

## PEER REVIEW HISTORY

BMJ Open publishes all reviews undertaken for accepted manuscripts. Reviewers are asked to complete a checklist review form (<http://bmjopen.bmj.com/site/about/resources/checklist.pdf>) and are provided with free text boxes to elaborate on their assessment. These free text comments are reproduced below.

### ARTICLE DETAILS

<b>TITLE (PROVISIONAL)</b>	How prepared are UK medical graduates for practice? A rapid review of the literature 2009-2014
<b>AUTHORS</b>	Monrouxe, Lynn V; Grundy, Lisa; Mann, Mala; John, Zoe; Panagoulas, Eleni; Bullock, Alison; Mattick, Karen

### VERSION 1 - REVIEW

<b>REVIEWER</b>	Dr Vicky Tallentire NHS Lothian and University of Edinburgh Scotland, UK
<b>REVIEW RETURNED</b>	15-Aug-2016

<b>GENERAL COMMENTS</b>	<p>A well-written and informative review, which answers many of the current questions around preparedness for practice.</p> <p>It should be noted that FY1 doctors would never (anywhere in the UK) be expected to insert central lines or chest drains – and I wonder if this should be removed from the manuscript as it leaves any clinical reader with a feeling that the authors are somewhat detached from the UK clinical workplace.</p> <p>In terms of the discussion, it might be worth mentioning the development of pre-prescribing, a preparedness intervention that has been shown to address many of the complex issues of preparedness in prescribing (see Smith SE et al., Pre-Prescribing: A safe way to learn at work? <i>The Clinical Teacher</i> 2012; 9: 45-9 and Smith SE et al., The effects of contributing to patient care on medical students' workplace learning. <i>Medical Education</i> 2013; 47(12): 1184-96).</p>
-------------------------	---

<b>REVIEWER</b>	Louella Vaughan Northwest London CLAHRC United Kingdom
<b>REVIEW RETURNED</b>	23-Sep-2016

<b>GENERAL COMMENTS</b>	<p>Well written and very useful paper!</p> <p>A number of minor things that need reconsideration prior to publication:</p> <ol style="list-style-type: none"><li>1. There is an uncritical assumption that the GMC is wholly correct in its stance on medical education. This paper also represented an opportunity to explore those areas which emerge as being important to both junior and senior doctors that the GMC overlooks and to point to areas which the GMC might wish in future to reconsider, based on emerging evidence. A prime of example of this is</li></ol>
-------------------------	---

	<p>shadowing. While the evidence supports shadowing, 'Tomorrow's Doctors' is explicit that medical students should be observers only on the ward and not involved in the 'business' of being a doctor.</p> <p>2. On the topic of shadowing, the article narrowly defines shadowing as the four days prior to starting work in the UK. Shadowing, in fact, refers to a whole range of activities, which range from simple observation to what is described elsewhere in the article as 'assistantship'. It should also be noted that most studies on shadowing the UK date from before the introduction of paid shadowing and therefore the definition given is wholly inaccurate. As the evidence for shadowing/assistantships is probably firmer than for most other aspects of junior doctor preparedness, it is critical that this is properly defined and explored.</p> <p>3. The statement 'Finally, a prolonged shadowing period can be ineffectual due to repetitive tasks undertaken with little opportunity for new learning' was not a conclusion of the Dornan study, which in any case dealt only with prescribing and NOT with shadowing as a whole. Please remove or modify this statement.</p> <p>4. The study makes much of CVL insertion and chest drain insertion. While exposure of junior doctors to these procedures in their first year is desirable, these could not be considered to be core competencies at FY1 level. They sit much more at CMT/ST level. It should not be a take home message that FY1s need to put central lines in!</p> <p>5. In the discussion, the issue of what type of curriculum best prepares the student needs to be more thoughtful. It is baldly stated that non-traditional schools better prepare students, but not 'for what', as preparedness (as demonstrated by the article) is multi-faceted. Moreover, newer/non-traditional medical schools are likely to be more interested in demonstrating their worth and therefore invest in studying outcomes (while Oxbridge is unlikely to care about this). With graduate students, there is also the issue of to what extent their previous careers have contributed to preparedness, as opposed to medical school. There was also no mention of the fact that there is some evidence that doctors who attended traditional medical schools do better with certain issues such as prescribing and decisions around management. This is a critical point and needs to be nuanced better. I am afraid that the evidence presented does NOT support the implicit contention that non-traditional medical schools are better!</p> <p>6. The study also neglects the fact that there is longitudinal data in the UK for preparedness. Goldacre (2012) is mentioned as part of the review, but not considered in discussion.</p>
--	---

### VERSION 1 – AUTHOR RESPONSE

Reviewer: 1

It should be noted that FY1 doctors would never (anywhere in the UK) be expected to insert central lines or chest drains – and I wonder if this should be removed from the manuscript as it leaves any clinical reader with a feeling that the authors are somewhat detached from the UK clinical workplace.

Reviewer: 2

4. The study makes much of CVL insertion and chest drain insertion. While exposure of junior doctors to these procedures in their first year is desirable, these could not be considered to be core competencies at FY1 level. They sit much more at CMT/ST level. It should not be a take home message that FY1s need to put central lines in!

Our Response

Thank you for these comments, which we fully take onboard.

Firstly, however, we would like to stress that at no point do we actually have the “take home message that FY1s need to put central lines in”. Moreover, we wholeheartedly agree that CVL and chest insertions are not within the GMC’s outcomes for graduates (despite research including them in the list of preparedness items). In fact, we already say as much in the results section (Page 12); they are in the 11 additional items in the Table. However, we cited chest drain only here (although CVLs are clearly in the Table as non-GMC items). To ensure that readers are quite clear about this issue we have now added central lines explicitly to this caveat on Page 12. Furthermore, we have added a second caveat on Page 18 as follows:

“However, it must be noted that some of these aspects do not fall within the GMCs outcomes for graduates (e.g. central venous line and chest drain insertion) and this must be taken into account when assessing overall preparedness.”

Finally, we have added the following caveat to our Strengths and Limitations section:

“Indeed, this is not a black and white issue: for example, whilst the list of procedures was current when the study was planned, there are some procedures that junior doctors are no longer expected to undertake and the context of healthcare (e.g. team structure, digital systems) is changing fast, so preparedness for practice will be an ever changing construct.”

---

Reviewer: 1

In terms of the discussion, it might be worth mentioning the development of pre-prescribing, a preparedness intervention that has been shown to address many of the complex issues of preparedness in prescribing (see Smith SE et al., Pre-Prescribing: A safe way to learn at work? The Clinical Teacher 2012; 9: 45-9 and Smith SE et al., The effects of contributing to patient care on medical students’ workplace learning. Medical Education 2013; 47(12): 1184-96).

Our Response

Thank you for highlighting these studies. We have added the following statement to the section on transition interventions on Page 20:

“Indeed, preliminary data from two studies (n=12 & n=33) around the benefits and challenges of students’ proactive participation in prescribing in the workplace through the novel intervention of pre-prescribing – in which students make prescribing judgements under supervision – suggests a potential way forward for this specific aspect of preparedness.<sup>96 97</sup>”

---

Reviewer: 2

A number of minor things that need reconsideration prior to publication:

1. There is an uncritical assumption that the GMC is wholly correct in its stance on medical education. This paper also represented an opportunity to explore those areas which emerge as being important to both junior and senior doctors that the GMC overlooks and to point to areas which the GMC might wish in future to reconsider, based on emerging evidence. A prime of example of this is shadowing. While the evidence supports shadowing, 'Tomorrow's Doctors' is explicit that medical students should be observers only on the ward and not involved in the 'business' of being a doctor.

2. On the topic of shadowing, the article narrowly defines shadowing as the four days prior to starting work in the UK. Shadowing, in fact, refers to a whole range of activities, which range from simple observation to what is described elsewhere in the article as 'assistantship'. It should also be noted that

most studies on shadowing the UK date from before the introduction of paid shadowing and therefore the definition given is wholly inaccurate. As the evidence for shadowing/assistantships is probably firmer than for most other aspects of junior doctor preparedness, it is critical that this is properly defined and explored.

#### Our Response

We respectfully disagree with some of Reviewer 2's assertions around the uncritical assumption that the GMC is wholly correct in its assumptions on medical education and the definitions of assistantships and shadowing. Given that it is the GMC who are the governing body responsible for the education and practice of medical students, trainees and doctors in the UK and as such are responsible for standard setting – we believe that it is wholly legitimate that we structure our review around the defined outcomes for graduates and that we use the GMCs' definitions for the terms 'assistantship' and 'shadowing'. Further, we do specify where research does not map directly onto the GMCs outcomes and therefore comprise an add-on to this viewpoint.

However, we fully take on board the reviewers' comments regarding the fact that the "compulsory 4-day paid period immediately prior to becoming a junior doctor in which they are able to become familiar with future working environments and expectations" only came into force in 2012 and that many of the studies in our data pre-date this. We have now revisited the studies with this in mind and have amended this section accordingly:

"Since early 2012, shadowing has comprised a compulsory 4-day paid period immediately prior to becoming a junior doctor in which they are able to become familiar with future working environments and expectations. It should provide protected time for graduates to develop relationships with their clinical and educational supervisors alongside their future colleagues.<sup>18</sup> Prior to this time, shadowing was variable. A total of 11/87 (13%) of manuscripts in this review reported relevant data on shadowing: 8 10 12 33 45 49 67 73-75 of which 8/11 (73%) were dated prior to the compulsory change in 2012<sup>8 10 33 45 66 73-78</sup> and 9/11 (82%) presented self-reported data (all except<sup>49 74</sup>). For the pre-2012 studies, what was meant by the term 'shadowing' was not defined.<sup>8 10 33 45 67 73-76</sup> Further, not all participants in the studies experienced shadowing: in one study it comprised a compulsory component to the course being studied,<sup>76</sup> in others there were reports of 'some' shadowing,<sup>10 33 73 74</sup> a lack of shadowing opportunities,<sup>10 33 73 74</sup> and shadowing of variable durations: 2 days,<sup>67</sup> 1-2 weeks<sup>8</sup> and 4+ weeks.<sup>8</sup>"

---

#### Reviewer: 2

3. The statement 'Finally, a prolonged shadowing period can be ineffectual due to repetitive tasks undertaken with little opportunity for new learning' was not a conclusion of the Dornan study, which in any case dealt only with prescribing and NOT with shadowing as a whole. Please remove or modify this statement.

#### Our Response

With respect – this is a finding from the Dornan study. On page 99/215 in the Dornan study from the GMC website it states:

"Another doctor, from a different medical school, compared the length of time he spent shadowing with his colleagues' experiences and felt that prolonged shadows were ineffectual. His reasons included the repetitive nature of the tasks with little opportunity for learning:

"A:...here they do a really, really long shadows, like eight, ten weeks or something, I don't really see what the gain is by shadowing for that long."

Further, there are numerous quotations in the Dornan manuscript around students' shadowing experiences leading Dornan et al to make the following recommendation:

“2e During practical placements and ‘shadowing’ experiences, undergraduate medical students should be supported in developing problem-framing skills and applying them to safe and effective prescribing”

---

Reviewer: 2

5. In the discussion, the issue of what type of curriculum best prepares the student needs to be more thoughtful. It is baldly stated that non-traditional schools better prepare students, but not 'for what', as preparedness (as demonstrated by the article) is multi-faceted. Moreover, newer/non-traditional medical schools are likely to be more interested in demonstrating their worth and therefore invest in studying outcomes (while Oxbridge is unlikely to care about this). With graduate students, there is also the issue of to what extent their previous careers have contributed to preparedness, as opposed to medical school. There was also no mention of the fact that there is some evidence that doctors who attended traditional medical schools do better with certain issues such as prescribing and decisions around management. This is a critical point and needs to be nuanced better. I am afraid that the evidence presented does NOT support the implicit contention that non-traditional medical schools are better!

Our Response

With respect, we think that the reviewer has probably misread this statement. What we actually say in our discussion is a summary of all the curricula factors that contribute to preparedness – thereby summarizing our findings as so:

“Following the extensive transformation of medical education curricula in the UK since the 1990’s, numerous studies are beginning to shed light onto how changes might affect levels of preparedness: higher levels have been recorded for graduates of ‘new’ (versus ‘traditional’) curricula, graduate-entry students, graduates of problem-based learning courses and those who have intercalated.14 30 35 37 38 40 63 73”

Thus we do not “baldly” state that non-traditional schools better prepare students – we merely list this as one factor. This issue is unpacked in the results section where we concur with the reviewer that preparedness is multi-faceted – but we believe that the discussion is not the place for this. Rather, in the discussion section we talk about the issue of publication bias – thereby going beyond the mere reporting of data, avoiding repetition of earlier assertions and entering the world of critique.

In terms of the reviewers’ comment asserting “the fact that there is some evidence that doctors who attended traditional medical schools do better with certain issues such as prescribing and decisions around management” – we did not find this evidence in our review. Following the reviewers’ comments, we have tried to find this evidence but have not succeeded.

---

Reviewer: 2

6. The study also neglects the fact that there is longitudinal data in the UK for preparedness. Goldacre (2012) is mentioned as part of the review, but not considered in discussion.

Our Response

Thank you for bringing this to our attention. In fact, it is Goldacre’s 2010 study that reported longitudinal data from 4 cohorts. We have now incorporated this study into our discussion around the paucity of longitudinal data as follows:

“By contrast, Goldacre and his colleagues<sup>38</sup> undertook the largest scale longitudinal study in the UK

to date (examining graduate cohorts from 1999, 2000, 2002 and 2005), with some being followed one or three years post qualification.<sup>38</sup> Many participants in the earlier cohorts were asked the simple broad-brush question 'Experience at medical school prepared me well for the jobs I have undertaken so far' requiring a 1-5 likert scale response. Additional items in latter years only included questions on clinical knowledge, procedures, administrative tasks, interpersonal skills and physical, emotional and/or mental demands; again requiring simple likert-scale responses. However, not only are the data reported in this study now over 10-years old, it measured very few aspects of preparedness highlighted in our review. Due to the paucity of longitudinal studies, there are currently no data following graduates throughout their career and measuring aspects of their preparedness for lifelong learning and adaptation to their roles as doctors.”

### VERSION 2 – REVIEW

<b>REVIEWER</b>	Louella Vaughan Northwest London CLAHRC United Kingdom
<b>REVIEW RETURNED</b>	30-Nov-2016

<b>GENERAL COMMENTS</b>	<p>Markedly improved from the first version of the paper! The paper will now be an important contribution to debates around education and training in the UK.</p> <p>The issue of 'preparedness for what' has been much better addressed. The paper is now well nuanced. It makes clear the complexities involved in this very tricky subject, but also points to areas that could be immediately improved.</p> <p>The issue around mapping to the GMC curriculum has been managed better. The mapping to domains is clearer and the explicit use of the domains as scaffolding to organise research findings has been well executed.</p> <p>I still don't agree with the use of a single sentence in a single report as a major conclusion (too much shadowing is not useful!). But I can live with this.</p>
-------------------------	--