**Author’s response to reviews**

**Title:** Understanding Professional Advice Networks in Long-Term Care: An Outside-Inside View of Best Practice Pathways for Diffusion

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Editor’s comment:

The authors should seek to comprehensively revise the manuscript in line with the major concerns of reviewer one. Particular attention should be given to the issue of theory application to data analysis and interpretation.

Author response: Thank you for this opportunity to review the manuscript. We have addressed the reviewer comments below. We used Rogers’ theory to guide data analysis; we have included greater application of theory to data interpretation and throughout the paper. We have discussed our findings in the context of organizational and systems theory and complexity science (for example, citing Borgatti & Cross; Lanham et al.; von Hippel).
Reviewer 1:

This very interesting study will have relevance to many other fields for a better understanding of network roles and the dissemination of best practices. I think the authors have done an excellent job addressing previous reviewer responses and has helped clarify the purpose of this study and its outcome. There are a few more points to be clarified to help the readers better understand the methods, specifically the processes used to classify the "Advice seeking relationships"

1) Lines 75-76- "Because advice seekers had to have at least one outgoing tie, all were survey respondents." This phrasing is confusing. Do the authors mean that all survey respondents were considered Advice Seekers because they had at least one outgoing tie?

Author response: Thank you for this feedback. We have rephrased this using your suggested wording for clarification and moved it to page 30 as a methodological note.

2) Types of Advice Seeking Relationships. Lines 175-186

The authors note that there are four types of advice seeking relationships; however, I am having trouble parsing out how "reciprocal" differs from the other classifications particularly "peer-peer". In addition, "formal" and "mentoring" appear the same to me as they both note they were more structured relationships with those who were senior to them. It also seems that "reciprocal" is classifying more the flow of information rather than the power structure in the relationship. Could the authors define these relationships more clearly?

Author response: Thank you for this feedback for clarification. We found that reciprocal referred to both the flow of information, and also it referred to the nature of the relationship between advice seekers and opinion leaders. To further distinguish and clarify these roles, we have added the following sentences to the manuscript (pages 12-13):

Advice seeking relationships often originated from existing, longstanding peer-to-peer relationships as a result from working together for several years. Advice seeking relationships also emerged from a mentoring relationship. While formal and mentoring relationships were both structured (e.g., based on seniority), formal relationships were leadership positions that may or may not have included mentoring roles. Reciprocity is a characteristic that most often applied to peer-to-peer relationships but also characterized mentoring relationships that are sustained and evolve over time.

The authors note in lines 187-190 & 212-214 that relationships could be classified as two different types. Did the research team account for this in the coding of the relationships? In addition, how did the research team account for relationships that changed and evolved (per line
Were these relationships double coded or was the coding based on the origination of the relationship?

Author response: We are unclear with the feedback about the noted lines 187-190 as this aligned with a quote (based on original numbering before our revisions). Lines 212-214 refer to information flow that evolved from one-way exchanges to two-way (reciprocal) exchanges. We analyzed the evolution of advice seeking relationships based on participants’ descriptions of how the relationship originated, and how it evolved and in what ways (i.e., relationships were not double coded). For example, mentoring relationships in which there was a senior opinion leader who imparted their experience and expertise to a junior advice seeker were coded as mentoring, unless they evolved to a more reciprocal relationship where the advice seeker and opinion leader exchanged experiences and expertise.

Figure 3 does not add to my understanding of Advice Seeking Relationships. Especially since "Reciprocal" is listed in both Types and Evolution. I think the manuscript can do without this figure since the manuscript already a little figure-heavy and these concepts are described in the body of the text.

Author response: Thank you for this suggestion, we agree, this Figure 3 can be deleted; it has been removed as an attachment and deleted from the in text citation (page 12).

3) While the focus of the manuscript is Advice Networks and network information dissemination, the authors do not touch a lot on the type of information that is being dissemination other than "promising practices." A key element of implementation science research and practice is that proven practices or evidence-based practices are the ones promoted in clinical and routine practice. Perhaps it would be opportune to add a line in the Implications for Research or Limitations section on how "promising practices" aligns with evidence-based practices? I think this would really help tie this study's relevance to implementation science.

Author response: Thank you for this suggestion. To be clear, in the Phase 1 survey we did not ask about the dissemination of general information, instead we asked: “Whose advice do you most value about delivery of quality care, care improvement and innovation?” Interview participants were reminded of this context of advice seeking before the interviews. In the interviews, some advice seekers described sharing effective practices or policies with Directors in other long-term care facilities so as to not “reinvent the wheel” and to promote evidence-based practices that were successfully implemented in their facility.
That said, we took a broad view of what constitutes evidence in this study. While some of our participants referred to evidence-based practice in terms of policies, others referred to effective practices that had been developed through application experiences in the facilities (e.g., sharing “lessons learned”).

We view this broad perspective less as a limitation but more of an implication for future research where we might distinguish more pointedly between practices predicated on research evidence and those predicated on experiential knowledge. We have included the following sentence to the Implications for Research section: Future research should further explore whether or not there are differences in how evidence is exchanged based on its source, i.e. research evidence compared to evidence based on experience (page 26). We take your point concerning promising vs proven practices, and these were discussed as effective practices in our data; therefore, for clarity, we rephrased promising to effective practices (page 26).

Reviewer 2: Thank you for the opportunity to review this manuscript. This paper describes the qualitative findings from a larger mixed methods study examining roles, activities, and reasons for advice seeking within a network of long-term care facility leaders. The data illustrate the unique characteristics of opinion leaders and boundary spanners, how they diffuse information through networks, and how advice seeking relationships evolve over time. This is important work because it offers a potential explanation of the micro-dynamics of why and how networks change and is a critical complement to structural studies of network dynamics. I believe this paper would make a greater contribution to the field of implementation science (and network evolution) if there were stronger and more meaningful connections to theory, and perhaps explicit connections to dissemination/implementation strategies. Additional observations and questions are detailed below:

1. Stronger connections to theory to interpret findings, and inform dissemination strategies - This paper draws on Rogers’ theory to explain the importance of interactions for diffusion (which is relevant and sound). However, there are other theories that complement Rogers, and explain in a more nuanced way how and why individuals, dyads, and by extension, networks form, evolve, strengthen, dissolve etc. These theories could be used to inform and contextualize the findings - this will help connect the findings of this study (in LTC facilities) to the broader field. For instance, finding that opinion leaders are sought out because they offer sound advice, and are approachable is consistent with transactive memory systems and organizational learning (perhaps re-examine Nebus 2006, Borgatti & Cross 2003, Hertzum 2014).

Author response to points 1-4: Thank you for this helpful feedback. We agree with your comments, and we have added some theoretical literature in both the Introduction and Discussion.
sections (while also considering the journal word limitation). Because the audience for Implementation Science is composed of both scholars and practitioners, we have balanced theoretical and practical perspectives.

We have drawn more fully on the management/business literature (re: reviewer point 1) and we have situated our findings in organizational and systems theory and complexity science to further contextualize our findings about the professional advice network and the nature of advice relationships more generally to be relevant to other settings (re: reviewer point 2) (for example, citing Borgatti & Cross; Lanham et al.; von Hippel) (pages 22-24).

In the Background section (re: reviewer point 3), we have drawn more on innovation diffusion theory to further describe social networks and opinion leaders and the management literature to define another key network actor for diffusion - boundary spanners (pages 4-5).

We have also included the following hypothesis (re: reviewer point 4) based on our findings in the Implications for research section that we believe strengthen the paper’s contribution to the implementation science literature: Based on the results of the present study, we hypothesize that active advice seekers in the network can become opinion leaders over time. This finding needs additional confirmation and elaboration of specific boundary conditions (page 26).

2. Since this qualitative examination of advice seeking complements quantitative/structural studies, it would also strengthen the paper to contextualize the research question and findings given these other studies of communication and advice network evolution. There are relevant examples of studies conducted in public health departments, schools, hospitals, businesses, and other settings - your findings likely converge with and might help explain those results.

3. Relatively thin background section - could benefit from a more robust literature review and grounding within larger knowledge base of key network actors when it comes to diffusion.

4. In line with my other comments, I would like to see the authors push the discussion about theory, mechanisms of action, and connect to their thoughts for development of diffusion strategies a bit further. This might entail offering some hypotheses (about how advice seeking relationships form and evolve) that could be tested in the future.

5. The majority of the information in the first paragraph of Study results (# of interviews with each type of network actor, and their characteristics) might be more appropriate in method section when describing participants.
Author response: Thank you for this suggestion. We have moved the participant characteristics (from the results) to the methods section- this is highlighted in yellow (page 8).


Author response: Yes, thank you this was a typo that has now been corrected (page 10).

7. In the results section, the boundary spanners do not appear all that distinct from the opinion leaders based on the data offered. This may need more in-depth treatment.

Author response: Thank you for this feedback, we have added to the results the main distinguishing feature of boundary spanners which now reads in the paper as follows: A key defining characteristic of boundary spanners was that they strengthened the network by bridging gaps in the network, and they sought to transmit information broadly across the network, information that otherwise would not get shared among network members (page 12).

8. "Systemness" - I struggled with some of these quotes. To me, they don't illustrate an awareness of system complexity so much as a commitment to their clients/patients. This may need further examination and explanation.

Author response: Thank you for this comment. We defined systemness as opinion leaders’ and boundary spanners’ heightened sense of responsibility to help progress the care and operations of the long-term care system well beyond their own organization and its more narrow interests; for example, participants described system planning and developing system-wide policies (We have included these examples in the paper on page 11). Systemness means a sense of belonging to a system, and an interest in making that system better for all individuals/stakeholders (i.e., not just the residents in each participant’s facility), which is demonstrated through their passion to improve quality of care for long-term care residents and improve the quality of the work environment.

9. Would the authors be willing to include the interview guide and codebook (codes, definitions, and application criteria) as supplemental files? This helps provide additional detail to readers, and enhances transparency.

Author response: Thank you for this suggestion. We have included the interview guide for advice seekers and our coding scheme as supplemental material.