

Chapter 3: Preparing doctors through medical education and training

Medical education in the UK begins with recruitment to medical school, and continues throughout the doctor's career. One of the first major tests of the education process is when a student emerges from medical school and takes up their first post as a provisionally registered doctor in foundation training. In this chapter we consider how well medical schools are preparing their students for this first step and more generally for a career in medicine.

The GMC sets the standards for undergraduate and postgraduate medical education and training (box 6, page 112), and carries out regular monitoring to check whether medical schools and training organisations (largely hospitals and GP surgeries) are meeting these standards.

The GMC quality assures undergraduate education through its quality improvement framework – for example, through visits, observing exams, annual reports from each school and desk-based audits.

As with other areas of the GMC’s work, we are increasingly using medical education data to understand and inform our work and to help others involved in this field. Data analysis can help identify

areas of excellence, show where standards are not being met, improve quality by identifying where more support is needed, and increase knowledge about risks to patients, particularly when studied alongside data from other organisations.

In this chapter we describe how prepared foundation doctors feel for entering practice and some factors that affect their preparedness. We go on to discuss what happens when a doctor struggles to progress through their training, explore some factors that affect preparedness, and highlight what is being done to improve it. We also look at how well medical schools are preparing their graduates for practice and which specialties their graduates choose.

Definitions

Medical student: an undergraduate student or a graduate entry student at one of the UK’s 33 medical schools.

Foundation doctor: a doctor in foundation training.

- **F1 doctor:** a doctor in the first year of foundation training after graduating from medical school. This doctor is provisionally registered with the GMC.
- **F2 doctor:** a doctor in the second year of foundation training. This doctor is fully registered with the GMC.

Core training: some postgraduate training programmes have this initial period of common training. For example, a doctor may go through core medical training before moving on to more specialist training in geriatric medicine.

Doctor in specialty training: a doctor in an approved postgraduate training programme. Once they complete the programme, the doctor will receive the Certificate of Completion of Training (CCT). The doctor can then apply to join the GP or Specialist Register. Specialty training may include a component of core training before further higher specialty training.

Doctor in training: a doctor who is in foundation or specialty training (including GP training).

BOX 6: GMC standards for medical education

The GMC sets the standards for both undergraduate and postgraduate education. The standards are set out in *Tomorrow's Doctors*³⁷ for undergraduate education and in *The Trainee Doctor*³⁸ for postgraduate medical education (this includes foundation, core and specialty training).

Tomorrow's Doctors includes:

- **the outcomes for graduates:** the knowledge, skills and behaviours that medical students are expected to learn
- **the standards for delivery:** how medical schools must support and assess students.

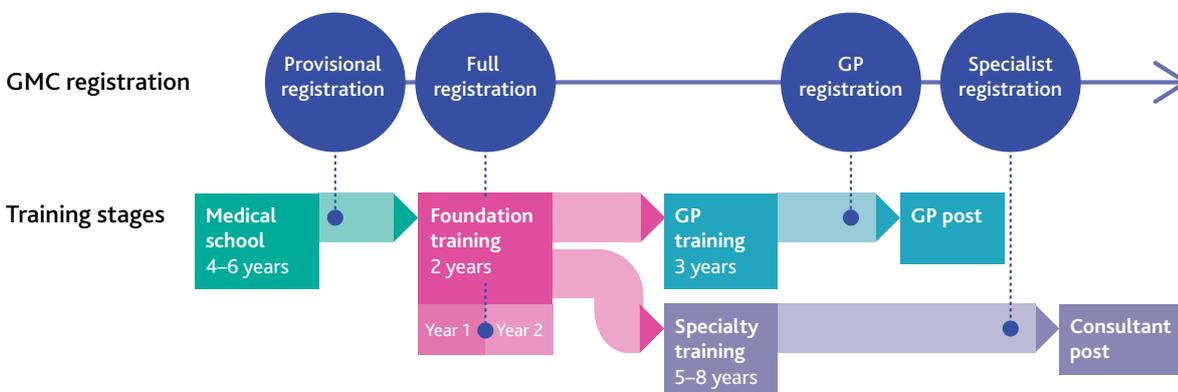
The 2009 edition of *Tomorrow's Doctors* sets out the competences required of graduates in more detail, and places greater emphasis on prescribing and professionalism than previous editions. It also includes more specific requirements about how to assess students, which has led to reforms such as the introduction of student assistantships.

We have just completed a review of the impact of this edition of *Tomorrow's Doctors* to see how well medical graduates are prepared for working as doctors. The findings of the review will be used to revise the outcomes required of graduates.³⁹

At the start of 2014, there were 40,625 medical students, 7,759 F1 doctors, 7,636 F2 doctors, 10,746 doctors training to be GPs and 32,328 doctors training to be specialists.

The stages from medical school through to completion of specialty training are set out in figure 54.

FIGURE 54: The stages of medical education



The national training survey and other sources of data

The GMC operates the largest survey of doctors in training anywhere in the world. The survey is now widely used by those involved in medical education, as well as by healthcare providers, patient safety organisations and other regulators. Completion of the survey is compulsory for doctors in training and the response rate for the 2014 survey was 98%, capturing the views of over 50,000 doctors training in the UK.

Local education providers (LEPs), such as hospitals and GP surgeries, use the findings to improve how they train doctors. The findings also help postgraduate deaneries and local education and training boards (LETBs) manage training programmes, which are usually delivered across several LEPs.

The survey consists of a set of generic questions that test whether doctors think those who provide their training are complying with GMC standards. It also includes programme-specific questions, which are developed in conjunction with medical royal colleges, faculties and the UK Foundation Programme Office (UKFPO), and are designed to test doctors' views of their individual training programmes.

We also gather data from other sources:

- outcomes of the annual review of competence progression (ARCP), which every doctor in specialty and GP training has to undergo
- data and intelligence from the UKFPO, which oversees the Foundation Programme
- feedback of various kinds from those who act as clinical trainers and from employers of doctors in training.

In addition, we receive annual reports from each of the medical royal colleges and from the local bodies that oversee postgraduate training. Our own inspections and checks also produce information and data about the state of medical education.

For our review of *Tomorrow's Doctors*, we also commissioned a rapid review from Cardiff University of recent academic literature on the transition from medical school to practice.⁴⁰ The researchers interviewed 185 doctors, including 34 F1 doctors and 33 F2 doctors; 26 F1 doctors kept audio diaries. As part of this exercise, we also reviewed other evidence.³⁹ The aim was to establish how prepared F1 doctors think they are for their first post, any weaknesses in their work as they take on their new role, how well medical schools are preparing new doctors, and why some struggle to progress.

How prepared do F1 doctors feel?

We know how well prepared F1 doctors – both UK and non-UK graduates – think they are for their first post from their answers to our national training survey in 2014.⁴¹ However, we don't know to what extent their perceptions are affected by the working environment and culture, the level of advice and support from senior doctors, and whether their post is located in the deanery or LETB where they were at medical school, in a hospital they are familiar with, or elsewhere.

In the national training survey, we ask doctors in training to tell us how much they agree or disagree with the statements in table 19% agreed that they were adequately prepared for their first foundation post.* 74% agreed the skills they learnt at medical school set them up well for working as a foundation doctor.

TABLE 18: How much F1 doctors agreed or disagreed with two statements in the national training survey (2014)

SURVEY STATEMENT		Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Don't know
'I was adequately prepared for my first foundation post'	Number of doctors	889	4,387	1,612	618	96	14
	% of doctors	12%	58%	21%	8.1%	1.3%	0.2%
'The skills I learned at medical school set me up well for working as a foundation doctor'	Number of doctors	1,337	4,343	1,319	565	86	6
	% of doctors	18%	57%	17%	7.4%	1.1%	0.1%

* Unless otherwise indicated, all data in this section are from our national training survey, in 2014 or in previous years, and all data are for F1 doctors. 'Agree' is equal to a response of strongly agree or agree, and 'disagree' is equal to a response of disagree or strongly disagree, except where specifically stated.

Some new doctors struggle with increased responsibilities

Tomorrow's Doctors recognises that graduates need to acquire several attributes to practise as a doctor, including good time management, the ability to cope with uncertainty, and good basic clinical skills. The audio diaries of a small sample of F1 doctors in the Cardiff University study⁴⁰ found that these new graduates did experience some difficulties adapting to their new responsibilities – such as time management in a busy care environment.

There are clearly risks to patient safety during the time that doctors in training move into new roles, and particularly when new graduates are introduced to hospital settings. While these issues are being addressed through the development of student assistantships and new arrangements for the induction of F1 doctors, the Cardiff study does suggest there is scope for further improvement. This should be seen in the context of the results from the national training survey, which showed that, six months into their placements in 2014, 69% of F1 doctors agreed that they were adequately prepared, 9.4% disagreed, and 21% neither agreed nor disagreed.

It is against our standards for F1 doctors to be working unsupervised by a senior clinician. We undertook a review in 2012–13 of training in emergency departments, including those training F1 doctors. The review showed departments that had combined services onto one site had a more robust rota, which meant that supervision for doctors in training was

stronger. We also found that a more intensive induction, an increase in 'shop-floor' teaching and use of simulation helped to extend the breadth of knowledge, giving the doctors in training a better educational experience and more confidence when dealing with patients.

Some of the sites paired clinical supervisors with doctors in training who had a similar interest, meaning that the supervisor could engage in detail with one curriculum and focus more effectively on delivering the training required. The doctors in training fed back positively on this. The Academy of Medical Royal Colleges has recommended changes to scheduling work so that foundation doctors get experience during the day, with full staffing, before they go on call on that ward when there may be fewer staff working on site.⁴²

Perception of the quality of clinical supervision appears to have slightly increased

Making sure doctors get practical experience under safe supervision is fundamental to good training. In the national training survey, we ask F1 doctors five questions to measure the quality of clinical supervision.* A high score out of 100 indicates good clinical supervision, whereas a low score indicates that patients and doctors in training could be put at risk. The clinical supervision score has slightly increased over the past three years from 85.18 in 2012 to 85.42 in 2013 and 87.36 in 2014.

* The five questions are: How would you rate the quality of clinical supervision in this post? In this post did you always know who was providing your clinical supervision when you were working? In this post how often, if ever, were you clinically supervised by someone who you felt wasn't competent to do so? In this post how often did you feel forced to cope with clinical problems beyond your competence or experience? In this post how often have you been expected to obtain consent for procedures where you feel you do not understand the proposed interventions and its risks?

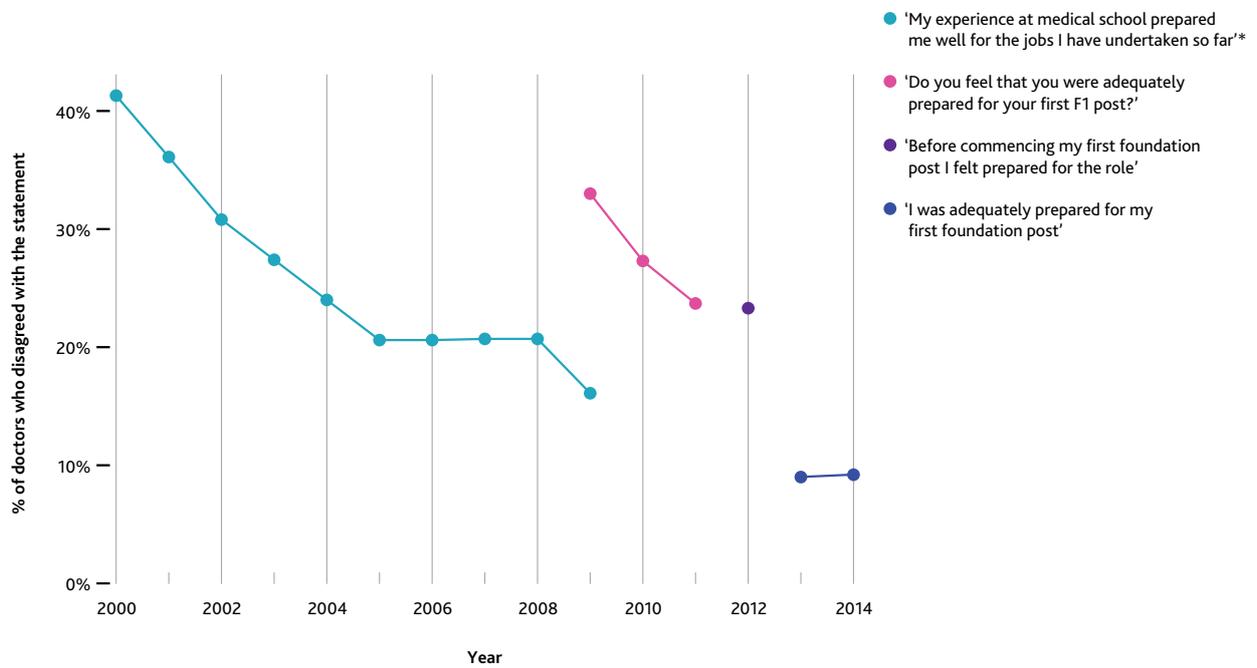
Today's F1 doctors believe they are better prepared than previously

In 1999, just over a third of doctors interviewed a year after graduation agreed they had been well prepared for their first foundation post. By 2002, this had risen to a half of doctors and, by 2005, to almost three-fifths, before falling back to a half in 2009.⁴³

After we published the latest edition of *Tomorrow's Doctors* in 2009 – which was substantially different from its predecessor, setting out clear competences required of medical school graduates and introducing student assistantships – the rise in preparedness appears to continue. The percentage of those disagreeing with the statement 'do you feel that you were adequately prepared for your first foundation post?' declines from 34% in 2009 to 24% in 2011. Due to question changes, it is difficult to ascertain whether perceptions of preparedness have improved further since then.

The proportion of F1 doctors who said they had felt forced to cope with clinical problems beyond their competence or experience monthly, weekly, or daily in their current post decreased from 51% in 2009 to 31% in 2014. Although that proportion may still sound high, inevitably F1 doctors will have to deal with the unexpected. With good follow-up and debrief, these can be valuable learning experiences. The reduction by 20% may indicate, though, that there has been a move to more conservative supervision and training, as well as an actual improvement in preparedness.

The proportion who said they never faced such situations rose from 8% in 2009 to 23% in 2014. Whether this is due to greater preparedness or to change in the way responsibility is given to F1 doctors, it probably does reflect a reduction in the risk posed to patients and it may indicate improved training for these doctors.

FIGURE 55: Trends of F1 doctors disagreeing that they were prepared for their first foundation post

* These data are for F1 doctors from Goldacre and colleagues' study,⁴³ whereas all other data are from the national training survey.

How well are medical schools preparing doctors?

Each of the 33 medical schools in the UK sets the entry grades that students need to get a place at their school, and decides what to include in its undergraduate curriculum and how to teach it, subject to our curricular requirements. Unsurprisingly then, our recent review⁴⁴ found considerable variation in the way medical schools assess students' progress.

On the whole, the review showed medical schools were delivering assessment in line with our standards in *Tomorrow's Doctors*, and we found many examples of good practice that could benefit others. Most medical schools had effective assessment strategies, setting out their approach to assessment and how it fits within the wider curriculum, and showed evidence of reflection and continual review. However, variability does exist and the GMC needs to take steps to better promote best practice, and to develop a better understanding of the causes and consequences of this variation.

Self-perceptions of preparedness vary across medical schools

Across medical schools that had a cohort of doctors completing their full undergraduate medical degree in 2013, 9% of graduates believed they were not adequately prepared for their first foundation post in 2014.* For ten medical schools, at least 10%

of graduates believed they were not adequately prepared once they started work. Five schools had fewer than 5% of doctors who felt unprepared.

Overall, the proportion of graduates who felt adequately prepared varied from 60% to 85% (table 19).

- For five medical schools, at least 80% of graduates felt prepared.
- For seven medical schools, 70–79% of graduates felt prepared.
- For 17 medical schools, 60–70% of graduates felt prepared.

The proportion of graduates who felt they had not obtained the skills needed to set them up for practice varied from 1% to 16% across medical schools. Between 62% and 97% felt they had gained these skills.

* F1 doctors were asked to give one of five answers to the statement 'I was adequately prepared for my first foundation post' – strongly agree, agree, neither agree nor disagree, disagree or strongly disagree.

TABLE 19: Preparedness of F1 doctors by medical school (2014)*

MEDICAL SCHOOL	Number of respondents	% of respondents who agreed with the following statements	
		'I was adequately prepared for my first foundation post'	'The skills I learned at medical school set me up well for working as a foundation doctor'
University of Aberdeen	165	73%	86%
University of Birmingham	408	66%	68%
University of Brighton and University of Sussex	151	69%	81%
University of Bristol	233	64%	73%
University of Cambridge	144	60%	62%
Cardiff University	383	61%	65%
University of Dundee	149	81%	93%
University of East Anglia	147	85%	97%
University of Edinburgh	242	74%	75%
Universities of Exeter and Plymouth	199	84%	93% †
University of Glasgow	263	74%	68%
University of Hull and University of York	143	70%	78%
Imperial College London	366	64%	62%
Keele University	127	83%	95%
Kings College London	364	68%	70%
University of Leeds	264	75%	86%
University of Leicester	236	67%	74%†
University of Liverpool	310	69%	80%
University College London	362	70%	80%
University of Manchester	416	75%	79%
University of Newcastle upon Tyne	345	68%	74%
University of Nottingham	308	69%	64%
University of Oxford	158	82%	84%
Queen Mary, University of London	607	67%	72%†
Queens University of Belfast	240	68%	71%
University of Sheffield	227	68%	63%
University of Southampton	238	63%	67%
St George's, University of London	43	74%	88%
The University of Warwick	165	71%	74%†
Total	7403	70%	74%

* No data are available for Lancaster University or University of Swansea as their first students have not yet graduated, so there are no doctors in foundation training who have a primary medical qualification from these universities.

† There was one fewer respondent for this question.

Doctors who feel less prepared have poorer ARCP outcomes

All doctors in training have a review at least once a year to make sure they are progressing as they should – this is known as the annual review of competence progression (ARCP, box 7). 2013 is the first year that we have these data for F1 doctors as the ARCP was introduced into foundation training in 2012.

F1 doctors who reported they were not adequately prepared for their first post were more likely to receive unsatisfactory ARCP outcomes (figure 56).

- Of those who did not get an unsatisfactory outcome, 70% agreed or strongly agreed that they were adequately prepared for their first foundation post, and only 8.3% disagreed or strongly disagreed.
- Of those who got an unsatisfactory outcome, 49% agreed or strongly agreed that they were adequately prepared, and 25% disagreed or strongly disagreed.

This difference may be larger than the underlying reality. F1 doctors start to gather evidence for their ARCP from the beginning of training, usually in August, but we asked the question in the national training survey in March–May, between seven and nine months later. Their response to the national training survey will be affected by several months of informal feedback from their trainers, and, where this is positive or negative, we might expect their understanding of their own preparedness to be shaped accordingly.

In future, further analysis should be able to verify the validity of the relationship between preparedness and an unsatisfactory ARCP outcome.

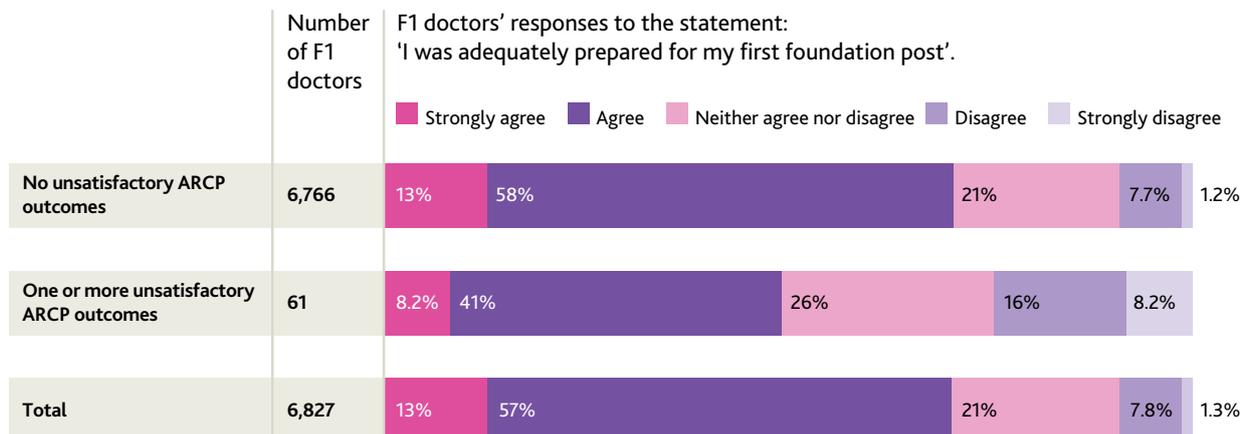
Box 7: How does the ARCP work?

A panel of clinical examiners reviews a doctor's portfolio of evidence about their progression. The review places more emphasis on evidence than on face-to-face meetings between the panel and the doctor in training. Each specialty has its own process that follows the *Gold Guide*,⁴⁵ and the process for foundation doctors follows the *Guide to Foundation Annual Review of Competence Progression (ARCP)*.⁴⁶

The doctor in training does not receive a grade – instead there are a range of outcomes. For example, the doctor may progress to the next stage of training,

having demonstrated all of the competences required for that stage. This is regarded as a satisfactory outcome. Alternatively the doctor may progress to the next stage with some competences outstanding or they may be given extra time at their current stage to demonstrate outstanding competences, both of which are regarded as unsatisfactory outcomes. Finally the doctor could be released from the programme, which is also an unsatisfactory outcome. Some doctors may have several unsatisfactory outcomes during the course of postgraduate training.

FIGURE 56: Relationship between self-reported preparedness in the 2013 national training survey and receiving an unsatisfactory ARCP outcome for the training year from 1 August 2012 to 6 August 2013*[†]



* Agreement with the statement 'I was adequately prepared for my first foundation post' was correlated with receiving no unsatisfactory ARCP outcomes in F1 training ($p < 0.001$ using a Mann-Whitney U test).

† The term 'unsatisfactory ARCP outcomes' refers to outcome 2, 3, 4, 7.2, or 7.3, or, where applicable, to in-training assessment (RITA) outcome D or E. We have not included ARCP outcome 5 'insufficient evidence required'. Further detail on these categories is available at www.gmc-uk.org/education/23861.asp. The data collection notices, other background information, and reporting by deanery or LETB can be found at www.gmc-uk.org/education/arcp.

Employers and trainers are concerned that F1 doctors are not adequately prepared

The average percentage of doctors who feel prepared has increased since 2009, but some trainers and employers* remain concerned about the preparedness of F1 doctors.³⁹

In a 2009 survey of employers, some respondents thought that standards were generally improving, with some excellent foundation doctors, but many respondents felt that foundation doctors were generally not meeting the needs and expectations of the current NHS.⁴⁷ They were concerned about 'confidence and competence in clinical decision making, clinical procedures and prescribing in practical situations, lack of understanding of the NHS and how it works, and standards of professionalism which are below those generally expected of NHS employees'.⁴⁷ This survey was conducted to feed into the review that led to the 2009 edition of *Tomorrow's Doctors*. As a result, the requirements of new graduates were revised and medical schools have developed student assistantships to give all medical students hands-on experience in clinical environments before they graduate.

Nevertheless, in our work to support the independent review of the shape of postgraduate training in 2012–13, we met employers who still had concerns that many new graduates were not fit to take up their foundation posts.⁴⁸ Some observed that F1 doctors often lacked professionalism and essential skills – and some employers claimed that they had to teach F1 doctors basic skills as part of their postgraduate training.

In addition, there is continuing evidence that those who train doctors (usually hospital consultants and senior GPs) remain concerned about aspects of the preparedness of new graduates.^{40, 49} Indeed, a number of surveys have indicated that trainers think graduates are less prepared than the graduates recognise themselves. However, the number of foundation doctors identified as being in difficulty and in need of additional support is relatively small. Out of a total cohort of more than 7,700, foundation schools reported that 193 F1 doctors and 185 F2 doctors needed additional support.⁵⁰

The perceptions of employers and trainers are crucially important and it would be helpful to have more systematic evidence of how they regard new doctors and what they feel needs to be done to continue making improvements to their training. It may be that, from their perspective, a lack of preparedness goes wider than the very small numbers of new graduates who are formally recognised as doctors in difficulty† or who fail to progress in their training in the standard timescale. This indicates the importance of involving and listening to employers and trainers, and moving towards greater alignment in the expectations of new doctors.

* Medical directors and other clinical managers in trusts, health boards and other healthcare providers.

† A doctor in difficulty is a doctor in training who the foundation school, or the LETB or deanery, has identified as having difficulty carrying out their work or progressing as expected and would be likely to benefit from additional support and closer supervision.

Mechanisms to improve preparedness

Students at medical schools must be properly prepared to be able to practise effectively as doctors after graduation. We want to reduce any risks associated with this transition as much as possible.

In the past few years, since the first edition of *Tomorrow's Doctors* in 1993, several mechanisms have been introduced to improve preparedness to practise. These include student assistantships and prescribing safety assessments.

Student assistantships

In the last year of medical school, students have a clinical placement called a student assistantship, where they assist an F1 doctor with defined duties under appropriate supervision. This is intended to be a hands-on learning experience that allows the medical student to gain experience of working within clinical settings and to practise clinical skills.⁵¹ Student assistantships were introduced following the revision of *Tomorrow's Doctors* in 2009 and are increasingly valued.⁵²

Many doctors in training believe the best way to improve undergraduate medical education would be to increase the amount or quality of practical experience.⁵³ Medical students who have a more hands-on assistantship seem to have a smoother transition to working as a doctor.⁴⁰ When asked about how to improve training at medical school, the main suggestion from doctors in training is to increase hands-on experience.⁴¹ In a 2012 study, both doctors in training and their educational supervisors said that the most useful learning opportunities from assistantships were on prescribing, managing acutely unwell patients and prioritising ward tasks.⁴⁰

Prescribing safety assessment

The prescribing safety assessment was run by all UK medical schools in 2014 after a national pilot in 2013. This is a pass or fail assessment of final-year medical students' skills, judgement and supporting knowledge related to prescribing medicines. It was developed by the Medical Schools Council and the British Pharmacological Society, based on the competences outlined in *Tomorrow's Doctors*.

The competences that medical students should achieve include being able to write new and review existing prescriptions, calculate drug doses, identify and avoid adverse drug reactions and medication errors, and tailor prescribing to suit an individual patient's circumstances. The content is relevant to the prescribing tasks expected of an F1 doctor.⁵⁴

Doctors who get into difficulty in their first years of practice

While much effort is put into the medical education of doctors in training by clinical trainers and others, there will always be those who find professional practice more difficult than others.

As we have seen, employers and trainers are concerned that F1 doctors are not always adequately prepared. But, in practice, only a very small proportion of foundation doctors find themselves officially falling below the standards expected of them.³⁹ This is usually caused by health or personal problems, poor attitudes and behaviours, lack of knowledge or skills, or a combination of these.⁵⁵

When a doctor in training is not progressing as expected – as identified by their clinical trainers and supervisors – the UK Foundation Programme Office (UKFPO) *Reference Guide* describes how to identify and support them.⁵⁵ Educational and clinical supervisors are required to keep a close eye on the doctor's work and to provide the necessary support. Of course a doctor in training could find themselves in difficulty at any stage from foundation, through to core and higher specialty training, but here we concentrate on doctors in foundation training.

For a deanery or LETB to have a number of doctors identified as being in difficulty is not necessarily a sign that something is wrong with the training in that area. This may indicate that doctors in difficulty are being identified and supported earlier. Doctors in training who do not get signed off by their agreed end time are a potential source of information on where these doctors might be struggling to cope with personal or professional difficulties during their medical education or training, or it may show where doctors are not being provided sufficient support in their learning.

The proportion of doctors in difficulty is declining

Postgraduate deans reported to the UKFPO that there were 378 foundation doctors in difficulty in 2013 – 2.6% of F1 doctors and 2.4% of F2 doctors.

- 135 were subsequently signed off as fit to continue training by the agreed end date.
- 187 were forced to repeat all or part of the first or second year of foundation training.
- 36 left medicine.
- 20 did not have their outcome reported by the UK Foundation Programme Office.

Overall, the proportion of doctors in difficulty has been declining: in 2010, 4.6% of F1 doctors and 4.2% of F2 doctors were in difficulty. This may suggest that the weakest doctors are becoming better prepared, although we cannot say this with confidence as the numbers may have been affected by local changes. In this climate of financial constraint there are inevitable pressures on programmes to support doctors in training.³⁹

The proportion of doctors in difficulty who had graduated from UK medical schools varied from 0% for some schools up to 2.7% for others, with the number for all UK graduates being 2.2% (table 20). By contrast, the very small number of doctors graduating from medical schools in the European Economic Area (EEA)* were more than twice as likely as any UK graduates to be in difficulty, and the small number of international medical graduates (IMGs)† were between three and four times more likely.

TABLE 20: Doctors in difficulty by place of primary medical qualification (2013)

PLACE OF PRIMARY MEDICAL QUALIFICATION	Number of foundation doctors	% of doctors in difficulty
UK graduates	14,628	2.2%
EEA graduates	335	5.4%
IMGs	432	7.9%

What are foundation doctors unprepared for?

In Monrouxe and colleagues' study,⁴⁰ some F1 doctors felt unprepared for the step change in responsibility, the workload, the degree of multitasking, deciding who and when to ask for help, understanding how the hospital works (which varied by hospital) and dealing with the underperformance of other team members.

Prescribing

In England, adverse events involving medication were the fourth most common type of incident reported during 2008 to the National Patient Safety Agency (80,150 incidents).⁵⁶ Research from the Health & Social Care Information Centre shows the number of prescriptions written per year rose by 385 million between 2002 and 2012, with over a billion prescriptions written in 2012.⁵⁷

GMC staff had 68 requests in 2013 from medical students in England wanting to discuss prescribing with our regional liaison service – this was more than for any other area of practice (figure 57, page 135). This appears to show that some students are taking this topic seriously and want to know more about prescribing.

* EEA graduates are doctors who gained their primary medical qualification in the EEA, but outside the UK, and who are EEA nationals or have European Community rights to be treated as EEA nationals.

† IMGs are doctors who gained their primary medical qualification outside the UK, EEA and Switzerland, and who do not have European Community rights to work in the UK.

The GMC commissioned a study of prescribing errors in general practice (PRACTiCe), which was published in 2012.⁵⁸ This found that one in 20 prescription items contained either a prescribing or a monitoring error, affecting one in eight patients. Although the majority of errors were judged to be of either mild or moderate severity, one in 550 of all prescription items contained an error judged to be severe.

The PRACTiCe study, and a study in secondary care in 2009 (EQUIP),⁵⁹ point to the importance of training and preparedness for prescribing. The EQUIP study found errors in 8.4% of prescriptions by F1 doctors in secondary care, but, of these, fewer than 2% of prescribing errors were potentially lethal. The report stressed that very few prescribing errors caused harm to patients because almost all were intercepted and corrected before reaching them. The intervention of nurses, senior doctors and, in particular, pharmacists was vital in picking up errors before impacting on patients.

Contributing factors to these errors included a lack of training, interruptions and distractions, and a failure to fully use existing IT solutions for safer prescribing.

To make sure doctors understand the standards expected of them, last year we introduced the guidance *Good practice in prescribing and managing medicines and devices*.²⁹ And, as mentioned previously, the Medical Schools Council and the British Pharmacological Society have developed the prescribing safety assessment for all final-year medical students.

Clinical procedures

Trainers have reported concerns about F1 doctors carrying out clinical procedures such as venepuncture, cannulation and arterial blood gas (ABG) tests.⁶⁰ Applicants to the Foundation Programme, when surveyed on the 32 practical procedures listed in *Tomorrow's Doctors* by the UKFPO, most often rated themselves not competent in nutritional assessment, insulin administration and blood transfusion. However, just to keep this in perspective, it is worth noting that in a systematic review of clinical skills in a number of countries across the world, foundation doctors working in England had the lowest deficit of clinical skills experience.⁶¹

Reporting risks to patient safety

Across the UK there has been a strong focus on incident reporting following the Mid Staffordshire inquiry.¹ The Department of Health in England has taken a number of steps,⁶² including the introduction of a duty of candour, subject to parliamentary approval, on all health and social care organisations in England.² The GMC and other health regulators have developed a professional duty of candour, reflecting current requirements on doctors to be open and honest, to report adverse incidents and inform patients whenever harm may have been caused.

NHS England has introduced Patient Safety Collaborative Programmes in a network across the country, bringing together frontline teams, experts, patients, commissioners and others to tackle specific patient safety problems, as well as learning from each other to improve safety.

The Berwick review into patient safety in England recommended that medical education should focus more on how to ensure high-quality care and what to do if patient safety is at risk. The review said this should be an initial and lifelong part of educating all healthcare professionals.⁶³

In its response to the Mid Staffordshire inquiry – *Delivering Safe Care, Compassionate Care* – the Welsh Government laid out its commitment to openness, compassion and delivering patient-centred care.⁶⁴ It also emphasised its expectations of the NHS in Wales to commit to greater transparency, improved communication with staff and patients, and better standards of healthcare.

The Scottish Government said it would examine how the recommendations in the Mid Staffordshire inquiry could be applied in Scotland, such as introducing a duty of candour for health boards.⁶⁵ Scotland already has a patient safety programme, introduced in 2008, which was one of the inquiry's recommendations for England.

Monrouxe and colleagues' literature review⁴⁰ found three studies,^{66,67,68} one of which was large scale,⁶⁶ where the data suggest that doctors in training are unprepared for reporting and dealing with error and safety incidents.

The large-scale study⁶⁶ of healthcare professionals training in nursing, physiotherapy and occupational therapy, as well as doctors, used focus group discussions, observed learning activity, and studied key documents and curricula of doctors. It found the different professional groups defined patient safety differently, and doctors tended to focus on diagnostic errors and high-risk procedures rather than wider issues. It also found that explicit teaching about systems for incident reporting was not common – patient safety was often viewed as an implicit part of the curricula and as an overall outcome of the teaching programme, rather than taught as a distinct area of competency.

Communicating effectively with patients

Many of the 67 F1 and F2 doctors interviewed in Monrouxe and colleagues' study appeared unprepared for many communication challenges, including:

- dealing with angry or upset patients and relatives
- managing complaints
- communicating with patients whose first language was not English
- communicating with vulnerable patients, including those with mental health issues
- breaking bad news
- dealing with more informed patients.

The doctors frequently reported distress during and after the incidents.

As noted above, the Mid Staffordshire inquiry¹ called for more openness and transparency when dealing with patients, and the Department of Health in England is introducing a duty of candour for health and social care providers.⁶⁹ It is clear though that such initiatives may be hindered if new doctors feel unprepared to communicate with patients and their relatives on difficult topics.

Medical schools may be preparing their graduates for different areas of practice

There are wide variations across medical schools in what specialty their graduates train in after they complete their foundation training (table 21). Oxford and Cambridge medical schools have a higher proportion of graduates becoming physicians or surgeons. Other schools produce a higher percentage of GPs.

Table 21 relates to doctors who joined the GP or Specialist Register. Not all doctors join the GP or Specialist Register – 9,020 doctors graduating from a UK medical school had not joined within 13 years of graduating.

TABLE 21: Percentage of UK graduates who became provisionally registered in 1990–2001 and joined the GP or Specialist Register by 16 March 2014*

MEDICAL SCHOOL	GP Register	Specialty group on the Specialist Register†											Not recorded on the GP or Specialist Register	Number of graduates from this school
		Medicine	Surgery	Anaesthetics	Psychiatry	Radiology	Paediatrics	Emergency medicine	Obstetrics and gynaecology	Pathology	Ophthalmology	Other		
University of Aberdeen	38%	10%	7%	6%	4%	2%	2%	2%	1%	2%	1%	1%	24%	1,506
University of Birmingham	41%	11%	8%	9%	5%	3%	4%	2%	1%	1%	1%	1%	15%	1,961
University of Bristol	31%	13%	11%	9%	3%	4%	3%	2%	1%	1%	1%	2%	19%	1,515
University of Cambridge	17%	23%	12%	4%	3%	5%	5%	1%	1%	2%	2%	2%	21%	1,589
University of Dundee	39%	9%	6%	7%	4%	3%	3%	2%	1%	1%	1%	2%	22%	1,428
University of Edinburgh	29%	16%	6%	8%	6%	3%	4%	2%	2%	1%	1%	2%	19%	2,223
University of Glasgow	32%	13%	7%	7%	5%	3%	3%	2%	2%	2%	1%	1%	22%	2,536
University of Leeds	39%	13%	7%	7%	4%	3%	4%	3%	1%	1%	1%	1%	16%	1,860
University of Leicester	43%	10%	6%	6%	3%	3%	3%	2%	2%	1%	1%	1%	20%	1,525
University of Liverpool	41%	11%	7%	5%	5%	2%	2%	3%	2%	1%	0%	1%	18%	1,819
University of London	33%	13%	9%	7%	4%	5%	3%	2%	1%	1%	1%	1%	19%	14,387
University of Manchester	37%	9%	8%	7%	4%	4%	3%	2%	1%	1%	1%	2%	19%	3,181
Newcastle University	38%	15%	7%	7%	4%	2%	3%	3%	1%	0%	1%	2%	16%	1,704
University of Nottingham	33%	13%	8%	8%	3%	4%	5%	1%	2%	1%	1%	1%	19%	1,719
University of Oxford	16%	27%	13%	5%	4%	7%	3%	1%	1%	2%	2%	1%	19%	1,178
Queen's University Belfast	30%	14%	7%	6%	5%	5%	3%	2%	2%	2%	1%	1%	21%	1,748
University of Sheffield	41%	11%	8%	6%	4%	3%	2%	2%	1%	2%	1%	1%	18%	1,848
University of Southampton	37%	13%	6%	7%	4%	3%	3%	2%	1%	1%	2%	1%	20%	1,582
University of Wales	43%	11%	9%	6%	3%	3%	3%	2%	1%	1%	1%	1%	16%	1,829
Total number of graduates	16,259	6,168	3,923	3,227	1,971	1,774	1,487	894	673	566	544	632	9,020	47,138

* We have data for 19 medical schools. Where a medical school split into more than one school between 1990 and 2001, or where a medical school change name, the data are kept in the name of the first medical school. For example, the University of Wales became the University of Cardiff and in this table it is called the University of Wales only.

† Specialties were grouped according to medical royal college in line with the graduate specialty destination tool available on the GMC website at <http://tinyurl.com/necazq3>.

How do the characteristics of foundation doctors affect preparedness and attainment?

Ethnicity affects doctors' attainment from secondary school onwards

When leaving secondary school, white students are less likely to apply to medical school than black and minority ethnic (BME)* students, but they are more likely to get into a medical school, partly due to differences in entry grades.⁷⁰

One study by McManus, Woolf and Dacre⁷¹ looked at the educational background and qualifications of BME medical students studying in the UK. It found that BME students achieved lower GCSE and A-level grades than white students and got lower marks than white students. The same study also found that, on average, BME medical students came from poorer socioeconomic backgrounds, but, even after secondary school results and socioeconomic background were accounted for, BME students underperformed relative to white students at medical school. In Woolf and colleagues' systematic review⁷² of attainment in academic assessments across medical school and postgraduate medical training, 22 of 23 studies showed robust evidence that BME medical students and doctors performed poorly relative to their white counterparts.

The attainment gap between BME and white students in higher education extends beyond medical school: across all subjects, 67% of white students achieve first or upper second class degrees, but only 49% of BME students do (38% of black students).⁷³ This gap can only partly be explained by school performance, but we don't know what causes it.⁷³ This attainment gap has not changed in the past decade, and is present across higher education.⁷³

In a meta-analysis⁷² of undergraduate and postgraduate assessments, researchers compared multiple choice written assessments marked by machines with practical clinical assessments marked by assessors and found similar patterns with BME doctors less likely to progress. The researchers concluded that bias from assessors could not explain the difference in attainment. Several factors may be at play here, such as the impact of students' chosen circles of friends on their academic attainment.⁷⁴ We do not know whether the different grades are caused by the undergraduate experience, or whether teaching and assessment factors affect different ethnic groups.

* BME includes Asian, black, other ethnic groups and mixed ethnic groups.

Graduates aged under 30 feel slightly better prepared than older graduates

Throughout students' and doctors' education there are many factors that relate to their academic performance, and the relationship between factors is often complex. McManus and colleagues found, for example, that female doctors performed better in assessments overall than male doctors, but were less likely to be on the Specialist Register, while BME doctors performed less well than white doctors, but were equally likely to be on the Specialist Register.⁷⁵ This is similar to findings by the Higher Education Funding Council for England, which found that female students tended to achieve first and second class degrees more frequently, while black and Asian students achieved them less, even when accounting for their A-level scores on entry to university.⁷⁶

Place of primary medical qualification is a strong factor for whether F1 doctors felt prepared for their first foundation post. Only 46% of the 100 EEA graduates who responded said they felt prepared in the 2014 national training survey, compared with 80% of 111 IMGs and 74% of 7,399 UK graduates.

We know that male and female F1 doctors report that they felt similarly prepared – for UK graduates 74% of males and 75% of females agreed with the statement 'the skills I learned at medical school set me up well for working as a foundation doctor'.

When broken down by ethnicity, 71% of BME UK graduates who were F1 doctors said that the skills they learned at medical school set them up well for working as a foundation doctor, compared with 76% of their white counterparts.

Age also affects how prepared doctors feel. 75% of UK graduates under 30 years old who were F1 doctors said that the skills they learned at medical school set them up well for working as a foundation doctor, compared with 69% of those aged 30 years and over. A number of these older doctors may have come from graduate entry four-year degree programmes, as we know they have an older age profile. Table 22 shows how age, gender and ethnicity affect whether doctors feel they have the skills they need – we found a very similar pattern when we asked doctors whether they felt adequately prepared for their first foundation post.

TABLE 22: Preparedness of UK graduates doctors by age, gender and ethnicity

Number of doctors and % who agreed with the statement: 'The skills I learned at medical school set me up well for working as a foundation doctor'.

AGE (YEARS)	Male doctors		Female doctors		Total					
	BME	White	BME	White						
<30	72%	956	76%	1,815	71%	1,138	78%	2,636	75%	6,545
30+	74%	62	67%	187	59%	59	70%	238	68%	546
Total	72%	1,108	75%	2,002	71%	1,197	77%	2,874	75%	7,091

Ethnicity and place of primary medical qualification are independent predictors of success in royal college exams

As noted earlier, Woolf and colleagues' systematic review showed that BME ethnicity has a strong correlation with performance in postgraduate assessments.⁷² Research on the Royal Colleges of Physicians, Psychiatrists and General Practitioners postgraduate training exams shows that ethnicity and place of primary medical qualification both affect the likelihood of a doctor passing their specialty or GP training exams.

The Royal College of Physicians found that, in 2002,⁷⁷ UK graduates were more likely to pass (67%) than non-UK graduates (26%), white UK graduates were more likely to pass (73%) than BME UK graduates (56%), and gender did not have a significant effect. More recent research on the exams taken from 2001 to 2011 showed that, while some examiners tend to give higher or lower marks across the board, there is no evidence of partiality by gender, and only one of 29 assessors showed evidence of partiality by ethnicity.⁷⁸

The Royal College of Psychiatrists published data on its membership exams – three written papers and one clinical skills assessment – for 2008–10.⁷⁹ Overall, UK graduates outperformed non-UK graduates, and white doctors outperformed BME doctors, especially in the clinical assessment of skills and competences.

Looking more closely at breakdowns by place of primary medical qualification and ethnicity, graduates from southeast Asia outperformed other groups in the three written papers as a group, but performed poorly in the clinical skills assessment. Chinese doctors outperformed others for the three written papers, with white doctors achieving the highest pass rate in the clinical assessment of skills and competences. Female doctors were more likely to pass than male doctors in all areas of assessment.

In the independent review of the Membership of the Royal College of General Practitioners (MRCGP)⁸⁰ exam, 5,721 doctors took their first clinical skills assessment between November 2010 and December 2012 and had an identifiable ethnicity. Of those, BME non-UK graduates were 15 times more likely to fail than white UK graduates. For UK graduates, BME doctors were four times more likely to fail than white doctors at the first attempt.

This review also showed that ethnicity differences in pass rates were no longer statistically significant for non-UK graduates, if scores for the applied knowledge test, part 2 of the Professional and Linguistic Assessments Board test and the International English Language Testing System exam were taken into account.⁸¹

Implications of our findings

Collating and analysing the wealth of data about medical education are key to making fair and balanced judgements and developing initiatives that recognise the impact on doctors in training and on their patients.

Many medical graduates report not feeling fully prepared, although to some extent moving from academic study into a stretching work environment is inherently difficult to cope with. We are particularly concerned about some aspects of practice such as prescribing, coping in emergency situations, resilience, professionalism and employability.

Our data highlight that medical students leave medical school with variable perceptions of how prepared they are for working as a doctor. Work needs to be done to better understand how medical schools can improve preparedness, and to share best practice between medical schools.

Variation in the performance of doctors in training that is associated with any protected characteristic, including their ethnicity, is concerning and we need to take steps to understand this better.

Medical school graduates vary in their chosen careers as doctors – for example, some schools produce more GPs in training – which raises questions around why these doctors are choosing different specialties, and what medical schools need to do to create the right balance in the future medical workforce.

Tackling these shortcomings will involve addressing the realities of clinical environments and the expectations of employers and trainers, alongside considering the design, delivery, assessment and regulation of undergraduate education. Among the options that have been discussed is the introduction of a national licensing exam.