Author's response to reviews

Title: Implications of Early and Guideline Adherent Physical Therapy for Low Back Pain on Utilization and Costs

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Limitations include reporting the validity and reliance of using ICD-9 codes to identify patients with general low back pain. In particular, many patients who have codes for "non-specific" types of low back pain also have codes for more specific types of back pain (e.g. spinal stenosis). It is not clear the PT guidelines apply to more specific forms of back pain that they apparently have not excluded.

To be clear, we removed specific pathology that would constitute a “red flag” condition for which PT would not be indicated (fracture, cauda equina etc.). We excluded these patients even if another “non specific” ICD-9 code was also present in the same episode of care. However, we realize that the coding process is an imperfect process therefore it’s possible that patients with a specific spinal pathology could have inadvertently been included in the data set. We do think this would be an infrequent exception rather than a common occurrence thus have no reason to think the findings would be altered in any meaningful way. There is also no reason to consider PT ineffective for those with musculoskeletal back pain who have a more specific diagnosis (sciatica, stenosis etc.).

Because the design of the study is observational, there is a high probability of selection by indication bias. Patients who are more enthusiastic about PT, less enthusiastic about interventional therapy, or who have milder or less specific form of back pain are more likely to receive PT and early PT. To help account for this selection bias, the authors should consider first apply more rigorous selection criteria to exclude patients who have co-existing codes for specific forms of back pain (e.g. spinal fracture, SCI, spondylolisthesis, scoliosis). They might also consider propensity-score matching approaches to limit the comparison groups to patients who are within the same region of support. This approach helps account for differences in selection bias, but not unobserved confounding. They should improve the discussion of the limitation that unobserved differences in patient characteristics or pathology may account for the changes that they observed.

We appreciate that the observational design of the study poses the potential for a selection bias to exist. We attempted to exclude non-musculoskeletal sources of LBP (e.g., kidney stones, urinary tract infection, etc.) within 4 weeks of the index date (Appendix) as well as patients with prior visits for LBP, a history of spine surgery, or spine trauma at any time. We also accounted for a number of co-morbid conditions that might influence LBP prognosis to mitigate against the possibility of selection bias, including mental health (depression, anxiety disorder, bipolar, schizophrenia, or other psychotic disorders), neck/thoracic pain, or fibromyalgia diagnoses by identifying the relevant ICD-9 codes over 12-months prior to the index date. Unfortunately, the data set did not contain clinical data on symptom duration/location/severity, physical examination findings, potential psychosocial variables, or patient-centered clinical outcomes (ie. pain, function, disability, patient satisfaction, etc.). Therefore, we acknowledge in the discussion the likelihood that those referred to physical therapy early could be more likely to have a shorter duration of pain, thus the potential for selection bias to have influenced these results. We also acknowledge that the retrospective observational design of this study imposes limitations on extending the associations we observed to causation.
The authors should also consider improving their summary and analysis of the imaging recommendations. In their study, the authors use imaging as an outcome to test whether PT use obviates imaging (it does- with a big effect). However they did not provide an overall estimate of the rate of "inappropriate" imaging. Most imaging appropriateness guidelines in back pain do not apply to those over age 50 years, or those who have "red flag" for serious problems. They are intended for non-specific back pain, not for those with specific spinal pathology. The authors somewhat overly-simplify these imaging recommendations by stating that clinical guidelines suggest to "avoid advanced imaging procedures ".

Thank you for this comment. We agree it's unlikely that we can assume that 100% of the differences we observed in advanced imaging based on early vs. late and adherent vs. non adherent PT is unnecessary based on current clinical practice guidelines. We added a sentence in the limitations section acknowledging that although we attempted to exclude patients with a specific spinal pathology, selecting patients based on ICD-9 codes is an imperfect process and therefore a few patients with a specific spinal pathology could have been admitted into the data set, in which case advanced imaging could be indicated.