

## **The hourglass review**

The review reported in this paper is described as an hourglass review to reflect the scope of the conceptual analysis and the number of papers considered in detail (rather than the sheer volume of titles reviewed) at each stage. The three parts of the review were a broad mapping stage, followed by a focused or formal review on the core issue of whether or not research engagement improves health care, and a final stage which involved an exploration of a wider literature to help identify and describe plausible mechanisms.

### **Stage 1: planning and mapping**

The initial scoping and planning phase was as wide as possible in an attempt to ensure any coherent bodies of empirical evidence relating to the question and any plausible mechanisms were captured. The research team examined a large number of bodies of knowledge. For this exercise, the review team drew on existing knowledge, team meetings and brainstorming sessions, and consultation with the advisory group. Reviewers started with an open mind about the types of research on research that might have addressed the review question, following the Institute of Medicine's definition of health services research as: “a multidisciplinary field of inquiry, both basic and applied, that examines the use, costs, quality, accessibility, delivery, organization, financing, and outcomes of health care services to increase knowledge and understanding of the structure, processes, and effects of health services for individuals and populations”.

These initial explorations presented a dilemma. Discussions with the project's information scientist confirmed that it would be impractical to conduct a focused search of all the bodies of knowledge that might have something relevant to say on the topic. Yet none of them appeared to contain a sufficiently large number of relevant papers to make it sensible to focus explicitly on that area in order to explore the various mechanisms involved. As a result, the team extended the initial stage to enable the field to be mapped as widely as possible so as to inform the later more detailed database search. This mapping phase continued the approaches described above, plus hand-searching of journals, searching of relevant web sites, and searching the Effective Practice and Organisation of Care Cochrane database.

The hand search at this stage focused on journals that covered aspects of the relationship between research engagement and improved health-care performance. These were: Journal of Health Services Research & Policy; The Milbank Quarterly; Evidence & Policy; Implementation Science; and Health Research Policy and Systems. Preliminary internet searches were conducted on the following websites: English Department of Health; NIHR; National Institute for Health and Care Excellence; World Health Organization; numerous Canadian health research organisations (including CHSRF); and the University of Birmingham Centre for Health Services Management library. Papers considered to be particularly relevant for the study were given a designated ‘KEY’ status, and snowballing was used to explore further potentially relevant references cited in these papers.

The findings from this informal but extensive searching were used to develop initial maps of each of the bodies of knowledge from the diverse range listed above, and to inform the search terms used in the next stage – the focused review.

### **Stage 2: the focused review**

#### **The search strategy**

The focused, or formal, review concentrated on the specific question of whether or not engagement in research improves health-care performance. For this stage the review team wanted a comprehensive search of as many databases as possible. The search terms were similar for the each database but were modified to meet the requirements of each. The review sought to identify empirical research studies where the concept of ‘involvement in research’ was an input and some measure of ‘performance’ was an output. The initial broad interpretation of terms was tightened as the review progressed.

The search strategy covered the period January 1990 to March 2012 as the mapping phase suggested that this was the most fruitful period for addressing the review topic. English-language terms were used, although papers identified through this route that were not published in English were considered for inclusion, and consideration was given to terms used in other English-speaking countries (e.g. the use of the term ‘community’ in North America can be noticeably different from its use in the UK). To be included, papers needed to contain empirical data from a whole range of research approaches, both quantitative and qualitative, in line with a broad interpretation of health services research. The search was not, therefore, limited to clinical trials. The databases searched included MEDLINE, EMBASE, PsycINFO, Cumulative Index to Nursing and Allied Health Literature (CINAHL), Web of Science, Applied Social Sciences Index and Abstracts (ASSIA), British Nursing Index, Health Management Information Consortium (HMIC) and System for Information on Grey Literature in Europe (SIGLE) databases. The search strategy was developed by members of the research team and a senior information scientist from King's College, London. These database searches were supplemented with more focused hand-searches of the five journals initially searched in Stage 1 (listed above), papers suggested by the expert advisors and patient representatives, further searching of several national and international websites (listed above) and snowballing of papers considered to be key for the discussion. Searches were conducted by an information scientist working closely with the review team.

### **Steps in the focused review**

#### **First step – title review**

This step involved examination of the title of each paper, and occasionally the abstract when the title provided too little detail, to quickly exclude documents clearly not relevant to the review. The predominant aim here was to be inclusive, only excluding papers clearly not relevant. Reasons for exclusion at this step were: not health related, not a human study, no mention of research (or related terms), no clinical outcomes or processes. At first papers were reviewed by two reviewers independently, but this was reduced to one reviewer after a short time as the numbers of abstracts to be studied was large and a test indicated that the agreement between the reviewers was considered to be satisfactory.

#### **Second step – abstract review**

In the second step of the review, titles and full abstracts were studied in greater depth to assess the eligibility of each paper that had not been excluded at the title review. A first reviewer conducted this exercise and then passed the paper (and, where appropriate, comments) to a second reviewer. The aim of the first reviewer was to be inclusive: the aim of the second reviewer was to be more selective. Where the two reviewers disagreed they met to discuss the title and abstract. If agreement was still not possible then the paper was taken through to the third step of the review for a study of the full paper, along with the papers where there was agreement on inclusion. Reasons for exclusion were: not health related, not a human study, no mention of engagement in research (or related terms), no clinical outcomes or processes. Reasons for inclusion were: mention of engagement

in research or of research in combination with collaboration, multicentre, organisational, or other related terms, mention of clinical outcomes or processes in the form of empirical data.

#### Third step – full-paper review

The third step was a further relevance and initial quality check of all the included papers from the second step to determine which papers were suitable to proceed through to the data extraction stage. Research engagement and improved health care had to be demonstrated in some way in the included papers. So, for example, in relation to clinical research, just because researchers who had been involved in a particular trial were now using the findings of that trial was not, by itself, sufficient. Instead, and as far as possible, the team attempted to include only studies that examined in some way whether or not those clinicians/institutions who had been engaged in the research were adopting the findings more rapidly and/or extensively than other clinicians/institutions, i.e. we were looking for some measure of control within the study. For collaborative and action research, slightly different considerations had to come in to play because, by the very nature of the research, it was intended to be most relevant for those engaged in the research.

During the earlier parts of the review some potentially important papers were identified describing activities such as participation in research networks or action research that the research team considered to be a form of engagement in research and that in some instances seemed to lead to improved health care. The team wanted to make sure that the review captured the full range of activities that might come under the term engagement in research and not to restrict the review to clinical trials. Therefore, to add precision to our inclusion criteria, the team explicitly set out some of the activities that could be considered to be included under the heading ‘engagement in research’.

Broadly similar inclusion principles were adopted across all categories of papers, and, where possible, reflected the spread of approaches we saw in the literature by including studies in organisational settings, and collaborative and participatory studies. This meant, for example, seeking to include studies that made some attempt to show that the use of the findings from engagement in collaborative or action research resulted in improvements in health-care performance, and that clinician/institution behaviour change was sustained beyond the period of the intervention. In other words, we attempted to distinguish a sustained impact from a more temporary study effect. Ideally such studies would also show some evidence of differential uptake of findings by the clinicians/institutions involved in the research, as measured against control groups not involved. But we found that this was rarely studied: collaborative or action research is often undertaken in response to the specific needs of the clinicians/institutions engaged in that research, and frequently does not include any control.

All three reviewers agreed on the papers taken through to the final data extraction stage of the review, and a data extraction sheet was completed by one reviewer for each of these papers. A quality check was informed by checklists available as part of the Critical Appraisal Skills Programme or similar, but the diversity of methods used in the papers meant that no one quality appraisal tool could be rigidly applied.

#### **Analysis in the focused review**

The papers in the focused review were heterogeneous and unsuited to a meta-analysis. Instead, an account of each paper was provided in tabular form. Each paper that reached the final data extraction stage was also analysed in relation to:

- its importance to this review based on quality (especially the level of control in the study), size of the study and relevance to our review question;
- Whether the findings were positive (showing research engagement did improve health care) or negative (showing no positive impact) or mixed. Under this interpretation, a ‘negative’ finding did not necessarily mean that health care worsened, it might have remained unchanged over the course of the study. Some papers provided mixed data about improvement that were inconclusive and difficult to interpret. Findings that were partially positive and partially inconclusive we labelled ‘mixed/positive’; findings that were partially negative and partially inconclusive we labelled ‘mixed/negative’;
- the degree of intentionality of the link between research engagement and health-care performance (by-product, research network, or intervention);
- the scope of the impact made by research engagement (broader impact/specific impact);
- the level of engagement discussed (clinician or organisational). We initially intended to analyse papers according to the four levels of engagement mentioned in the ITT – clinician, team, service or organisational – but eventually used the two levels of clinician and organisation because, at levels above that of individual clinicians, there is little consensus about the reporting terms used and we could not readily apply the separate categories of team, service and organisation.

Finally, each of the papers was examined to identify any factors that the authors were proposing as possible causes of the improvement in health-care performance. This analysis was supplemented by the wider review described below.

### **Stage 3: wider review**

The final stage was an informal wider review. This was primarily intended to contribute to a fuller understanding of the relationship between research engagement and improved health-care performance, and, in particular, to help us identify and explore the mechanisms through which research engagement can improve health care. It was intended to build on relevant theories and supplement the focused review. The papers considered for this wider review included all the papers from the full-paper review stage of the focused review, plus additional papers most relevant for the analysis from the 440 papers considered potentially relevant from the initial mapping, and ongoing snowball exercises but excluded from the final step of the focused review. The papers that were additional to the 33 finally included in the focused review were interrogated and sorted into groups according to the theoretical approaches outlined in Chapter 2 and the emerging categories of mechanisms. At this stage many papers were excluded from further consideration as they were not relevant to the issues being reviewed.

The remaining papers in each category were reviewed in an attempt to identify any that met one or more of the following criteria: (1) Despite not meeting the full inclusion criteria for the focused review, nevertheless illustrated positive or negative findings about the impact of research engagement on performance, especially on aspects about which there was a dearth of evidence from the focused review; (2) They had to have at least reasonably strong empirical data describing progress some way along the pathway from research engagement to improved health-care performance; (3) They needed to provide a strong descriptive account of initiatives involving mechanisms through which some form of research engagement might improve health-care performance; (4) They were relevant theoretical and/or review papers that helped illuminate the issues.

The papers identified through this process helped to provide a fuller understanding and a context for the findings from the focused review about whether or not research engagement improves health-care performance, and to assist exploration of the suggested mechanisms through which this might happen.