Reviewer's report

Title: Impact of Social Integration on Metabolic Functions: Evidence from a Nationally Representative Longitudinal Study of US Older Adults

Version: 4 Date: 2 October 2013

Reviewer: Bradley Layton

Reviewer's report:

Discretionary revisions:

1. I find the p-values in Table 1 unnecessary. There is no hypothesis being tested: it’s simply the distribution of characteristics.

2. I would have preferred a more thoughtful covariate selection process where covariates were pre-selected based on potential for confounding determined by subject matter knowledge rather than a significance criterion.

Minor essential revisions:

1. The authors excluded those with missing covariate data. Was there any attempt to compare the distributions of measured characteristics between those retained and those excluded to see if there is any potential for selection bias?

2. The authors state that characteristics in Table 1 are for the participants at “baseline” while the outcomes are displayed for the 2006 wave. It is unclear exactly what this means: are the covariates the measurements in 1998 at the first wave, in 2006 at the last wave, or some other time?

3. The language is occasionally awkward, particularly in the introduction, and could benefit from a thorough editing.

Major compulsory revisions:

1. I am concerned about the covariate assessment. Some of the covariates are measured at the end of the study; factors such as BMI, medications, and socioeconomic status can vary widely over the 8 years of the study (particularly in older individuals), and clinical factors like medications are likely the result of changes in the biomarkers and metabolic functions under study. If the primary analysis is modeling the intercept $a$ (essentially the mean SNI in 1998) but you are adjusting for covariates measured in 2006, there will be inadequate adjustment of true confounding factors and potentially adjusting for factors along the causal pathway, reducing the causal interpretation, rather than increasing it.

2. Table 1 shows large differences in characteristics by Social Integration status for the measured covariates. How confident are the authors that they have captured and measured all potentially confounding factors? There appears a large chance that the observed protective effects may be due to unmeasured confounding. There appears to be no acknowledgement of this profound
limitation, which deserves some discussion.

**Level of interest:** An article whose findings are important to those with closely related research interests

**Quality of written English:** Needs some language corrections before being published

**Statistical review:** Yes, and I have assessed the statistics in my report.

**Declaration of competing interests:**
I declare that I have no competing interests