Author's response to reviews

Title: Knowledge Management in Health Care: Lessons from the Business Sector

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Author's response to reviews: see over
We extend our thanks to the reviewers’ detailed feedback, which we have used to improve the manuscript as follows:

REVIEWER 1

1. The format of the review is written in three sections, however, you ended each one differently. For example, the section “KM Solutions/Strategies” ends with a conclusion in contrast with the section “KM Facilitators and Barriers”, which does not have a conclusion.

Response: We have included a concluding paragraph for the KM Solutions/Strategies section on the bottom of page 6: “The literature demonstrates that a one-size-fits-all KM solution may not be achievable or desirable. Organizations may need to invest some time to identify their needs and reasons for employing KM practices, and to ensure that they have the resources (e.g., financial, personal, technical) to support their desired strategy. Identifying possible KM facilitators and barriers may assist various organizations in recognizing whether they are capable of successfully implementing a KM solution or strategy.

We have also added a paragraph on page 11 to summarize the KM Facilitators and Barriers: “To summarize, some individual-level barriers can be overcome, such as training or allocating adequate time for KM work. Organizational environments that downplay reporting hierarchies in favour of openness and a shared culture are more favourable to KM strategies. While management support is crucial for success, the need for support from human resources departments is not conclusive. Another important consideration is a clear KM framework or strategy that incorporates human factors (e.g., rewards, face to face time). Finally, the challenges that accompany information technology need to be addressed.”

2. Moreover, some works are analyzed more profoundly than others, for instance, in the final paragraph of page 3 you discuss to a greater extend the reference [39], which is different to the others in that section of the document. This way of presenting results would usually be for a specific purpose in your discussion or conclusion, but it is recommend to standardize the structure and layout of your results in the main body of your paper.

Response: We have read through the main body of the paper and have balanced out the use of references. We also moved some of the specific discussion about communities of practice to the discussion section. It was difficult to use a standard structure to report on all papers; some of our references spoke to a number of important KM issues, and we felt it important to discuss such papers in greater detail.

3. Firstly, some aspects of the methodology review should be clarified. The keyword search is very broad, and provides a large number of studies that do not correspond to the objective of the literature review. Therefore, it should be specified whether repeated items were removed, or if
the keyword was provided to search engines in specific sections such as the title, abstract, or full text.

Response: In the methodology we have indicated that repeated items were removed, and we have clarified how the keywords were used. We have added: “Two reasons supported the decision to target search terms in abstracts. First, authors use relevant words in abstracts due to limited space availability, and second, this strategy ensured that identified articles were the main topic of discussion.” The editorial office also required that we follow the “Moose Proposal for Reporting Meta-analysis of Observational Studies in Epidemiology”, which we have done as closely as possible (see table below).

4. Secondly, your suggestions in the discussion refer to an overlap of knowledge management with the knowledge translation process. However, this conclusion does not have an explicit classification with regard to the three aspects of your literature review (Reasons for KM, KM Solutions/Strategies, and KM Facilitators and Barriers). To improve the discussion, it is advised to include an analysis of each of the three individual aspects of the review.

5. And finally, a vital consideration in the application of knowledge management approaches is the importance of the organizational context like organizational culture. Furthermore, considering that your review focuses on the business sector it would be interesting to clarify how your findings can be extended to the medical domain, which has a different organizational culture (i.e. you could discuss what knowledge management facilitators or barriers in the business sector can be found in the medical domain).

Response: The discussion has been revised considerably to address these points. We have removed the paragraph that presents our view about the relationship between KM and knowledge translation. Then, we have very briefly analyzed the three aspects of the review (reasons for KM, KM Solutions, Facilitators and Barriers). This is followed by a general discussion about organizational context in the health care domain; we have kept the discussion more general rather than focusing exclusively on the medical domain. We took this approach because there are other cultures, such as a nursing culture or a rehab culture, also at play. Finally, we have returned to the current state of KM in the health sector (as described in paragraph 2 of the paper), and drawn on the lessons learned from reviewing the literature to address the identified shortfalls in the health sector. The discussion section now reads:

“Interest in KM has increased in fields outside of business, particularly in health care, where health practitioners are beginning to realize the potential of embedding KM concepts in their own practices and organizations[6]. Improvements in business processes, better coordination with other departments or with outside stakeholders and prevention of information loss due to staff retirements are cited as important reasons for turning to KM practices in the business sector. Thus, the catalyst has been described as a desire for organizational improvements, and not so much as staff-level advancement or professional development. Although there has been a marked increase in academic publications related to KM over the past ten years, there are unanswered questions about which strategies are most effective given that direct comparisons have not been studied systematically. The reviewed literature discusses passive ‘push’ strategies to sharing knowledge, e.g., seminars, as well as the ways in which technology has been used to encourage asynchronous interactions among workers. Social learning strategies in the form of communities of practice were commonly identified. Finally, the literature reviewed pointed to systems perspectives in the use of frameworks (e.g., capabilities maps). While the common business solutions have been reported here, several other tools are also likely to exist which have not been published, or are not easily accessible. The facilitators and barriers related to implementing KM solutions in a business environment were also raised in this review. These facilitators and barriers were multilevel (individual, unit, organization), and inter-related (for example, individual
motivation is related to organizational rewards structures and learning culture). A key learning that emerges is that organizational context is an important consideration in the application of KM approaches, as organizational structures and processes contribute to the ability of an individual to carry out knowledge sharing activities that are sustainable.

Before discussing how the lessons from the literature might be applied in health care, it is worth noting the ways in which the health sector differs from the business sector in terms of organizational context. Health care organizations tend to be under-resourced, and they are expected to perform in accordance with state or national health policies, while private sector organizations are responding primarily to internal goals. Relatedly, health care organizations are more likely to run into political interference (or support) by elected officials than an independent business might experience. Health care organizations are often the linchpin holding together collaborations with other health agencies and civil society organizations; through these inter-organizational arrangements, information and practices are shared to support a continuum of care in the community. In contrast, in the business sector key information is withheld in service of a competitive advantage in the marketplace. Business is focused on profit, while health care aims to produce a somewhat intangible public good. Inside a health care organization one is likely to find different professional groups who belong to different unions; are paid through different funding envelopes (e.g., hospital budget or reimbursed through the state); are paid through different funding mechanisms (e.g., salary or fee for service); and who have strong alliances with their professional community across organizations. Within an organization, these different groups exhibit a particular professional culture. Despite these differences, however, both sectors experience the common influences of new technology, globalization, operational optimization and the need to evolve through reforms and transformation[90].

Thus in discussing ways that health care organizations might move forward with a knowledge management agenda, it is acknowledged that there are variations across organizations and that sensitivity to contextual conditions is vital. These differences are important for understanding “how context and purpose may shape learning strategies, processes and outcomes” [90, p. 465]. Nevertheless, KM experiences from the business sector can contribute to advancing the current KM status quo in health care as described in the introduction of this paper: 1) information and communication technologies (ICTs) are static and do not support knowledge sharing, 2) sustainability of communities of practice and networks require attention, 3) the dominant evidence-based culture stresses research information, and 4) KM strategies tend to be single initiatives.

Experiences from business point to examples of ICTs for knowledge sharing purposes, such as wikis or blogs. These technologies can help support knowledge management and e-learning by enabling users to access content of interest quickly and conveniently. Further, interactions between individuals can also serve to co-create new, relevant knowledge. Some authors have suggested that KM and IT advances can have a strong and beneficial impact on the quality of health decision-making[13]. To transfer this learning successfully into the health realm, it would be important to identify non-hierarchical groups, such as a professional discipline, who might readily share best practices with each other. Alternatively, such strategies might be ideal for multidisciplinary care teams who provide care collectively and share a similar culture. In this way, technology – serving as the common boundary object across professionals – can help in the creation and support of virtual communities to help maximize the sharing of knowledge and learning[7]. Not to be forgotten is the patient population: patients are being invited to participate in their own care through shared decision making, and ICTs can play an important role in facilitating access, discussions and understanding of complex medical and health information.
There is documented interest in communities of practice and networks in health; these structures are perceived as a new way to organize public services[91-94], but their long-term viability is of concern[9]. Experience from the business sector suggests that “one-size fits all” or externally imposed programs may lead to the underdevelopment of knowledge and/or limited sustainability. One study in particular perceived communities of practice to be the key to a successful KM initiative[77]. In this study the authors reported that communities of practice strengthen topic-specific social networks by enabling knowledge retention and allowing for the dissemination of best practices and lessons learned[79]. In addition to a common topic of focus, sustainability might be achieved by ensuring that online networks incorporate a face-to-face component for community-building purposes. Business leaders are demonstrating that they value their employees’ tacit knowledge – their employees’ experiences and interpretations derived from interacting with the company and those associated with the company – by devoting resources to capturing tacit knowledge. The business sector has moved from simple repositories of such information to more active approaches, knowing that sustainability requires an interactive approach to managing knowledge. Engaging workers in CoPs or networks helps build the collective knowledge base (or ‘knowledge capital’) and expand knowledge assets, which in turn will help foster a sustainable organizational context.

The area of evidence-based medicine, a paradigm of clinical teaching and practice, might be a deterrent to the use of KM practices in health care. Dedicated journals, practice guidelines, research use frameworks, and supporting organizations promote the use of medical research literature, leaving little room for the sharing of tacit knowledge, an important foundation of KM strategies. The evidence-based medicine movement has spread to other areas of health care. The broader field, now referred to as knowledge translation, has developed from efforts to explain and promote the use of research evidence in clinical, managerial and policy decision-making related to health care[95-97]. Both the evidence-based medicine and knowledge translation movements have encouraged health care professionals and their organizations to seek out relevant research evidence and adapt it for internal decision-making for the eventual purposes of improved health outcomes. Rather than a deterrent, however, this paradigm might be seen as an opportunity with which to introduce KM practices. Health care professionals have already been engaged with the notion (and related techniques) of using externally-derived information in a systematic way. Using KM strategies to promote the use of organizationally-based, internally-derived information should be seen as a natural extension of knowledge translation. We suggest that knowledge management can overlap with the knowledge translation process, with the merger occurring when local knowledge (e.g. tacit knowledge[1,2] or data such as a local needs assessment) is used in conjunction with research evidence.

As this is a relatively new area for health managers and executives, KM initiatives have been, generally speaking, designed as single-faceted interventions. The review describes KM as an interpersonal and an organizational process, and as such both may influence the success of implementing a KM initiative. Multi-faceted interventions can support implementation efforts by: addressing the organizational and individual limitations described in this paper; indicating upper management support for KM; and providing a carefully planned but flexible approach for the organization. Thus, the reviewed literature suggests that health care organizations consider a holistic or multilevel KM strategy to enhance embeddedness. Multiple, coordinated initiatives are required to achieve a synergistic use of ICTs with new approaches to linking people with information, and research with data, and supporting the conversion of information and data into useable knowledge …”
6. I suggest a couple of additions that would strengthen the papers' intent of providing useful learning for healthcare knowledge management projects. Firstly, the paper would benefit from the inclusion of a discussion within the introduction of current knowledge management practices in healthcare, and identifying existing gaps and research challenges. Some starting places (with apologies for the UK focus of these suggestions) might be (references provided...).

Response:
In the second paragraph of the introduction we summarize the current KM practices in health care, “Health care organizations, as late adopters of the KM concept, are starting to implement and evaluate KM strategies[7-9]. Current KM practices in health care are focused on the use of information and communication technologies (ICT)[6,8,9]. Examples of such systems include electronic libraries (e-libraries), repositories containing research articles, clinical guidelines or best practices to assist organizations in managing knowledge[10-14]. A criticism of this approach is that these ICTs are static and do not provide appropriate context to make an effective clinical diagnoses[8]. Further, they do not support knowledge development and sharing. Communities of practice knowledge-sharing strategies have been used to promote interactions among health practitioners. These strategies can be ICT based[7], narrowly focused on practice improvement and/or broadly defined as networks involving multiple stakeholders and objectives[9]. Research has indicated that there may be value in having a venue, or a social space that enables and encourages knowledge sharing to take place[15-17]. Nevertheless, sustainability of such structures continues to be an issue[9]. Another aspect of the health care environment is the strong evidence-based medicine movement that has penetrated continuing education and quality improvement efforts. The point to note is that evidence-based practice focuses on the transfer of explicit knowledge (i.e., research literature), while KM promotes the transfer of tacit knowledge [7,9]. A few health care researchers[16-21] have examined the importance of tacit knowledge, evaluating the role that it plays, and how it ought to be considered in future research. The on-going emphasis on explicit knowledge would have to change if tacit knowledge were to be seen as an important resource in health care. A final observation is that KM initiatives tend to focus on one solution (e.g., ICT, evidence-based practice) instead of a comprehensive strategy. Overall, there is an increased interest in the health care literature about the importance of capturing, sharing, and using explicit and tacit knowledge within the daily work of health professionals. However, a predominant number of published research articles within the health sector tend to focus on the conceptual and theoretical aspects of KM that, although valuable, lack a pragmatic component."

7. Secondly, the discussion would be strengthened by some specific examples of knowledge management challenges in healthcare, linking this back to the learning identified in the review and describing how the learning from this review might be of use. The authors discuss evidence-based medicine and knowledge translation, and observe the difference between the promotion of external information within an organisation vs. knowledge management and the capture and sharing of internal knowledge but it would be useful to describe some examples of these internal challenges in different contexts (e.g. disparate public health professionals spread across a region sharing analysis expertise; a group of family doctors based at the same practice developing treatment guidelines based on their experiences; sharing positive behaviours and
habits around hygiene between hospital staff), and consider how the learning from your literature review might be applied in these contexts.

Response: This feedback was considered concurrently with the suggestions from Reviewer 1 (comments 5 & 6, above). Both reviewers suggested slightly different approaches, and we tried to find a middle ground in service of improving the manuscript. We described the KM challenges in health care and then discussed how the lessons learned might address these challenges. We acknowledge, however, that we have described, generally speaking, the different contexts associated with the business and health care contexts, and flag these differences for the reader to consider when applying KM strategies, but we do not go so far as to analyze how these differences might influence KM initiatives. We assumed that transferability of lessons learned would be possible given that “both sectors experience the common influences of new technology, globalization, operational optimization and the need to evolve through reforms and transformation.”

8. Table 1 is a very helpful summary of all the papers the authors have considered - however it would be even more useful if it were to include the reference numbers of the papers - it's quite tedious moving back and forth between this table, the numbered list of references and the text.

Response: We have included the reference numbers in the table.

ASSOCIATE EDITORS

"Reviewers have focused on different aspects for the required revision. I believe that the discussion should consider more examples (as suggested by one reviewer) to make the application to practice clear. The suggested reorganisation by the other reviewer should improve the paper."

Response: As described above, the discussion considers more examples to enable generalizability to the health care sector. We have also reorganized the paper for consistency in lay out.

9. EDITORIAL REQUEST

Editorial requests
Please ensure you adhere to MOOSE guidelines in your revised manuscript: http://www.consort-statement.org/resources/downloads/other-instruments/

Response: We appreciate the journal’s goal to support the rigorous reporting of scientific research. We have tried to adhere to the Moose guidelines where possible (see attached Table). The guidelines are about reporting meta-analytical results from observational primary studies. We had some difficulty applying some of the criteria since we were not trying to determine the effectiveness of a particular treatment. Instead, we reviewed studies from the business literature related to knowledge management tools in order to extract insights for healthcare. As we mention in the Methods, this work represents an integrative review.
### Addressing the Moose Guidelines

<table>
<thead>
<tr>
<th>GUIDELINE FOR REPORTING</th>
<th>RESPONSE</th>
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<tbody>
<tr>
<td>Problem definition</td>
<td>Paragraph two, Background section</td>
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<tr>
<td>Hypothesis statement</td>
<td>Not applicable for an integrative review</td>
</tr>
<tr>
<td>Description of study outcome(s)</td>
<td>Not applicable - we did not focus on a specific clinical outcome</td>
</tr>
<tr>
<td>Type of exposure or intervention used</td>
<td>In our Literature Search section we write: “Inclusion criteria included studies that (a) contained information about specific KM initiatives (i.e. strategies, tools, and or frameworks); (b) described at least one of the following: type of KM initiative; process involved in the implementation of the KM initiative; evaluation of previously implemented KM initiative, facilitators and/or barriers associated with KM; or lessons learned from previous KM initiatives.” We did not exclude or include studies on the basis of study design.</td>
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<td>Type of study designs used</td>
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<td>Study population</td>
<td>In our Literature Search section we write: “Inclusion criteria included studies that (a) contained information about specific KM initiatives (i.e. strategies, tools, and or frameworks); (b) described at least one of the following: type of KM initiative; process involved in the implementation of the KM initiative; evaluation of previously implemented KM initiative, facilitators and/or barriers associated with KM; or lessons learned from previous KM initiatives.” We did not exclude or include studies on the basis of study design.</td>
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<tr>
<td>Qualifications of searchers</td>
<td>We have added the fact that the search was conducted by a health sciences librarian.</td>
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<tr>
<td>Search strategy, including time period included in the synthesis and keywords</td>
<td>This is described in our Literature Search section.</td>
</tr>
<tr>
<td>Effort to include all available studies, including contact with authors</td>
<td>We have reported that, “We did not make an effort to contact authors and as such may be missing some articles that are in press.”</td>
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<tr>
<td>Databases and registries searched</td>
<td>Not applicable – we were not interested in on-going trials or studies.</td>
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<tr>
<td>Search software used, name and version, including special features used</td>
<td>The various search engines used are named in the Methods section.</td>
</tr>
<tr>
<td>Use of hand searching (eg, reference lists of obtained articles)</td>
<td>We now report that, “Hand-searching was not conducted.”</td>
</tr>
<tr>
<td>List of citations located and those excluded, including justification</td>
<td>Citations that were included are described in Table 1. We report that a list of those citations that did not conform with our inclusion and exclusion criteria are available from the first author.</td>
</tr>
<tr>
<td>Method of addressing articles published in languages other than English</td>
<td>We have reported that, “We did not include articles published in languages other than English, nor did we include abstracts or unpublished studies; there was also no attempt to contact authors.”</td>
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<td>Method of handling abstracts and unpublished studies</td>
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<tr>
<td>Description of any contact with authors</td>
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<td>Description of relevance or appropriateness of studies assembled for assessing the hypothesis to be tested</td>
<td>We commented that, “Most articles presented theories, or used case study, grounded theory or ethnography methodology. It was decided that critically assessing the quality of the methods used within each study was less helpful than gaining an overall picture of the field and extracting key messages in the fashion of an integrative review.</td>
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<tr>
<td>Documentation of how data were classified and coded (eg, multiple raters, blinding, and interrater reliability)</td>
<td>Our description of this process: “Titles and abstracts were screened independently by two reviewers (AK and SS). Articles deemed relevant underwent systematic data extraction, using a data extraction form, independently by two reviewers (NH and RH) to identify overarching themes.”</td>
</tr>
<tr>
<td>Assessment of confounding (eg, comparability of cases)</td>
<td>Not applicable.</td>
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</table>
Assessment of study quality, including blinding of quality assessors; stratification or regression on possible predictors of study results

In the discussion section we write, “In this integrative review we addressed methodological rigour in a number of ways. Two authors (AK and SS) reviewed the abstracts for inclusion, and two other authors (NH and RH) systematically extracted the information from articles using a data extraction form. In both cases the two researchers worked independently and then met to discuss any discrepancies. We intended to critically assess the research process associated with each study but we abandoned this approach given the prominence of case study methods. Searching the literature was a very difficult task due to the diverse and evolving vocabulary. It is therefore possible that we missed some important articles along the way (including non-English ones).”

Assessment of heterogeneity

Not applicable to our integrative review.

Description of statistical methods (eg, complete description of fixed or random effects models, justification of whether the chosen models account for predictors of study results, dose-response models, or cumulative meta-analysis) in sufficient detail to be replicated

Not applicable to our integrative review.

Provision of appropriate tables and graphics

Table 1 describes our ‘sample’ of studies.

Graphic summarizing individual study estimates and overall estimate

Not applicable.

Table giving descriptive information for each study included

Table 1 describes our ‘sample’ of studies.

Results of sensitivity testing (eg, subgroup analysis)

Not applicable.

Indication of statistical uncertainty of findings

Not applicable.

Quantitative assessment of bias (eg, publication bias)

Not applicable.

Justification for exclusion (eg, exclusion of non–English-language citations)

We have not justified our decision to review the English literature.

Assessment of quality of included studies

We have previously noted that most studies were case reports, and that the decided not to assess quality as it was not helpful for the purposes of the study.

Consideration of alternative explanations for observed results

Not applicable for the broad approach taken in this review.

Generalization of the conclusions (ie, appropriate for the data presented and within the domain of the literature review)

We have compared the business and health sectors in paragraph two of the Discussion section.

Guidelines for future research

We have provided some suggestions for future research.

Disclosure of funding source

We have added our funding sources.