was something that respondents felt grew to some extent during F1, it was felt that it was partial and mostly limited to the operation of the local NHS, within a hospital or between local providers, rather than a view of the NHS nationally. However, gaps in knowledge of the NHS were not perceived as a problem. The size of a hospital was identified as making a difference; in a small hospital there may be more local support and simpler organisational structures, but also more inter-organisational contact as fewer services are available on-site. The majority of learning was informal, from doing the job, and from conversations with colleagues. Some comments referred to difficulties in understanding structures – both the overall management structure and particular hierarchies, such as nurse hierarchies.

4.3 Learning – 'Being a trainee'

One of the perennial tensions in medical education is between service and education, and the F1s feel this as much as anyone. While they have made the transition from being a medical student to being a practising doctor, they are still learners, and must balance their need to find learning opportunities, and complete the learning portfolio, with doing a job. They have responsibilities to a number of stakeholders with sometimes competing demands: clinical unit, hospital, Deanery; all of which must be attended to.

Generally there was a sense from the primary sample interviews that new F1s were all prepared to take responsibility for their own continuing professional development which would largely be more through clinical practice. There were common areas, discussed above, in which they identified learning needs: prescribing, management of acute and complex cases, and dealing with complex areas of communication. F1s at all sites indicated that the extent to which an individual might benefit most from learning opportunities depended both on their attitude, and the extent to which the team they worked with provided opportunities. However, Glasgow clinicians interviewed for triangulation suggested Glasgow graduates were particularly likely to ask questions, and attributed this to the self-directed nature of the PBL course which instilled greater confidence in seeking out learning opportunities.

As well as ongoing learning, F1s also became aware during the year of an additional role in their responsibility to 'be a teacher' to medical students and to the new F1s shadowing them at

the end of the year (It is possible that participation in the research had made them more mindful of this, as they reflected on the teaching they experienced themselves).

4.3.1 Using a learning portfolio

A learning portfolio is a key part of the Foundation Programme, and must be completed satisfactorily to progress to F2. The portfolios differ in England and Scotland, and while the primary aims and general content are the same, with reflective accounts, evidence logs, multi-source feedback and observed assessment of a number of practical procedures common to both, the Scottish portfolio is part of the Doctors' Online Training System (DOTS), which features more substantial online study modules which must be completed.

The primary sample had limited knowledge of the Foundation portfolios before starting F1, although they had used portfolios as undergraduates. At four and twelve-month follow-ups there were substantial, although not universal, negative feelings about portfolios, both about their being time-consuming and inconvenient, and in their actual utility. Reflective accounts were found to take time which may have been better spent on other activities. Several respondents in Glasgow found the online DOTS modules to be time-consuming and not beneficial, even if other elements of the portfolio were useful.

For many, getting other staff to observe and rate procedures, and complete multi-source feedback, was difficult, and intrusive on their colleagues' time. This had a knock-on effect on the perceived validity of these assessments, with forms being completed when procedures had not been directly observed, and raters sometimes being 'generically nice'. As such, trust in the assessments was less than it may have been, a feeling echoed by the triangulating clinicians, who also saw portfolios as time-consuming and cumbersome, and open to manipulation by trainees. The portfolio was seen by several clinicians as at best an indicator of performance for further investigation if there were concerns, rather than direct evidence of performance.

4.4 The stress of F1

It was anticipated that the primary sample would experience stress during the F1 year, from dealing with the change in status, responsibility and workload of being a doctor, and balancing this with their continuing role as a learner. In the initial interviews F1s expressed some anxieties about the responsibility for patient care, and the hours they may have to work. In subsequent interviews, particular stresses were related to initial exposure to acute and emergency cases, particularly during on-call and night shifts.

At the end of the year, the majority of F1s interviewees reported that the year had indeed involved stressful periods from the start, , some of them severe, but that stress was not felt to be chronic, being 'manageable' or even 'enjoyable'. There was a sense that particularly stressful periods – being on call, working nights, dealing with acutely ill patients – had become more manageable through experience, but that stress could be exacerbated by a heavy workload, insufficient support in an understaffed environment or settling into a new placement with insufficient induction and clarity of role (reinforcing earlier findings[21]). Conversely being supported and working in a good team were important factors which helped F1s cope with stressful situations. Respondents mentioned in particular the F2s, educational supervisors and nurses to whom they could turn for advice and support. Other support at stressful times largely came from peers, with respondents talking about a degree of camaraderie stemming from shared experiences. Others felt they had a good work-life balance and friends and family who helped, while others simply got on with the job hoping things would get better over time.

4.5 Improvements to training

Respondents were asked to identify ways in which they felt the undergraduate programme could be improved to better prepare them for F1. Most respondents at all sites were positive about their course, but some did identify particular areas they felt could be improved. Common

areas were: the importance of gaining more experience on the wards to help prepare for F1, more targeted teaching for prescribing and improvements to shadowing.

In interviews at the end of the year, the majority of respondents reinforced the view that more clinical exposure in the final year would have helped them be more prepared for starting work, and that this should be well structured, with a more defined role. However, at least one respondent pointed out the risk of F1s becoming frustrated if they are limited to working at that level for longer than a year. Some reported that it would have been beneficial to experience full days on the ward rather than shorter periods, to allow greater continuity, integration and experience of day-to-day ward work. Others commented that looking after allocated patients from initial assessments to management plans one or two days a week would provide helpful continuity.

Greater structure in clinical placements could include an expectation to attend specific clinics so that staff are prepared for students' arrival, more formal sessions on the wards, and more focused practical teaching on prescribing. It was suggested by some Glasgow respondents that a simple workbook for completed procedures or tasks to be signed off would be useful in guiding and focusing learning on clinical placements. Some also suggested that learning could be improved if it was the definite responsibility of the F1 to deal with the medical student, as they have the closer contact. However it was also noted that the F1 role is not set up to look after a student, and so this would in itself require more teaching and development of that role.

Some respondents considered that a more intensive grounding in pharmacology at medical school may have avoided difficulties with prescribing, although several respondents suggested that practical teaching would have been more useful, for example focusing on common scenarios to increase applied knowledge. Pharmacology teaching reinforced toward the end of the course would enable its contextualisation in clinical practice. Learning more about prescribing in an applied, ward setting would have been helpful with regard to a number of areas: common doses and interactions (particularly warfarin), insulin, fluids prescribing, setting up infusions, and writing up Kardexes under supervision. Other suggestions for practical teaching included students on wards being asked to write dummy prescriptions, supported by current F1s, as well as being shown how to work well with the BNF, and how hospital clinicians work with pharmacists. Formal, classroom, teaching was still seen as important to inform this practical experience.

There were suggestions for more time for shadowing and for this not to be interrupted by demands away from the ward. Shadowing could also have more structure. More exposure to acutely ill patients as students, and exposure to on-call and out of hours/night shifts, where they were most likely to be responsible for initial management and decision making, would be helpful in learning about prioritising patient care and decision making and management. There was some suggestion that paperwork could be given more attention at medical school.

Some respondents suggested that final exams could be placed earlier in the course, to enable them to focus on developing the skills needed for F1 at the end of their final year. There were mixed views on this, with some feeling strongly that studying for final exams was a distraction meaning practical learning opportunities in the final year were not always taken, while others felt that the focus on theoretical learning was necessary alongside practical experience. The strongest feelings seemed to come from Glasgow graduates, who had worked with graduates of Dundee medical school (which has finals at the end of the penultimate year), whom they felt to be better prepared.

4.6 Summary of qualitative data

Qualitative data on the primary sample's perceptions of preparedness over time was collected through interviews at graduation and after four months and twelve months as F1s. These perceptions were triangulated with the views of undergraduate tutors, educational supervisors, clinical managers, portfolio assessors and members of the clinical teams who worked with F1s.

The main findings, in agreement with the cohort and triangulation questionnaire, highlight graduate preparedness for basic communication and clinical skills, including history taking and basic procedures. Lack of preparedness for prescribing was highlighted in all qualitative datasets, as in the cohort and pharmacist questionnaires and the prescribing assessment. Also identified through interviews was a lack of preparedness for areas of practice that are best learned and experienced on the job. These included: becoming more familiar with the role and duties of an F1, working on-call and on nights, dealing with acutely ill patients, dealing with complex communications, managing time, prioritising work and managing hospital systems including paperwork. Analysis identified exposure to clinical practice before starting work as being the core theme underlying preparedness. In the terms of grounded theory, this identified the theory that preparedness for practice increases with exposure to clinical practice.

5 Discussion

The research aimed to identify how prepared new medical graduates of three medical schools are for practice, in which areas and ways their preparedness varies, and what factors may influence that preparedness. Qualitative and quantitative data were collected from medical graduates before starting work, and twice in their F1 year, and with their seniors and colleagues from different professions. Secondary data was examined in a review of portfolio assessments in their first placement, and a safe prescribing assessment completed by some graduates.

Findings may be summarised as follows:

1. Graduates looked forward to ‘being a doctor’, fulfilling years of training and finally having a proper role to play in a clinical team. The transition from student to doctor was experienced as a ‘step up’ in responsibility and involved a steep learning curve.

2. While communication is a strong area at graduation, F1s were under-prepared for some complex communication tasks. These included breaking bad news to patients, dealing with distressed or angry relatives, and dealing with challenging colleagues.

3. Other clinical skills are well practised as undergraduates, but not in contexts which sufficiently mimic the real clinical environment, involving multiple demands on time, the need to prioritise, and the responsibility of dealing with acute cases.

4. Knowledge of non-clinical areas such as legal and ethical issues, and the operation of the NHS, was lacking at the start of F1. It grew over the year, but only as necessary, and restricted to the local NHS.

5. Prescribing is a significant area of under-preparedness. Undergraduate teaching does not prepare new graduates sufficiently for prescribing as a skilled task involving applied clinical pharmacology. There is a perceived lack of focus on common prescribing tasks, and the complexities of interactions and pharmacokinetics. Risks to patient safety are reduced, but not removed, by checks from other clinicians and pharmacists.

There are no indications of a systematic variation in the preparedness or concerns of the respondents with their MTAS quartile. The sample of medical graduates was selected to include males and females, and represent ethnic minorities and those with disabilities. While a fuller study targeting these dimensions would be necessary to be exhaustive, there was no evidence that these dimensions were related to preparedness.

There was agreement from all sources that the data indicated a need for more 'on the job' training. New graduates have less time in clinical practice, with direct patient contact and involvement in day-to-day ward business, than was the case for earlier generations of medical student. This has made it difficult to develop a sense of 'belonging', culminating in students feeling like strangers in the team.

Of particular importance are opportunities for involved, participant learning as opposed to observational learning in the later clinical stages of medical undergraduate courses. The balance that has to be struck is between assuring public safety, by ensuring that patients' treatment is in the hands of appropriately experienced clinicians, and optimal preparation of student learners for the responsibilities they will take on for patients.

Unfortunately, numerous changes have coincided that may have resulted in less clinical exposure for final year medical students. These include:

- Loss of student 'locum' post opportunities through which many students previously gained an understanding of what was expected of them post-qualification.

- A change in team working. The sense of belonging which was a feature of the clinical 'firms' in traditional medical education, has perhaps suffered as shorter placements and shift-working (driven by the European Working Time Directive) have become the norm.

- Foundation doctors themselves feeling the need to increase their experience of practical skills and therefore not devolving to senior students practical procedures and other tasks which were formerly more within the student domain.

- Related to this, a more complex mix of skill and authority in multi-disciplinary teams means available opportunities are fewer, and trainees in other professions compete for access to patients.

Another possible factor is that senior students sometimes prioritise 'library-based' learning to meet defined and assessable objectives over the less definable experiential learning which accrues from maintaining a presence in the ward environment and being ready to volunteer for every possible patient contact activity. The latter form of learning may be perceived as less likely to contribute to successful outcomes in assessments, and yet may also make a strong contribution to the subsequent confidence of the new doctor.

Changes in NHS structures and treatments have also had an impact on the level to which students can (or feel they can) be involved. Increasingly patients have shorter hospital stays and tend to be more severely unwell than in the past; this results in student access to acutely ill patients being reduced and, as a result, student/patient contact is less legitimate and more peripheral.

In the context of the present research we were unable to look in detail at the effect of different models of clinical attachment, but we identify this as a priority for future research, looking at how students may feel a sense of 'belonging' and more meaningful involvement in service delivery, so that they learn through participation.

The over-riding conclusion from these findings is that perceived competency, and therefore perceived preparedness, comes with practice in a real clinical environment, with real patients, among real ward teams. Clinical practice in such a context is ‘messy’, and does not consist of textbook cases. The data indicates that an increase in the quality of clinical practice would produce an increase in preparedness. This experience was also vital in preparing for hospital procedures and protocols in areas such as prescribing, requesting tests or scans, and informal, cultural aspects of inter-team communication in hospitals.

However, learning opportunities to provide this experience were limited by undergraduates’ having no formal role in the team and being effectively outsiders looking in. While more time on wards and a longer shadowing period were seen as potentially useful changes, it was clear that this time needs to be more structured and more participative to be effective. The medical

student needed to be brought into the team, to have a role and to participate in supervised practice to really learn about the duties of the F1 doctor.

This idea of moving gradually from peripheral participation to more central involvement is reflected in the educational theories of 'situated learning'[43, 44, 45]. Through co-participation in the work environment and engagement with the 'daily round', learners have the opportunity not only to extend their knowledge but also to learn about procedures, processes and interactions that are contextualised in the workplace situation.

Theories of 'situated learning' refer to learning in the workplace as a process of enculturation of individuals into real practices through authentic activity and appropriate supported participation, that is, through 'legitimate peripheral participation'[44]. Learners are allowed to participate 'legitimately', i.e. their participation matters to the community's successful performance of its work. Their role is initially 'peripheral' to the community, but moves more to the 'centre' as they become more competent and skilled, eventually resulting in full participation.

While some F1s felt strongly that moving final exams to an earlier point in the year would provide more time to develop in practice, without the distractions of studying for finals, others felt that curricula were not adapted to such a structure, and that they would not have been prepared for exams earlier in their course.

5.1 Differences between the three medical schools

The medical schools from which the primary samples were recruited represent three different approaches, varying in student cohort and curriculum. The sample was guided by findings in the literature that the preparedness of graduates of different schools varies[2,3]. The three schools selected in this study were anticipated to elicit differences in preparedness.

However, the findings showed very few differences between the medical schools and many similarities in preparedness. The results suggest that it was not the type of curriculum or cohort that influenced preparedness but the amount and particularly the quality of clinical practice. Both qualitative and quantitative datasets suggest common areas of preparedness and under-preparedness, with simple clinical tasks and communication skills being seen as the most prepared for, and complex skills, prescribing and some hospital procedures the least. Similar frequencies of assessments on different procedures in the first placement suggested that there was little practical difference in what F1s were prepared to do.

Some respondents, both F1s and triangulating senior clinicians, did identify particular strengths or weaknesses in their respective cohorts which were attributed to medical school. Some suggested that a graduate entry cohort was more confident and more able to deal with situations requiring more complex and demanding communication skills, which may be a reflection of age-related maturity. Graduate entrants to the other medical schools supported this view. There is also some suggestion that Glasgow students, having followed a PBL curriculum throughout, might be more adapted to self-directed learning, and less concerned about asking questions. This is supported in two items on the cohort questionnaire ('Identifying your own learning needs' and 'Managing your own time effectively') administered at the end of medical school. The increased ability of PBL graduates to ask for help has also been reported elsewhere[9]. The strength of Newcastle medical school's communication skills teaching was noted by several respondents. It should be noted though that these perceptions may be biased by the respondents attributing behaviour to the courses, rather than actual differences in behaviour. As some Glasgow respondents also noted, there is a chance that any differences may have been present at entry to medical school, rather than the effect of the course.

6 Conclusion and implications for policy

The findings of this study point to one fundamental conclusion – that undergraduates' preparedness to begin the Foundation Programme will be improved by more experiential

learning in clinical practice as part of their undergraduate programme. If this conclusion is accepted, it is in the GMC's interests to ensure that policy related to undergraduate programmes, and the transition to the role of junior doctor, ensures that the maximum possible salient clinical experience is gained.

The current version of *Tomorrow's Doctors*[1] sets out recommendations for undergraduate curricula, providing guidance for structure and content. To the extent which the data reflect the outcomes set out in *Tomorrow's Doctors*, all three medical schools fulfil those outcomes. In light of the evidence presented in the study, however, one area notable by its absence is the need for undergraduates to gain *experience*. Knowledge, skills and attitudes are all addressed, but on-the-job clinical experience is not highlighted.

The results of this study indicate that clinical experience is variable at present, and depends on organisational factors, and interpersonal relationships between students and the clinicians with whom they are placed. A key recommendation for policy is that *Tomorrow's Doctors* and similar documents explicitly prioritise the amount and type of practical experience medical students receive, particularly towards the end of the undergraduate programme. Increasing this experience may also develop the knowledge and skills outcomes which are already specified.

The only reference to experience in the 2003 edition of *Tomorrow's Doctors* is in the details of shadowing set out in paragraphs 51-53:

> *"51 Students must be properly prepared for their first day as a PRHO. As well as the induction provided for PRHOs, students should have opportunities to shadow the PRHO in the post that they will take up when they graduate. [...]*
>
> *52 These attachments must include opportunities for students to refresh the practical and clinical skills that they will be expected to carry out on their first day as a PRHO. These include the ability to prescribe drugs under the supervision of a qualified doctor and to carry out procedures involving veins.*
>
> *53 Such attachments should normally last at least one week. Students should gain this experience as close to the point of employment as possible."* (*Tomorrow's Doctors*[1], p.12)

The suggestion from the data is that these guidelines should be more explicit and prescriptive, and the duration of shadowing extended. Similar guidelines for clinical placements could be developed, and current initiatives for increasing undergraduate clinical experience being tried in different medical schools reviewed[46, 47].

To facilitate these changes, places where medical students and F1s are learning need to have a *learning culture*[48], and the engagement of all clinical professions of all grades. The GMC's QABME (Quality Assurance of Basic Medical Education) process may provide the means to shape such change.

The teaching role of an F1, although specified in *Good Medical Practice*[49], needs to be bolstered by explicit ward-level guidelines on what they can or should turn over to medical students. Nurses of all levels also need to be aware of this. Nurses could perhaps be made more conscious of their role in medical education – their skills in nurse education and mentoring would be transferable, but issues of professional identity need to be considered. Multi-professional working also needs to be accounted for in the transition to the workplace, as confusion over hierarchies, and the changing skills sets of nurses, seem to be an issue.

The practical implications of this research rest on one key question, raised by a senior clinical educationalist at a dissemination event – what are we preparing trainees for? The end point of an undergraduate programme needs to be matched to the starting point of F1. An increase in the level at which medical students work may have consequences for the F1 role, and in turn the wider clinical workforce. That said, there is a strong argument for qualifying doctors to have had comparable experience as they start their medical careers. Student anxieties may be reduced, and the transition to the workplace made less traumatic, if practical induction to the F1

role, and to the clinical environment, is made more comprehensive, targeted, and above all consistent between schools and hospitals.

The priorities for the GMC should therefore be to:

1. Ensure that undergraduate clinical placements have more structure and consistency, with experiential learning across a range of specialities to balance the opportunistic learning which currently takes place.

2. Ensure medical students are given a greater role and involvement in medical teams, with due regard to patient safety. Clinical placements should consider the dimensions of legitimacy and centrality, to move the student into a more central and authentic role before they take on the responsibilities of a F1.

3. Establish fuller guidelines on shadowing, to be more prescriptive of structure and content, and aim to ensure, rather than recommend, that new F1s have shadowed their own job. Foundation schools should be encouraged to ensure induction events do not take shadowing trainees away from wards.

4. Specify the limits of the F1 role, and the boundaries of its responsibilities with senior doctors and other members of multi-professional teams.

5. Address particular weaknesses in prescribing by supporting the development of teaching of prescribing as a skilled procedure which is subject to the time pressures and contingencies of all clinical skills. Such teaching should place greater emphasis on prescribing as an instance of applied pharmacology, and the need for new doctors to engage with prescribing and develop their own expertise rather than relying on others'.

While some F1s felt strongly that moving final exams would benefit experience, improving the structure and increasing the educational value of clinical placements and shadowing would have the desired effects without requiring major changes to curricula and undergraduate programmes. However some reflection on exam timing may be helpful in maximising the value of this clinical experience.

7 Strengths and limitations of the research

The methodological breadth, and large qualitative sample sizes (despite unavoidable attrition of the primary sample across the year) give the study strength. The agreement of triangulating data suggests that the often-questioned validity of self-reports[50] is supported by concurrent data, although 'preparedness' in this case is more analogous to confidence, rather than a prediction or assessment of performance[51, 52].

There were slight differences in sampling due to the time constraints for recruitment, with Glasgow forced to take a more opportunistic approach. All samples nonetheless contained representation across a demographic cross-section and a range of MTAS scores. The current study was not able to consider individual differences such as personality and learning style, although these did emerge in the data as attributions for preparedness. Related issues of organisational culture, and the social-psychological barriers to transition were also not addressed.

Practical restrictions had an impact on the quantitative and secondary data. Time and resources precluded full piloting and validation of questionnaires, although the cohort questionnaire does have adequate indicators of validity. Time pressure in the development of the triangulation questionnaire led to a sample size too small to conduct any validating analysis. Differences in portfolio data available – between English and Scottish, and between electronic and paper portfolios – meant that more detailed comparisons of portfolio completion were not

possible, while practical considerations meant the prescribing assessment could not be run in Glasgow to provide a comparison of all three sites.

8 Further Research

This research has identified common experiences of graduates of three medical schools as they begin Foundation Programme year 1 in terms of their preparedness and lack of preparedness for different areas of practice. There are questions around the preparedness of new doctors in different clinical areas which remain, and have been elaborated by the research. Some suggestions for further work are:

1. The core finding that preparedness is directly related to experiential learning should be validated by comparison with other medical schools. By comparing graduates of schools which have different programmes of clinical experience in the undergraduate years (rather than simply different curricula) the impact of practical experience, and any particular dimensions of that experience, may be clarified.

2. The extent to which prescribing skills are learnt and developed is worthy of more detailed study. The use and usefulness of interventions such as the safe prescribing assessment in Newcastle, and on-ward teaching may identify how prescribing and clinical pharmacology are best learnt, and best translated to practice.

3. The development of professional identity, and the experience of transition, may be explored further. Identifying the social and social-psychological barriers to transition may aid new doctors as they establish themselves within clinical teams. An increased awareness of organisational cultures as well as formally prescribed roles may make doctors more attuned to their new working environments.

4. The validity of workplace assessments (procedural observation and multi-source feedback) has been questioned, as in other studies. Empirical work may be indicated to look in detail at how much of this perception is because of procedural weakness in the execution of these assessments, and how much in a personal or cultural mistrust of them.

5. Findings on F1s' attitudes to asking for help contradict other work which predated the introduction of the F1 grade. Further work should identify the circumstances in which F1s find difficulty in deciding whether to ask for help in the post-MMC environment.

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Appendix A – Admissions processes at each medical school

The three medical schools have common elements to their admissions procedures, but differ in certain ways. The process for each with the entry requirements, and stages of application is summarised below. Full details, including equal opportunities and other requirements can be obtained via the URL given for each school.

Warwick

Full details: www2.warwick.ac.uk/fac/med/study/ugr/select/

Entry requirements:

> Applicants must have a first degree with 2i or higher in Biological, Natural or Physical Sciences. Applicants with a 2ii may also be considered if they have a PhD in a relevant discipline. Overseas qualifications are checked for equivalence.

There are three stages to the applications process:

1. Shortlisting from the Universities and Colleges Admissions Service (UCAS) form, in which the applicant sets out his or her academic achievements and gives a personal statement. UCAS applications include personal references.
2. The UK Clinical Aptitude Test (UCKAT), a standard cognitive aptitude test administered by computer.

UCAS applications and UKCAT scores are reviewed by the Admissions Office before forwarding to Warwick Medical School, where a decision is made on which candidates should be invited to a selection centre.

3. Selection Centre, at which candidates are observed completing tasks, complete a written exercise and a structured interview.

Scores from the selection centre are reviewed by the Director of Admissions and Admissions Tutor, who must sign off conditional or unconditional offers.

Glasgow

Full details: www.gla.ac.uk/medicine/undergraduatestudy/medicine/mbchbdegreeprogramme/admissions/

Entry requirements:

> For school leavers qualifications are specified of Scottish Highers with minimum grades of AAAAB, including Chemistry and Biology and one from Maths and Physics, or A-levels with grades of at least AAB including Chemistry and one of Maths, Physics and Biology. Grades are to be obtained in the first sitting and in one sitting.
>
> For graduates requirements are a 2i or higher in any discipline, although applicants who do not have a relevant science degree require Chemistry and Biology qualifications. (Qualifications will normally be obtained within five years of the entry date).. Additionally dental Graduates can apply for entry into year 3 of the MBChB course.
>
> Applicants on recognised Access courses will be considered on an individual basis, as will applicants from outside the EU.

Application process:

4. Shortlisting from UCAS form.
5. UKCAT.
6. Structured interview with two members selected at random from the Admissions Committee. Interviews are recorded with the candidate's consent.

Newcastle

Full details: https://mbbs.ncl.ac.uk/admissions

Entry requirements for five year programme:

> AAA at A level including include Chemistry and/or Biology at A or AS level. Scottish Highers with grades of AAAAA including Chemistry and/or Biology. For access qualifications Distinction grades are essential for modules in Biological Sciences and Chemistry and Quantitative Methods.
>
> Graduate applications from candidates with a scientific background will be considered. Applicants must have achieved, or expect to achieve, at least an upper second class or first class Honours Science degree.

Entry requirements for four year accelerated programme.

> Applicants must have a 2i or first class honours degree. No subject areas are specified.

Application process:

7. UCAS form. Applicants must indicate whether they have a preference for the Newcastle University or Durham University (Queen's Campus) locations of the programme.
8. UKCAT.
9. Interview by two selectors.

Appendix B – Mean scores for each cohort questionnaire item for each site

	Glasgow		Newcastle		Warwick		
	Mean	SD	Mean	SD	Mean	SD	
q1 History taking	4.328	.533	4.243	.540	4.361	.631	
q2 Performing a full physical examination	4.153	.650	4.040	.613	4.230	.640	*
q3 Performing a full mental-state examination	3.321	.797	3.507	.751	3.699	.735	*
q4 Pre-operative assessment of patients	2.878	.920	3.000	.792	3.197	.757	*
q5 Interpreting the results of commonly used investigations	3.883	.647	3.637	.670	3.628	.621	*
q6 Carrying out simple practical procedures (e.g. taking blood, IV access, administering oxygen)	3.985	.886	3.946	.707	3.508	.855	*
q7 Carrying out complex practical procedures (e.g. bladder catheterisation, operating syringe driver)	2.679	1.010	2.911	.858	2.626	.863	*
q8 Carrying out arterial blood sampling	3.450	1.090	3.564	.943	2.958	.955	*
q9 Dealing with emergency care situations (e.g. CPR/ALS)	3.374	.788	3.404	.872	3.058	.788	*
q10 Carrying out basic respiratory function tests	3.298	1.079	3.513	.860	2.869	.909	*
q11 Administering oxygen therapy	3.298	.974	3.743	.851	3.361	.928	*
q12 Administering a nebuliser correctly	2.985	1.074	3.566	.863	2.926	1.001	*
q13 Making clinical decisions based on the evidence you have gathered	3.359	.713	3.321	.754	3.421	.629	
q14a Assessing a patient's problems	3.634	.659	3.742	.623	3.680	.633	
q14b Forming plans to investigate and manage a patient's problems	3.538	.624	3.571	.659	3.645	.644	
q14c Involving patients in the process of assessing, forming and managing their problems	3.580	.832	3.790	.801	3.934	.713	*
q15 Writing safe prescriptions for different types of drugs	2.893	.963	2.982	.863	2.983	.836	
q16 Calculating drug dosages	2.252	.964	2.982	.956	2.574	.890	*
q17 Writing out death certificate, either real or mock	2.679	1.090	3.711	.791	3.074	.883	*
q18 Writing out Part A of a cremation form	2.145	1.039	2.628	1.081	3.107	.851	*
q19 Recognising and managing the acutely ill patients	3.443	.776	3.411	.810	3.390	.685	
q20 Applying the principles of holistic care	3.664	.891	3.627	.927	3.691	.860	
q21 Communicating clearly, sensitively and effectively with patients and relatives	4.130	.717	4.138	.622	4.106	.798	
q22 Communicating effectively with colleagues from a variety of health and social care professions	4.130	.695	4.027	.632	4.073	.748	
q23 Communicating with individuals who cannot speak English, including working with interpreters	3.328	1.019	3.351	.843	3.344	.925	
q24 Breaking bad news to patients and/or relatives	3.412	.876	3.434	.753	3.073	.812	*
q25 Dealing with difficult and violent patients	2.954	1.029	3.179	.870	2.836	.856	*
q26 Applying knowledge of patient lifestyle, background or religion that may influence diagnosis and management of the patient	3.515	.865	3.580	.781	3.585	.735	
q27 Communicating with patients who have mental illness	3.489	.931	3.527	.761	3.508	.752	
q28 Using knowledge of legal and ethical issues in practice	3.153	.898	3.231	.866	3.174	.782	
q29 Employing a patient centred approach	4.015	.784	4.222	.658	4.049	.756	*
q30 Demonstrating, explaining to or teaching medical students and colleagues	3.336	.900	3.717	.748	3.463	.852	*
q31 Using knowledge of the structures and functions of the NHS in practice	2.756	.842	2.907	.805	2.976	.741	
q32 Integrating scientific principles into clinical practice	3.419	.757	3.469	.749	3.525	.633	
q33 Gaining knowledge of legal and ethical issues (e.g. confidentiality, Mental Health Act)	3.369	.882	3.293	.740	3.344	.701	
q34 Applying knowledge of alternative and complementary therapies and how these may affect other treatments	2.588	.960	2.928	.965	3.285	.795	*
q35 Identifying your own learning needs	4.290	.638	3.902	.612	3.959	.583	*
q36 Managing your own time effectively	4.084	.724	3.673	.698	3.876	.600	*
q37 Prioritising tasks effectively	3.817	.732	3.435	.744	3.818	.619	*
q38 Applying the principles of promoting health and preventing disease	3.870	.684	3.677	.671	3.802	.600	
q39 Applying knowledge of how social and psychological factors impinge on patients' health and care	3.954	.678	3.978	.715	3.975	.661	
q40 Completing a learning portfolio of evidence to document your progress	3.748	.923	3.704	.792	3.439	.821	*
q41 Identifying appropriate situations in which to seek help from a senior colleague	3.954	.732	3.750	.836	4.057	.705	*
q42 Using knowledge of how errors can happen in practice and applying the principles of managing risks	3.473	.835	3.567	.718	3.650	.640	
q43 Being honest with patients, colleagues and supervisors	4.412	.619	4.344	.658	4.244	.682	
q44 Managing your health in order to protect patients and colleagues	4.221	.694	4.049	.763	4.016	.813	
q45 Taking action if colleagues' health and performance puts patients at risk	3.450	.962	3.438	.982	3.438	.855	
q46 Making appropriate choices to facilitate your career	3.546	.997	3.446	.892	3.425	.785	
q47 Working as part of a team with other healthcare professions	4.420	.581	4.280	.646	4.279	.695	
q48 Working with colleagues with different lifestyles, backgrounds or religions	4.542	.558	4.373	.629	4.344	.665	*
q49 Respecting the roles and expertise of other health and social care professionals	4.481	.586	4.391	.596	4.350	.669	
q50 Demonstrating awareness of the policies and procedures to be followed in the event of problems in clinical practice	3.618	.907	3.574	.812	3.582	.832	
q51 Demonstrating effective leadership skills	3.832	.735	3.612	.796	3.579	.814	*
q52 Asserting yourself and expressing your views clearly to colleagues	3.695	.803	3.560	.880	3.648	.822	
q53 Handing over care of a patient (e.g. at the end of a shift)	3.275	1.046	3.188	.957	3.472	.843	*

** Significant differences between at least two schools ($p < 0.05$)*

Appendix C – Mean preparedness as reported by respondents to the triangulation questionnaire

	Newcastle			Warwick			Glasgow			
	% Prepared	% Unprepared	% Don't know / missing	% Prepared	% Unprepared	% Don't know/ missing	% Prepared	% Unprepared	% Don't know/ missing	Overall % prepared
NG Tube	24	48	29	13	27	60	4	68	28	14
IV drip	14	38	48	7	13	80	36	40	24	19
IV drugs	19	29	52	47	7	47	28	48	24	31
Making clinical decisions	48	43	10	47	40	13	32	48	20	42
Catheterisation	43	29	29	40	13	47	44	36	20	42
Acute management	57	29	14	60	13	27	16	64	20	44
Prioritising workload	67	19	14	67	33	0	20	64	16	51
Arterial Blood gases	71	24	5	33	7	60	56	28	16	53
Anatomy	76	10	14	67	13	20	32	36	32	58
Hospital procedures	62	24	14	73	27	0	48	44	8	61
Handover	67	14	19	87	7	7	52	32	16	69
Cannulation	76	19	5	67	20	13	68	24	8	70
Prescribing	67	29	5	73	27	0	72	24	4	71
Venepuncture	86	5	10	73	7	20	88	12	0	82
Working with a multi-disciplinary team	90	5	5	87	13	0	80	16	4	86
Examination	81	10	10	93	0	7	88	12	0	87
History taking	90	5	5	93	0	7	96	4	0	93

Appendix D – Third Interview schedule for primary sample (July-August 2008)

1. Have you had a chance to read the executive summary we sent to you?
   Were there any issues you particularly agreed with / disagreed with?
   Any other issues not mentioned that should be?
2. We recommended more exposure to clinical practice in the final year of medical school, would this have helped you be more prepared to start work as an F1 doctor? If so, in what ways?
3. How do you think your exposure to clinical practice could have been improved?
4. We have also recommended that medical students have a greater role in the medical team, do you have any views on this? (by this we mean purposeful, active involvement rather than observation)
5. Do you think having more structure in shadowing placements would have helped your transition into F1? (by this we mean purposeful, active involvement rather than observation)
6. a) The first phase of the study identified that prescribing was the weakest area of practice, did prescribing continue to be an issue for you during the rest of F1? In what ways? If it was a problem, how did you deal with it? If not a problem, what or who helped?
   b) Do you think any prescribing difficulties would have been avoided by more intensive grounding in pharmacology at medical school?
7. We have recommended that final year students learn more about prescribing in an applied setting while on the wards. Would this have helped? Would anything else have helped during medical school?
8. Managing time and being able to prioritise work was an issue for most F1s when we interviewed them at the end of the first placement – did this continue to be an issue for the rest of the year?
9. What have you learned about the structure of the NHS and how it works, both generally and locally, as you progressed to the end of your F1 year? What has contributed to your understanding? If not, why do you think this is and what would have helped?

9b What impact did working across many wards and with many teams have on you as a new F1?

10. Would it have been helpful to have your exams earlier to leave you more time to focus on preparation for practice?

Experience of the full F1 year

11. You have now experienced three different four month placements. Do you think you were better prepared for some placements than others (e.g. medicine vs. surgery)?
12. What impact if any did trying to complete the portfolio have on your ability to do the job of an F1?
13. How have you coped personally with your first Foundation year? How stressful has the year been? Why? What factors have helped you cope?
14. Are there any times when you felt particularly confident and prepared?
    when was this?
    what do you think it was that made you feel particularly confident and prepared? (prompt: how much of this was due to medical school?)
15. Overall, looking back over a year of F1, are there any times when you felt particularly unprepared for the role you were being asked to perform?
    can you explain what was involved?
    do you think there were any patient safety issues in this case?
    when in the F1 year was this?
    would anything different at medical school have helped?
16. How much do you think your experience and learning at medical school will continue to be relevant as you go into F2 and beyond?

Concluding questions

17. Looking back over the F1 year, was there anything that you felt unprepared for that we haven't covered already?
18. Finally, how could your medical school have prepared you better for F1?
    What could you have done differently?

Appendix E – Summary of analysis of third interviews with Primary Sample (July-August 2008)

A1 Introduction

The original research protocol was extended to include a third interview with the primary sample at the end of the F1 year (agreement for which was obtained during the second interview in November 2007). This was in order to allow the F1s to consider preparedness across the whole year, having experienced a range of specialties and allowing reflection on their development looking towards F2. The interview also provided respondent validation of the findings of the first two interviews as reported in the Executive Summary of the April 2008 report[1].

Nineteen telephone interviews were conducted with the Newcastle sample, sixteen with the Warwick sample and eleven with the Glasgow sample. This summary draws on the findings from these 46 interviews (71% of the original sample interviewed).

A2 Respondent validation

The primary sample was sent a copy of the executive summary of the report for the purpose of respondent validation. There was general agreement amongst those who had read the report that it was an accurate reflection of their views and no issues were identified as missing from the report. There was overall agreement with the findings, particularly with being well prepared in communication skills, students having more of a role in teams, more teaching on prescribing with greater practical application, and more focused shadowing experience, although there were mixed views regarding the timing of exams.

Some respondents in Glasgow disagreed with the observation that the PBL curriculum prepared students more for self-directed learning and 'finding things out', saying that those attitudes may have preceded medical school – "It's just the way I am", and that certain personality types may be drawn to PBL because it suits their style.

All respondents were asked in more detail about key areas of interest, as follows.

A2.1 Having a role/exposure to clinical practice

The majority of respondents agreed that more exposure in the final year would have helped them be more prepared for starting work as an F1 doctor, provided that this was 'good' exposure, e.g. well structured and with a more defined role, allowing them to practise the job, rather than just observe.

Some reported that it would have been more beneficial to experience full days on the ward rather than shorter periods to allow greater experience of continuity and integration of care, and of day-to-day ward work. Some respondents suggested that looking after allocated patients from initial assessments to management plans one or two days a week, under supervision, would provide helpful continuity. Exposure to ill patients, including exposure to out of hours/night shifts, where an F1 is most likely to be responsible for initial management and decision making, would mean they were introduced to the contingent application of clinical knowledge rather than performing isolated tasks: assessing a whole patient and making a working diagnosis rather than just listening to the chest.

Whilst acknowledging a place for proactive, self-directed learning, some respondents also felt there should be greater structure in clinical placements, with staff prepared for their arrival, more formal sessions on the wards, and more focused practical teaching on prescribing. It was suggested by some Glasgow respondents that a simple workbook requiring students to have completed procedures or tasks signed off would be useful in guiding and focusing learning on clinical placements. Some also suggested that learning could be improved if it was the definite responsibility of the F1 to deal with the medical student, as they will have closer contact. However it was also noted that the F1 role is not set up to look after a student, and that this would in itself require more teaching and development of the F1's role.

There was substantial variation in the experience gained in clinical placements between different hospitals, and even wards or departments. Some differences were down to local procedures, others down to the personalities and approaches of the staff on those wards. Experience also varied with the individual student and their eagerness to be involved and pursue learning opportunities. These factors were all noted to be outside the medical school's control.

A2.2 Shadowing

There was general agreement regarding the need for more structured shadowing placements. The importance of shadowing the outgoing F1 was stressed. There were some suggestions that F1s were

under-prepared to be shadowed, and one suggestion from Newcastle was that F1s be given a checklist of tasks for the graduate to complete. Shadowing needed to be related to the practicalities of doing the job (including dealing with the acutely ill and skills largely acquired on the job such as prescribing, prioritising work and being on call); also getting to know their own role and that of the team. Respondents stressed the importance of uninterrupted shadowing, separate from induction, ALERT courses, health and safety talks etcetera. In Newcastle there was a suggestion to keep shadowing and trust induction separate to allow for greater continuity while on the ward. Further suggestions were for greater formality in the introduction to particular hospital systems; for a two to four week transition period doing the job with extra support, and for shadowing to take place at the start of each placement.

A2.3 Prescribing

The majority of respondents agreed that prescribing had been a weak area of practice at the start of F1, and for some it had caused anxiety, particularly when encountering new or complex situations. However with experience, they reported that their confidence, knowledge and ability had improved with time. Increase in confidence was linked to: increasing familiarity with commonly prescribed drugs and experience of more complex drug interactions, also to F1 teaching, support from colleagues and sources of information such as the BNF, trust guidelines, online protocols and, in one locality in Scotland, a prescribing book detailing common doses and interactions. Some respondents in Newcastle commented that the prescribing exam had highlighted areas of weakness and raised their awareness of error and how to minimise error. The helpfulness of others, particularly pharmacists, was stressed at all three sites.

Some respondents considered that more intensive grounding in pharmacology at medical school may have avoided difficulties with prescribing, but the importance of contextual knowledge that comes from experience was also stressed at all sites. Some respondents felt more pharmacology teaching in later years of the course might be helpful, particularly if reinforced in clinical practice. However, it was also felt that prescribing errors were more related to practicalities, such as transcribing, or errors made under time pressure. Several respondents suggested that more practical teaching would have been useful, for example through scenarios to increase applied knowledge.

Although some reported positive experiences, there was strong agreement that learning more about prescribing in an applied setting on the ward as a medical student would have been helpful and increased confidence as a new F1. This could be, for example, with regard to common doses and interactions (particularly warfarin), also prescribing insulin, fluids and infusions, and writing up Kardexes under supervision. Formal teaching was still important to inform this experience.

A2.4 Placement of exams

There were mixed views at all sites concerning the suggestion that exams could be moved to an earlier time in the course to encourage students to focus on the skills needed for F1.

Many Glasgow respondents felt that such a move would be positive, and referred explicitly to the apparent greater preparedness of graduates from Dundee medical school with whom they had worked. They felt that early exams provided more time to shadow an F1 without the distraction of written work with less immediate relevance.

However, others felt that having the exams too early would mean an impetus for learning would be lost, and that some people might feel their time was not being used positively in the final period, with frustration at having completed study, but not being able to practise. One felt that this would mean effectively two years of an F1 job.

Others felt that the structure of the final two years at Glasgow would not lend itself to early exams, meaning the curriculum would need to be reorganised to ensure everyone had sufficient clinical experience to pass clinically-focused exams, with one respondent feeling they had not had enough understanding of medicine to have completed finals in the fourth year. Conversely another felt that the traditional assessment of a final exam sat awkwardly with the ‘progressive’ PBL approach.

Some felt that while the fourth year might be too early in terms of their clinical knowledge and experience of different specialties, six months before the end of the final year would be early enough to give more shadowing, and experience of different specialties, as well as allowing re-sits within a single academic year if required.

In Newcastle some respondents agreed that it would be helpful if exams took place earlier and suggestions were for either at the end of fourth year, the beginning of fifth year or about four to six months earlier than at present. Others disagreed though, and a small number were unsure. Advantages would include the ability to focus on clinical experience without the pressure of exams, and avoidance of the tension some felt between spending time on the ward and revising. Disadvantages could be

knowledge becoming 'rusty' by the beginning of F1, a loss of focus after exams or difficulty maintaining motivation and continuing to gain theoretical knowledge.

In Warwick, some agreed with doing finals earlier but others disagreed because of theirs being a four year course. Those who agreed proposed between one and six months earlier only.

A3 Experience of and development over the F1 Year

A3.1 Time management

There was a consistent feeling that time management had improved during the course of the year, with F1s having better work-life balance, and feeling they had more personal time. Much of this improvement came from simple practice and developing local knowledge: things which might initially take 20 minutes (for example identifying who to contact for a referral, or looking up drug interactions and doses) would only take five.

A3.2 Knowledge of NHS

Knowledge of the NHS was something that respondents felt grew to some extent during F1, from being something they weren't interested in as a student, to something that has to be dealt with on a daily basis to get help and get the job done. However it was felt that knowledge was partial and mostly limited to the operation of the local NHS, within a hospital or between local providers, rather than a view of the NHS nationally. The size of a hospital was identified as making a difference, with a different view within a small hospital, where there may be more local support due to slimmer hierarchies, but there was also more inter-organisational contact necessary as fewer services would be available on-site. The majority of learning was informal, from doing the job, and conversations with colleagues.

Some comments referred to difficulties understanding structures – both the overall management structure and particular hierarchies, such as nurse hierarchies. A comment was also made about the competition for learning opportunities with nurse practitioners, but that these practitioners will not progress beyond that level while the F1s will. The importance of networks was noted – that it is the more junior levels of F1s, F2s and consultants' secretaries who make plans about referrals etc.

Often comments were negative about the NHS, indicating a feeling that management, including senior clinicians, did not appreciate how things operated on the ward, and made assumptions about the level and seniority of staffing available at any one time. Some felt disillusioned with the NHS: one feeling that they were not being developed as a doctor but plugging gaps in service, another that the way the NHS is portrayed does not match up with the reality of how it actually works. Another felt that there was a risk to care at an administrative level, with people 'getting lost' and not being followed up because processes were not in place.

One interesting observation of the language used by the F1s in Scotland was in their use of the terms JHO, SHO, house officer. This may indicate a cultural inertia in the perception of the F1 role, and the risk that it is not seen by seniors and other clinicians as that different from the historical house officer role. Other F1s argued that in the context of ongoing reforms, in particular the Darzi review, knowledge about NHS structures may become obsolete and career prospects of doctors may become more difficult to manage.

A3.3 Experience of different teams/specialties

The majority of respondents had moved around frequently during F1 (some more than others) with each post involving placement in more than one ward or department. There were different views of this frequency of movement, with some feeling that too short a time with a team meant they did not settle in and learn beyond superficial contact, while others felt that experience of lots of teams gave a good overview, seeing more varied clinical presentations, and provided more opportunity to experience good and bad practice, and 'not being stuck' with seniors or a team who may be less effective at teaching and providing educational opportunities. Working with a number of teams also provided greater knowledge of the organisation, and made referrals and other inter-departmental contacts easier later on in the year.

Overall F1 jobs were seen as fairly generic but some felt more prepared for some placements due to a different degree of exposure as a student (e.g. lack of exposure in a core speciality or a strong personal interest in a particular specialty) or the demands and nature of the job (e.g. better preparation for a medical placement vis-à-vis a surgical one or taking over a job which required more experience in their view). Working across several wards was more difficult if it occurred on the first placement and when F1s needed to get to know different ways of working.

Some differences were found between surgery and medicine, but this varied between respondents – many found medicine easier, some surgery. Some found greater responsibility and less support in surgery as seniors would be in theatre, while others found medicine more challenging because patients were sicker and with multiple problems compared to surgical patients. Some reported a focus on medicine in exams, which helped preparation for medical placements. Personal interest in a specialty also affected what respondents got out of a placement, as did the culture of a department – some being positive and enthusiastic, some being more judgmental.

F1s also commented that the order of placements affected how prepared they were for the next placement, arguing that a demanding first placement prepared them well for the next one. Some commented that timing influenced preparedness – feeling more prepared for the last placement than the first (due to cumulative experience), although one F1 felt more prepared for the first placement as there had been an opportunity to shadow the post.

A3.4 Portfolio

There were common criticisms that the learning portfolios was a burden and added stress to the job, despite differences between English and Scottish portfolios. Getting portfolios signed off in a pressurised working environment was difficult and there was a perceived danger that it was being treated like a tick-box exercise by all concerned. With the electronic portfolio used in the Northern Deanery additional problems were identified as staff had to find a computer and time to enter the data after the assessment. The computer system also timed them out if the online form was not completed within a given period. This was not noted in Glasgow, suggesting a difference in the IT infrastructure, but there it was still noted that assessments were not always based on observation, and that towards the end of a placement raters may be 'generically nice'.

The difference between Scottish and English portfolios is also noted in comments from the Glasgow sample talking about the portfolio not as just the assessments, but as the entire Doctors Online Training System (DOTS) used in Scotland which includes online study modules, evidence logs and reflective accounts which were all seen as time-consuming and onerous. While some English respondents mentioned learning plans, the workplace assessments were a focus for them in a way they were not for the Scottish respondents.

A3.5 Stress

The majority of F1s reported that the F1 year had involved stressful periods particularly at the beginning. While some reported several periods, stress was not felt to be chronic, being 'manageable' or even 'enjoyable' as some put it. Particularly stressful were situations such as being on call, working nights, dealing with acutely ill patients, having insufficient support in an understaffed environment or settling into a new placement. One (Warwick) respondent suggested that dealing with stressful scenarios is part of the learning experience, as F1s are always likely to encounter situations where they are less well supported.

Support largely came from peers, although friends and family were mentioned by some, with some talking about a degree of camaraderie and shared experience which encouraged mutual support. Others mentioned a good work-life balance or simply getting on with the job and hoping that things would get better over time. Being supported and working in a good team were also important factors which helped F1s cope with stressful situations. Respondents mentioned in particular the F2s, educational supervisors or nurses to whom they could turn for advice. Ward induction also aided this adjustment for some respondents.

A4 Overall preparedness for the F1 year

F1s reported feeling more confident at the end of each placement and at the end of the F1 year. Preparedness was related to experience on the wards. F1s recognised the contribution of the medical school training in terms of providing a firm underpinning to the practice of medicine, but it was experience that led to confidence. Confidence grew through the year, as did awareness of the role and responsibilities of an F1.

Most of the F1s had experienced times when they felt out of their depth. This was generally associated with less staff support and particularly with working nights, working on-call and when less senior support was available. This was particularly true in dealing with acute care and being the first doctor to deal with a sick patient. Initial decisions on management highlighted an area of particular concern, and one that remained at the end of F1. Some Newcastle F1s reported that having to deal with an acutely ill patient before senior help arrived had implications for patient safety.

While issues such as time management had improved over the year there were instances when the workload itself was too heavy to manage effectively. At the end of the year some F1s were still having problems with workload and working long hours was a source of stress.

Communication skills training had been seen as a strength from all medical schools, but some F1s felt it had not prepared them for the more demanding communications such as dealing with bad news and dealing with poor staff communication and staff conflict.

Medical school was still seen as relevant for F2 and beyond, providing the core of knowledge on which experience gained in F1 was built. Unlike particular approaches to management and treatment which might be superseded, this core knowledge would remain constant.

Where suggestions for improvements to medical school training were referred to, they were similar to those identified and recommended in the earlier report and included: having more clinical exposure, having a clearer role, more supervision of tasks, more time for shadowing and more structured shadowing placements, more structured support with prescribing, more support on the management of acutely ill patients and more guidance on the management of paperwork.

A5 Overall summary

The Executive Summary of the previous report was well received by the majority of respondents who had read it before the interview took place. There was strong support for most of the recommendations, validating our earlier findings. There was one issue where there was no clear consensus: the timing of the final exam. Some welcomed the idea of having more time to focus on practical preparation for the job, whereas others expressed concerns.

The majority of the F1s considered that having increased, or better, exposure to clinical practice would have improved their preparedness to start work. Having a specific role in the team and having some supervised responsibility for patients would have enhanced their experience and would have improved their understanding of the roles and responsibilities of an F1 and their place within the team.

Some of the areas identified as weak at the four month follow-up did improve over the year. These included being able to prioritise work, manage time, manage paperwork and prescribe. However, some challenges still remained; these were to do with managing a heavy workload, and dealing with more challenging communications with relatives and staff.

Different placements and specialties were perceived to have different challenges, with some respondents more prepared for some placements than for others due to a variety of reasons (previous experience, interest, nature of the job).

Any transition from student to practitioner may be accompanied by anxieties and stress. Most respondents reported having experienced some degree of stress at some stage of their F1 year, often in situations where they felt less well supported, for example due to low staffing, high workload or being on call.

Moving into F2, respondents expected that learning and experience gained at medical school would provide a firm basis upon which to build, and some felt that undergraduate learning would be *more* relevant as they took on more responsibility and had to exert great clinical judgment in F2.

Reference

[1] Illing J, *et al. How prepared are medical graduates to begin practice? A comparison of three diverse UK medical schools Final Report for the GMC Education Committee.* General Medical Council/Northern Deanery. April 2008