Reviewer's report

Title: How the study of networks informs knowledge translation and implementation: A scoping review

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Reviewer: Douglas Luke

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Review of How the study of networks informs knowledge translation and implementation: A scoping review

This paper is a scoping review of social network analytic methods used in one area of implementation science (knowledge translation)—namely applied to studies of health professional networks. The paper has a number of notable strengths: it is clearly written, well-structured, and the scoping review methods were conducted appropriately. The topic is timely, and likely to be of interest to an implementation science audience. Both conceptually and methodologically, systems science approaches (of which network methods are a subset) hold the promise of advancing the implementation science field. Given the stated inclusion criteria, the selected studies make sense, and the authors demonstrate a good knowledge of network analytic tools and methods. However, the paper has a number of areas of concern that collectively weaken its potential interest and impact.

The most important issue, in my mind, is that of scope. The review focuses on studies of 'health professionals,' which is extremely narrow in scope. Scoping reviews can and should be used to provide perspective on or an overview of a broad field (Moher, et al., Systematic Reviews 2015). Other than one sentence about the inter-professional nature of healthcare practice, no rationale is really presented for focusing in this area. It's not clear whether or how the broader field of implementation science would learn from the small number of studies reviewed here. (It also doesn't help that a somewhat broader, but quite similar scoping review was published by Duncan Chambers and colleagues in 2012, which found over 50 studies to include.) Rather than type of setting, perhaps the review could focus on the type of D&I study (e.g., dissemination studies, or implementation studies). I really think that a broader scoping review could be of immense benefit to implementation science, but whatever focus is ultimately used there needs to be a clearer argument about how the review will benefit the field.

Other, less major concerns are the following:

The introduction does a nice job of setting up the type of network theories and methods that will be the focus of the review. I think the paper would benefit by including some discussion and framing that takes a systems science perspective. Network methods are used to map and study complex systems (such as those that are the focus of implementation science)—and thus we can see that network methods are appropriate when we want to study these types of systems.
In addition to listing network visualization and descriptive statistics, I would explicitly include statistical and computational modeling as other relevant network methods in the 2nd paragraph (lines 70-82).

The end of the introduction (104-106) could be stronger. The review shouldn't just 'inform future research' but guide the field in certain specific ways. Whatever conclusions or recommendations you end up with in the discussion section should be set up here at the end of the intro.

Lines 132-133 - I didn't understand this.

It's not clear why the various exclusion criteria (149-154) were used.

I think it might be better to use the phrase 'modeling' or 'network modeling' to describe the information presented starting on line 212. Also, if none of the included studies used more sophisticated or newer modeling techniques such as ERGM (exponential random graph models) or SAOM (stochastic actor oriented models) you might want to mention that here or later in the discussion. (Actually you do mention these on p. 17, but could possibly set this up earlier.)

Given that many readers may not be that familiar with network methods, I thought that the Network Properties paragraph (228-232) could use a little more unpacking. You don't need to define everything, but introducing the broad types of network properties (actor promince, subgroup identification, etc.) might help.

I really liked the inclusion and description of the theories used across the reviewed studies.

Given the importance of network visualization in network analysis, I would like to have seen greater discussion of the variety (or lack of variety) of visualizations used in the studies. The short historical overview at the beginning of the discussion section is welcome, although you might want to emphasize more how young KT/D&I is as a field relative to social network analysis. You also might want to mention the work of James Dearing and Ev Rogers—in many ways network thinking applied to the diffusion of innovations is just as important (and may predate) Valente's important work.

In addition to discussing the utility of SIENA (270), you might want to mention how network dynamics can be explored within computational models such as agent-based modeling (e.g., El-Sayed, et al., Epidemiol Perspect Innov., 2012).

Your point about the utility of administrative data for network studies (295-300) is important, and could be amplified a little further (possibly giving a specific healthcare example).

Be very careful about your conclusions on page 16, especially on what was missing in the reviewed articles. The fact that you didn't see studies focus on '…adapting knowledge … assessing barriers to change… facilitating organizational practice…', etc., may have been due to the narrow focus of review!

Again, the Theoretical Insights section was quite strong, I thought.
That being said, much of the interesting material in the discussion section is not very tightly tied to health professional in healthcare settings. This goes back to my initial comment, and further supports the possibility of broadening the focus of the review.

The conclusion is fairly generic, and a stronger or more specific set of recommendations would be welcome here. Also, as suggested earlier, concluding something like "a small body of work focused preferentially on physician networks and restricted to information exchange patterns" begs the question of whether this is partially a methods artifact of the narrow inclusion/exclusion criteria.

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