Reviewer's report

Title: The Effect of Graduate Medical Education on Patient Outcomes: a Systematic Review

Version: 1 Date: 15 February 2012

Reviewer: John Benson

Reviewer's report:

1. Is the question posed by the authors new and well defined?
The question is important and as well defined as is practicable in a field whose definition is difficult (this difficulty is appropriately acknowledged by the authors) and with a literature that is challenging to synthesise.

2. Are the methods appropriate and well described, and are sufficient details provided to replicate the work?
The question posed by the review is broad, but this is justified by the stated aim to evaluate the effects of aspects of residency training on patient outcomes. The methods section describes in reasonable detail how this question was operationalized in selecting literature for inclusion.

NB comment re ‘graduate medical education’ / ‘Residency training’ in section 6 below.

3. Are the data sound and well controlled?
The selection criteria for papers and the methods by which papers were selected are well described. The methods used are conventional, with more than one researcher involved in paper selection after initial screening of titles for relevance. There is no information on how many researchers were involved in data extraction, or whether data extraction was checked in any way. The MERSQI score is used to offer a quantitative estimate of study quality.

4. Does the manuscript adhere to the relevant standards for reporting and data deposition?
A structured summary of abstracted data is provided in the tables, allowing inspection of the summary data from the papers included in the review.

Methods/Data sources & searches/ para 2: the authors definition of GME does not include training for family practice. Was such GME excluded? I suspect not, as there is mention of such training later in the paper. This needs clarification.

Methods/Data sources & searches/ end para 2: ‘compete search strategies are available on request’. For an on-line journal, perhaps these could be made available on-line.

Methods/Study selection/end para 2: The authors’ meaning by ‘non-targeted
participants (i.e. medical students or nursing home residents) is unclear.

Results/Categorization of studies and subsequent Results sections: The paper is inconsistent in its hierarchy of description for groups of papers. The sections on ‘10 studies’ and ‘17 studies’ both refer to the second ‘subcategory’. The sections on ‘19 studies’ and ‘7 studies’ both refer to the third ‘subcategory’. This could be corrected by referring to the 79 and 17 groups as ‘categories’ and the 43, 10, 19, and 7 groups as ‘subcategories’ and ensuring that the appropriate descriptor ‘first’, ‘second’ etc is used. A minor point, but important to follow the organization of results. Figure 1 is very clear.

Results/17 studies evaluated the effect of specific training situations/ final sentence: how was the assertion that studies on ‘specific training situations’ yielded equal or improved outcomes etc.’ reached?

5. Are the discussion and conclusions well balanced and adequately supported by the data?

It is in this area that the paper raises significant difficulties.

The paper’s overall conclusion is that ‘patient care is safe and of equal quality when delivered by residents’. Yet the results as presented do not support this degree of absolute statement. Across the reported results, a significant minority of papers showed that residents, or subgroups of them, delivered worse care. The authors report this to be the case for 8 out of 43 studies; 6 out of 10 studies; 6 out of 19 studies; 6 out of 7 studies; 1 out of 17 studies (these studies relating to comparisons of training situations); one study of post residency outcomes showed that programmes could be ranked.

This data collectively suggests that there is considerable evidence that outcomes may be worse following treatment by some categories of residents in comparison with faculty/ other residents / themselves at a later point in training. Given that new doctors have to learn, it would seem more accurate to acknowledge this strand of data and discuss the practical significance of the differences observed and their acceptability to patients and training organisations. If the authors feel that the above is not a fair interpretation of their results, there is a need robustly to justify that position from the data as presented in the paper.

Discussion/second sentence: This is the first mention that the review was aimed to gather evidence that ‘better training’ will enable residents to become ‘better doctors’. This statement fits neither with the previously stated aim of the review nor the literature selection strategy. I would suggest consistency here with the previously stated aim.

Discussion/ Explanation of result/ First para: ‘This makes it much more difficult to assess the educational effect of residents’ care on patient outcomes’. I suspect this intends to say ‘This makes it much more difficult to assess the effect of residents’ education on patient outcomes’? It is not a logical statement as it stands.

Discussion/ Explanation of result/ First para: ‘From a cost perspective…needed
to ensure (a) future health care workforce and ‘Exploring differences between teaching hospitals and non-teaching hospitals’. These points are discussing separate issues from those addressed by the review and do not therefore place the results in context (implications for research and practice are discussed in a later section)

Discussion/ Explanation of result/ Second para: ‘We found little evidence for the July effect…’ Please see comments above. A minority of studies did identify this effect. This needs greater acknowledgement and discussion.

6. Do the title and abstract accurately convey what has been found?
The title was, for me, a UK reader, misleading. I expected the paper to relate to outcomes following initial medical training via the Graduate entry route (4 year graduate entry courses) rather than following initial postgraduate medical education. I note that MeSH refer to ‘Graduate medical education’ as do the authors, rather than ‘postgraduate medical education’. The abstract refers to ‘residency training’. Perhaps this term might be used in the title. The authors could either use ‘residency training’ throughout the paper in place of ‘GME’, or substitute ‘GME’ early in the paper, with explanation.

7. Is the writing acceptable?
The writing is clear and grammatical. There are some minor typological errors (listed below)

Please make your review as constructive and detailed as possible in your comments so that authors have the opportunity to overcome any serious deficiencies that you find and please also divide your comments into the following categories:

- Discretionary Revisions (which are recommendations for improvement but which the author can choose to ignore)
  1. Methods /Data sources & searches/ end para 2: ‘compete search strategies are available on request’. For an on-line journal, perhaps these could be made available on-line.

- Minor Essential Revisions
  1. Background/mid para 2 typo: GME typically focuses on educational outcomes and DOES not include patient outcomes.
  2. Methods/Study selection/end para 2: The authors’ meaning by ‘non-targeted participants (i.e. medical students or nursing home residents) is unclear.
  3. Results/Categorization of studies and subsequent Results sections: The paper is inconsistent in its hierarchy of description for groups of papers. The sections on ‘10 studies’ and ‘17 studies’ both refer to the second ‘subcategory’. The sections on ‘19 studies’ and ‘7 studies’ both refer to the third ‘subcategory’. This could be corrected by referring to the 79 and 17 groups as ‘categories’ and the 43, 10, 19, and 7 groups as ‘subcategories’ and ensuring that the appropriate
descriptor ‘first’, ‘second’ etc is used. A minor point, but important to follow the organization of results. Figure 1 is very clear.

4. Discussion/ Explanation of result/ para 1: ‘This makes it much more difficult to assess the educational effect of residents’ care on patient outcomes’. I suspect this intends to say ‘This makes it much more difficult to assess the effect of residents’ education on patient outcomes’? It is not a logical statement as it stands.

- Major Compulsory Revisions

1. Methods/ Data sources & searches/ para 2: the authors definition of GME does not include training for family practice. Was such GME excluded? I suspect not, as there is mention of such training later in the paper. This needs clarification.

2. Results/17 studies evaluated the effect of specific training situations/ final sentence: how was the assertion that studies on ‘specific training situations' yielded equal or improved outcomes etc.’ reached?

3. The paper’s overall conclusion is that ‘patient care is safe and of equal quality when delivered by residents’. Yet the results as presented do not support this degree of absolute statement. Across the reported results, a significant minority of papers showed that residents, or subgroups of them, delivered worse care. The authors report this to be the case for 8 out of 43 studies; 6 out of 10 studies; 6 out of 19 studies; 6 out of 7 studies; 1 out of 17 studies (these studies relating to comparisons of training situations); one study of post residency outcomes showed that programmes could be ranked. This data collectively suggests that there is considerable evidence that outcomes may be worse following treatment by some categories of residents in comparison with faculty/ other residents / themselves at a later point in training. Given that new doctors have to learn, it would seem more accurate to acknowledge this strand of data and discuss the practical significance of the differences observed and their acceptability to patients and training organisations. If the authors feel that the above is not a fair interpretation of their results, there is a need robustly to justify that position from the data as presented in the paper. Otherwise, this requires a significant review of the discussion, conclusions and abstract.

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**Quality of written English:** Acceptable

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**

I have no competing interests