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Self-reported preparedness for clinical work has increased among recent cohorts of UK-trained first-year doctors

Shelly Lachish, Michael J Goldacre, Trevor Lambert

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UK Medical Careers Research Group, Nuffield Department of Population Health, University of Oxford, Oxford, UK

Correspondence to

Shelly Lachish, Unit of Health-Care Epidemiology, Nuffield Department of Population Health, University of Oxford, Old Road Campus, Old Road, Oxford OX3 7LF, UK; shelly.lachish@dph.ox.ac.uk

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ABSTRACT

Introduction UK medical schools have made considerable efforts to ensure that graduates are well prepared for their first year of clinical work. We report the views of two recent cohorts of UK-trained doctors 1 year after graduation about whether their medical school prepared them well, and compare responses with earlier cohorts.

Methods We surveyed doctors who qualified in 2011 and 2012 from all UK medical schools. We obtained their responses to the statement 'My experience at medical school prepared me well for the jobs I have undertaken so far' on a 5-point scale from 'Strongly Agree' to 'Strongly Disagree'. Responses were compared with those of the UK graduates of 1999, 2000, 2002, 2005, 2008 and 2009, surveyed in the same way 1 year after graduation.

Results The percentage of doctors who either 'Agreed' or 'Strongly Agreed' that they were well prepared doubled from 35% in 1999 to 70% in 2012, while the percentage who 'Strongly Agreed' with the statement increased fourfold. Perceptions of being well prepared have increased in graduates from almost every medical school. Variation between medical schools in self-reported preparedness of their graduates has decreased in recent cohorts. However, some large differences between medical schools remain. Significant differences in perceived preparedness remain between white and non-white doctors, but have diminished between men and women.

Conclusions Our work contributes to growing evidence suggesting that changes to medical education in the UK are producing doctors who feel well prepared for the challenges of being a doctor, though further improvements could be made.

INTRODUCTION

The primary tasks of medical schools are to provide students with a firm basis for the development of a working lifetime in medical practice and to ensure that their graduates are well equipped with the necessary knowledge and skills for the first stage of their professional career as junior doctors. Numerous studies, however, have shown that medical graduates often feel ill-prepared for the demands of their new job.^{1–4} In the first 2 years of clinical practice (termed the foundation years in the UK), foundation doctors work under the close supervision of more senior doctors. Nevertheless, many graduates find the transition from student to junior doctor to be highly stressful.^{5 6}

Consequently, medical education and training has undergone extensive reforms in many countries

in recent years. Over the past 15 years, UK medical schools have restructured clinical courses to better deliver the directives for learning and competencies outlined in the General Medical Council's (GMC) 'Tomorrow's Doctors' reports.^{7 8} Changes have included scenario-based and problem-based approaches as well as traditional lecture-style courses and bedside teaching; the use of 'student-led' learning under appropriate supervision; a focus on teaching core curricula to small groups of students; and the integration of clinical and non-clinical learning across disciplines.⁹ In recent years, the GMC has further updated its standards for excellence in medical education.^{10 11} In particular, the most recent update of *Tomorrow's Doctors* places considerable emphasis on clinical assistantships and 'shadowing' (students working closely alongside qualified doctors undertaking their routine clinical duties) in the final year of medical school.¹⁰ Accordingly, medical schools have continued to modify and adapt their curricula and educational programmes to meet these standards.¹²

One means of assessing whether such changes undertaken by medical schools are succeeding in their task of producing better-equipped graduates is to seek the views of the graduates themselves regarding whether their medical school prepared them well for work. In our previous research on medical careers, we reported a moderate, but variable, increase in self-assessed preparedness for work from 1999 to 2009 expressed by junior doctors towards the end of their first postgraduate year and also showed persistent and sizeable differences between medical schools and demographic subgroups.^{2 13–15}

In this study, we update our previous findings on self-reported preparedness in junior doctors with data obtained from the graduates of 2011 and 2012, to evaluate the extent to which continuing reform of medical education is associated with improvements in self-reported preparedness for practice.

METHODS

We contacted graduates from all UK medical schools towards the end of their first foundation year of postgraduate training (the F1 year) via addresses obtained from GMC registrations. Registration with the GMC is mandatory in order to practise medicine in the UK. Graduates of 2012 were sent questionnaires by mail in mid-2013 and were also contacted by email with the option to complete a web-based version of the survey. Up to



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four reminders were sent to non-respondents. Graduates of 2011 were surveyed a year earlier in mid-2012 via a trial 'web-only' approach and were only contacted via email and invited to complete the web-based survey.

Our surveys were multipurpose and included questions about future career intentions and factors affecting them, experiences of the F1 year and views on training and work. Among other themes, we invited doctors to respond to the statement "My experience at medical school prepared me well for the jobs I have undertaken so far" on a five-point scale from 'Strongly Agree' to 'Strongly Disagree'. Those who did not 'Strongly Agree' or 'Agree' to the statement were asked to indicate whether 'lack of preparation was a serious, medium-sized, or minor problem' for them, and to indicate in which of five areas of work they felt unprepared ('clinical knowledge', 'clinical procedures', 'administrative tasks', 'interpersonal skills', 'physical/emotional/mental demands'). Some respondents who had agreed with the preparedness statement overall, nevertheless, indicated that they did not feel well prepared in one or more of the areas and their replies were also included in our analyses.

For some of the analyses, binary variables were constructed by combining (a) those who 'Strongly Agreed/Agreed' (which we refer to as 'Agreed') versus all other responses combined and (b) those who 'Strongly Disagreed/Disagreed' ('Disagreed') versus all other responses combined. We used non-parametric tests (χ^2 tests, Mantel-Haenszel χ^2 tests for a linear trend, Spearman's rank correlations) and binary logistic regression to (a) explore trends in the data; (b) assess variation between doctors who graduated from different medical schools, between men and women, and between ethnic white doctors and non-white doctors; and (c) compare the responses of the graduates of 2011 and 2012 with those of six previous cohorts: the qualifiers of 2008 and 2009 (and ref. 13 as published in ref. 15) and 1999, 2000, 2002 and 2005 cohorts (as published in ref. 14). The questionnaires sent to graduates of the 1999 and 2000 cohorts only contained the main question of preparedness and not the two subsidiary questions. The cohorts of 2008 and 2009 included graduates from five new medical schools not present in earlier cohorts, and the 2012 cohort included graduates from one additional new school. Since multiple analyses were performed on the same dataset, we deemed differences to be significant at $p \leq 0.01$.

RESULTS

Excluding graduates who were deceased, declined to participate, were untraceable, or responded to a short version of the questionnaire that did not contain the preparedness question, the overall response rate was 45% (2324/5171) for the 2012 cohort who were contacted by post and email, and 15% (1000/5615) for the 2011 cohort who were contacted by email alone. The response rate for the 2012 cohort is similar to the 46% obtained for the 2008 cohort and the 44% obtained for the 2009 cohort.^{14 15}

Increased sense of preparedness over time

More than two-thirds of respondents from both the 2011 and 2012 cohorts 'Agreed' that medical school had prepared them well for work (2011: 68% (95% CI 64.6% to 70.5%); 2012: 70% (68.4% to 72.2%)). There was no statistically significant difference between the 2011 and 2012 cohorts in the percentage that 'Agreed' ($\chi^2=2.3$, $df=1$, $p=0.13$) or 'Disagreed' ($\chi^2=4.9$, $df=1$, $p=0.03$) that they were well prepared; however, the percentage that 'Strongly Agreed' that they were well prepared was greater in the 2012 cohort

(24%) than in the 2011 cohort (15%; $\chi^2=25.9$, $df=1$, $p<0.001$).

There was a marked increase, over time, in self-reported preparedness for work among medical graduates from 1999 to 2012 (figure 1). Across the eight cohorts surveyed, the percentage of doctors who 'Agreed' that they were well prepared for work doubled from 35% in 1999 to 70% in 2012 ($\chi^2=512.5$, $df=1$, $p<0.001$), while the percentage who 'Disagreed' with this statement declined from 43% in 1999 to 14% in 2012 (χ^2 trend=512.5, $df=1$, $p<0.001$). Almost a quarter of the graduates of 2012 (24%; 553/2308) 'Strongly Agreed' that their experiences at medical school had prepared them well for work compared with just 4% (95/2383) of the graduates of 1999 (figure 1).

Differences in preparedness by medical school, sex and ethnicity

We compare the responses of the 2011/2012 cohorts combined with those of the 2008/2009 cohorts combined and the earlier cohorts combined. Although doctors in the 2011/2012 cohorts felt far more prepared overall than had graduates of earlier cohorts, there remained large variation between medical schools in the percentage who 'Agreed' that their medical school had prepared them well for work ($\chi^2=213.18$, $df=27$, $p<0.001$; figure 2). Controlling for the possible confounding effects of sex and ethnicity with binary logistic regression did not diminish the significance of medical school as a predictor of the proportion of doctors who 'Agreed' that they were well prepared (Wald's statistic=117.0, $df=27$, $p<0.001$).

The percentage of 2011/2012 respondents who 'Agreed' that they were well prepared varied by 44% across the 29 medical schools (from 53% to 97%; figure 2). This was a narrower range than reported for earlier cohorts: there was a 55% difference in the 2008/2009 cohorts¹⁵ and 52% difference for the earlier cohorts.¹⁴ Preparedness among graduates increased (compared with previous cohorts) across almost all medical schools, substantially in some, and did not decrease appreciably at any school (figure 2).

There was very strong agreement between the ranks of medical schools in the 2008/2009 and 2011/2012 cohorts (ranked by the proportion of doctors agreeing that they were well prepared and comparing with data from 15; Spearman's $r=0.65$, $p<0.001$), but weaker agreement between rankings of schools in 2011/2012 and those prior to 2008/2009 (comparing with data from 14; Spearman's $r=0.47$, $p=0.02$). The newest medical school was ranked highest among the graduates of 2011/2012 (figure 2).

Perceptions of preparedness did not differ statistically between men and women in the 2011/2012 cohorts, and differences in the earlier cohorts, though significant in the 2008/2009s, were modest (table 1). In the 2011/2012 cohorts, as in previous cohorts, white doctors were more likely than non-white doctors to 'Agree' that they felt well prepared for work, but were not more likely to 'Disagree' (table 1).

Extent to which feeling unprepared was a problem

Among the graduates of 2011/2012, lack of preparedness was scored as having been a serious problem by 1.4% of all respondents, and a medium-sized problem by a further 16.5% of respondents (table 2). These values are lower than those reported previously (table 2).

Merging the serious and medium-sized response categories to form a binary variable, we found that, unlike in earlier cohorts,¹⁴ there were no significant differences in this respect

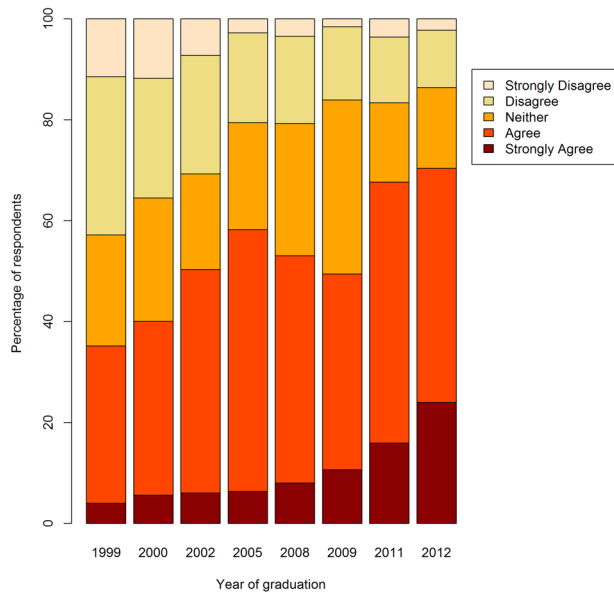


Figure 1 Percentages of doctors in each cohort responding to the statement 'My experience at medical school prepared me well for the jobs I have undertaken so far' on a five-point scale from 'Strongly Agree' to 'Strongly Disagree'.

in the responses of men and women ($\chi^2=1.46$, $df=1$, $p=0.23$), or white and non-white doctors ($\chi^2=0.04$, $df=1$, $p=0.84$).

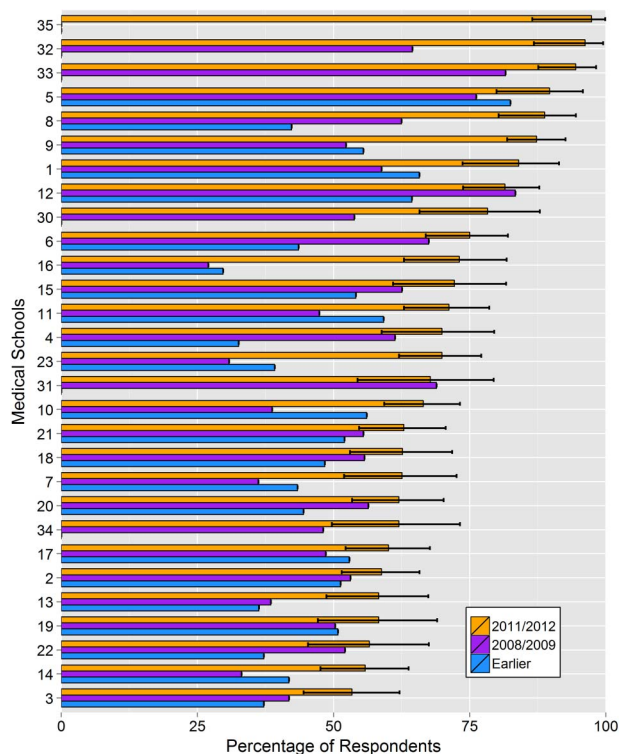


Figure 2 Percentage of first-year doctors from each UK medical school who 'Agreed' that their medical school had prepared them well for work. Medical schools are coded by numbers that correspond to the numbers used in ref. 15. Responses are shown for graduates of 2011/2012, 2008/2009 and earlier cohorts (1999/2000/2002/2005) combined. Some recently formed medical schools do not appear in older cohorts. To avoid visual clutter, 95% CIs are not shown for the earlier cohorts but can be found in refs. 14 and 15.

Areas of work in which doctors felt unprepared

Doctors were also asked to indicate in which, if any, of five areas of work they felt unprepared. Results for the 2011/2012 cohorts were broadly comparable to those obtained for previous cohorts (table 2). As in previous cohorts, the area of work for which most graduates felt unprepared was 'Administrative Tasks', while few graduates felt unprepared for the 'Interpersonal Skills' required for their work (table 2). As in previous cohorts, there was considerable variation between medical schools in the percentage of the 2011/2012 graduates who indicated areas of work for which they felt unprepared (see online supplementary figure S1). Compared with graduates of 2008/2009 and the earlier cohorts, differences in the percentage of men and women and white and non-white doctors specifying particular areas of work as problematic were far more marginal in the 2011/2012 cohorts (table 3).

DISCUSSION

Using surveys of eight cohorts of graduate doctors spanning 13 years, we show a marked increase in self-reported preparedness for practice among recent cohorts. We found that the percentage of doctors who agreed that their medical school had prepared them well for clinical work doubled from 1999 to 2012, while the percentage who strongly agreed with this statement increased fourfold. In addition, we found that fewer graduates in the 2011/2012 cohorts considered their lack of preparedness to be a serious or medium-size problem. Our finding that 70% of the graduates of 2012 agreed that they were well prepared corresponds very closely to the GMC's recent findings into preparedness for practice (69.9% of F1 graduates of 2014 agreed or strongly agreed that they were 'adequately prepared for their first Foundation post').¹⁶

An important result from this study was that self-reported preparedness for work among the graduates of 2011/2012 increased across almost all UK medical schools. This indicates that the overall increase in preparedness of graduates we observed was a nationwide phenomenon and not just driven by a subset of graduates from a few schools. While this is an encouraging result for medical educators in the UK, we cannot confirm from this study whether this near-universal improvement is a result of ongoing changes to clinical courses, to some other aspect of undergraduate or postgraduate training,^{17 18} or even to differences in the characteristics of recent graduates.¹⁹ Previous studies have reported that integrated learning programmes and those that offer greater opportunities to experience practical clinical work can facilitate the acquisition of core medical skills and knowledge by medical students.^{20–22} In addition, more structured induction processes, particularly those involving shadowing, have also been shown to improve clinical skills, competence and preparedness among new doctors.²³ The results of our study support these previous findings by indicating that such changes to medical education and more comprehensive induction programmes in the UK are probably among the key factors in alleviating some of the apprehensions regarding preparedness for work felt by junior doctors. Our results are also consistent with other studies that have reported that recent qualifiers feel better prepared than those in the past.²⁴

Almost all the graduates (97%) from the top-ranked medical school, in this respect, agreed that they were well prepared for clinical work compared with just half of the graduates (53%) from the lowest-ranked school. Given that many factors beyond curriculum and policy contribute to the learning environment, it may be unreasonable to expect 'no variation' among medical

Table 1 Percentages of doctors who agreed, and who disagreed, that "My experience at medical school prepared me well for the jobs I have undertaken so far" by sex and ethnicity‡

	'My experience at medical school prepared me well'					
	% Agreed			% Disagreed		
	2011/2012	2008/2009	1999/2000/2002/2005	2011/2012	2008/2009	1999/2000/2002/2005
Men	71.4	54.1*	48.8	14.8	16.7	29.5
Women	68.4	50.0	47.9	14.4	19.6	31.6
White	72.4†	53.6†	49.3†	13.1	18.0*	30.9
Non-white	64.1	44.2	45.3	14.9	20.6	30.7

Percentages are compared between the graduates of 2011/2012 combined, 2008/2009 combined and of 1999/2000/2002/2005 combined.

* $p < 0.01$.

† $p < 0.001$ for comparisons within table cells.

‡For the 2011/2012 cohorts: $N_{\text{men}}=1218$, $N_{\text{women}}=2081$, $N_{\text{white}}=1703$, $N_{\text{non-white}}=569$. Denominators for 2008/2009 cohorts are given in ref. 13 and for earlier cohorts are given in ref. 14.

schools.²⁵ Nevertheless, our finding that the disparity among different medical schools has lessened in the 2011/2012 cohorts compared with previous cohorts^{14 15} indicates that it should be possible to narrow this gap further. The percentage of UK medical graduates who reported feeling well prepared for clinical work falls short of that achieved in Denmark (83% of graduates reported feeling prepared for work).²⁶ This, too, indicates scope for further improvement in the UK.

We report in this study that differences in the responses by sex and ethnicity in the 2011/2012 cohorts were more marginal than those found among earlier cohorts.^{13 14} In contrast to our previous studies, we found no significant differences between men and women of the 2011/2012 cohorts in overall preparedness, in the extent to which lack of preparedness was a problem, or in the types of tasks that they considered to be problematic. Unlike previous cohorts, white and non-white doctors in the 2011/2012 cohorts did not differ in the extent to which they perceived lack of preparedness to be a problem, or in the types of tasks they found problematic (with the exception of physical/

emotional/mental demands; refs. 13, 14). It seems plausible that moves towards project-based, focused learning in smaller groups may have benefitted some women and ethnic minority students through the greater degree of 'inclusivity' that such teaching methods afford individual students.²⁷ Elsewhere, we have discussed at length the implications and possible causes of differences in perceived preparedness for work comparing ethnic groups.¹³ The fact that differences have persisted despite greater overall preparedness among recent graduates should be investigated further.

This study covers the views of a very large number of junior doctors from all medical schools in the UK in cohorts that span a 13-year period. Our surveys are conducted independent of any organisation that employs, trains or influences the doctors' careers. We therefore believe that we get honest answers from respondents. Nevertheless, there are certain limitations to our study. We present analyses of self-reported preparedness for work among newly qualified doctors, which may or may not correlate with independent assessments of their clinical competency.²⁸ It is possible that self-reported preparedness might reflect, at least in part, respondents' confidence (or lack of it) or self-awareness rather than actual levels of 'preparedness'. Comparing independent tests of doctors' abilities with their self-reported responses could distinguish between these possibilities and may be a fruitful area for further research.

As with all voluntary surveys, our results may be susceptible to non-respondent bias. Considering this, we compared the responses of those who replied early (to the first or second survey mailing) with those who replied late (to one of the subsequent mailings, and who would have been non-responders had we not persevered with follow-up mailings). There was no significant difference in percentages that agreed that they were prepared for work (respectively, 70.3% c.f. 68.9%, as was found in our previous studies).^{13 15} Hence, non-respondent bias is not likely to be a major problem. It is worth noting that we obtained a low response rate for our 'email only' survey of the graduates of 2011 and thus hard-copy post remains an essential part of our survey method.

Ensuring that graduates are well prepared for clinical practice is a key factor in facilitating a smooth transition from student to new doctor. We have shown that self-reported preparedness among recent graduates is higher than at any other time in the past 13 years. Thus, our work contributes to a growing body of evidence suggesting that recent reforms to medical education in the UK are helping to produce doctors who feel 'prepared' for the challenges of being a doctor. Focused studies of particular

Table 2 Percentages of all respondents who specified (a) that lack of preparedness was a serious, medium-sized or minor problem for them, and (b) that they felt unprepared in each area of work: average across medical schools*

	Graduating cohorts		
	2011/2012	2008/2009	1999/2000/2002/2005
Extent of problem			
Serious	1.4	2.7	1.7
Medium	16.5	22.5	17.9
Minor	29.1	28.1	20.2
Areas of work			
Clinical knowledge	10.8	17.4	11.7
Clinical procedures	15.4	21.2	20.5
Administrative tasks	23.9	31.6	22.0
Interpersonal skills	3.0	2.7	1.5
Physical/emotional/mental demands	17.4	26.2	15.8

Responses are shown for graduates of 2011/2012 combined, 2008/2009 combined and 1999/2000/2002/2005 combined.

*The denominator in all cases is all respondents: 3324 for the graduates of 2011/2012, 5410 for the graduates of 2008/2009 and 9025 for the earlier cohorts (data for 2008/2009 are adapted from Svirko *et al*¹³ and for the earlier cohorts from Goldacre *et al*¹⁴).

Table 3 Differences by sex and ethnicity in the percentage of doctors who felt unprepared in each of five areas of work (graduates of 2011/2012 combined; N=3324)

	Clinical knowledge	Clinical procedures	Administrative tasks	Interpersonal skills	Physical/emotional/mental demands
Men	12.6	18.6 ^(a,b)	33.1 ^(a,b)	4.3	20.0 ^(a,b)
Women	15.6	21.2	28.5	4.2	24.3
White	8.8	13.5 ^(a)	20.1 ^(a)	2.6 ^(a,b)	13.5 ^{†(a,b)}
Non-white	11.2	14.9	24.9	4.6	21.5 [†]

†Indicates $p < 0.01$ for comparisons within table cells. Superscripts in brackets indicate that comparisons between these subgroups were statistically significant ($p < 0.01$) in previous cohorts: (a) the 2008/2009 cohorts¹³ and (b) the earlier cohorts (ie, 1999/2000/2002/2005).^{14,15}

elements of learning and training could help identify methods for further improving 'preparedness' in first-year doctors. Seeking advice and input, systematically, from students, junior doctors and senior doctors may also help identify ways of improving the extent to which newly qualified doctors feel well prepared for work.

Main messages

- ▶ Recent graduates of UK medical schools feel better prepared for clinical work than did their predecessors.
- ▶ The increase in perceptions of preparedness among graduates has occurred across almost all medical schools and constitutes nationwide progress, suggesting that medical education reforms are succeeding in producing better-prepared doctors.
- ▶ Despite improvement in overall preparedness, considerable differences remain between the graduates of different medical schools.

Current research questions

- ▶ Which particular elements of learning and training can now be enhanced to further improve 'preparedness' in junior doctors?
- ▶ Will the compulsory period of 'shadowing', introduced for all medical students in 2014, improve views about preparedness among junior doctors?
- ▶ Can differences in practice be identified between medical schools whose graduates feel that they are well prepared for work and those whose graduates feel on average less well prepared?
- ▶ What are the underlying reasons for the relatively small but persistent ethnic differences in perceived preparedness?

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