Author’s response to reviews

Title: Longitudinal Assessment of the Association Between Implementation Strategy Use and the Uptake of Hepatitis C Treatment: Year Two

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Dear Dr. Hutchinson,

We appreciate the thoughtful reviews and the opportunity to revise our manuscript. Please see the point-by-point responses to Reviewer 2’s comments below.

Thank you,
1. The primary endpoint is the number of Veterans started on HCV treatment per year at each site. Is this truly a raw number as stated in their methods, or is it a proportion of eligible patients who are treated? If the dependent variable is the number of treatments that occur, and each VA has a somewhat limited population of eligible Veterans with HCV who could initiate treatment, then I worry that a VA which is successful in delivering HCV care in year 1, could show a falsely low number of treatments in year 2. In other words, if a VA has 10,000 Veterans with HCV in the VISN and they treat 6,000 in the first year, then there will only be 4,000 potentially treatable patients in the next year and the correlation between implementation strategy and the number treated will falsely show a decline. Similarly, if a VA is more effective than another (prior to implementation) then there may be less ground for improvement. Can the authors control for prior levels of treatment at each facility before evaluating the correlation between implementation strategies and the number treated?

We used the raw number of treatment starts in the year as our primary endpoint. While we did explore the proportion of patients treated in the first paper as well, there are disadvantages of this outcome. For example, using proportions, a site that treats 20 of 40 eligible patients appears to be doing as well as a site that treats 200 of 400 patients. Given that the sites that needed to treat a higher absolute number of patients likely were doing more active implementation, we chose to focus on the absolute number of treatment starts as our primary outcome.

We agree that the Year 1 treatment could have theoretically impacted the Year 2 denominator and the “opportunity to treat”. However, only 30,000 of over 160,000 eligible patients with HCV were treated across VA in Year 1. As shown in the table below, all sites still had many eligible patients in Year 2, and we found that the number of patients who were treatment eligible was strongly and positively correlated (r=0.88) between years, indicating that sites continued to have eligible patients. We added the table below to provide context and clarity and address this point.

2. Related to 1, it would be nice to see the actual number/proportion of treated Veterans and the changes over time. It’s useful to know that a given implementation strategy correlates with the number treated, but it is hard to assess the importance without a sense of the magnitude of change (I don't recall seeing an actual number of increase/decrease in treatment over the study period).

We added a table to the manuscript illustrating the absolute numbers of patients treated at the participating sites in each year (Table 2). This information was added to the results section of the manuscript. We also added the number of eligible patients in each site and the proportion of patients treated.

3. Given the large number of implementation strategies being tested, was there a statistical correction for multiple comparisons?
The statistical literature is generally inconclusive regarding when and whether to adjust for multiple comparisons. As such, following general guidance, rather than adjusting for multiple comparisons, we chose to acknowledge the potential for type 1 errors in the limitations. We would expect 5% to be significant by chance (~4) and we found 26 significant strategies.

4. How did the authors verify that the individuals at each hospital understood the different implementation strategies and how to differentiate them? I realize they developed a survey for this purpose, but am worried that conceptually similar strategies may bleed together in peoples' minds so that if they feel strategy A was used by the institution, then they are more likely to also say that strategy B was used because they seem somewhat similar.

We agree that it is possible that providers would not be able to distinguish between closely-related strategies. However, the clusters were designed to group similar strategies, and we did not find strong correlations between endorsement of specific strategies within a cluster. In fact, there was significant variation in endorsement of the strategies within clusters (where the most similar strategies are housed). This information was added to the discussion section. To further address this concern, we plan to conduct interviews with providers to assess their understanding and interpretation of the survey. We also acknowledged this limitation by changing description of the survey in the abstract from “reliable” to “useful”.

5. As far as strategies attributed to the HIT collaborative, is there a sense that these are being appropriately attributed? In other words, did the collaborative deliberately emphasize and support the strategies attributed to them more than others that were note?

We previously asked the HIT leadership team (n=6) to rate the strategies that they considered to be inherent to the HIT Collaborative. All six leaders agreed on specific strategies in Year 1 including access new funding, facilitate relay of clinical data, data warehousing, consensus discussions, preparing champions, information sharing/networking, and small tests of change. In Year 2 they felt the collaborative was responsible for these strategies as well as sharing knowledge gained from QI efforts, developing implementation blueprints, creating new clinical teams, and tailoring strategies to deliver HCV care. These choices by the Collaborative leadership team align well with the strategies that were often attributed to the Collaborative. However, the Collaborative leadership team also encouraged and supported creative strategies at the site-level and provided funding and support for any strategies that the sites deemed necessary, so it is possible that any strategy could theoretically and legitimately be attributed to the Collaborative. Conversely, many sites conducted activities independent of the Collaborative, which is why we assessed the attribution.

6. I was also curious if the authors were able to look at treatment success rates across VA's? This is certainly not necessary for publication but might be interesting to see if there's a relationship between implementation strategies and success as well as treatment initiation.
Overall the SVR rate, or HCV cure rates, were >92%. Given the efficacy of the DAAs in curing HCV, we did not expect to find enough variation in the SVR rates (among patients treated) to distinguish between sites and therefore did not assess these data. This is a potential area for future study.