Author's response to reviews

Title: Assessing Nonresponse Bias at Follow-up in a Large Prospective Cohort of Relatively Young and Mobile Military Service Members

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Author’s response to reviews: see over
Dr. Aldcroft:

We appreciate the careful second review of the reviewers and the resulting opportunity to further improve our manuscript (Assessing Nonresponse Bias at Follow-up in a Large Prospective Cohort of Relatively Young and Mobile Military Service Members). We were pleased that our revisions had satisfied two of the three reviewers. Below, we have copied the critique of Reviewer #3 followed by our response. We hope that with these additional revisions, we have adequately addressed her concerns and that the manuscript is acceptable for publication in BMC Medical Research Methodology.

Sincerely,
Alyson Littman on behalf of the authors

Major Compulsory Revisions:
Unfortunately, the authors’ replies do not adequately address my main concern about this report, which is that they cannot justify the claim made in the conclusions i.e. “These findings suggest that analyses from this cohort should yield reasonably unbiased results.” In order to in any way justify these conclusions - which in any case rely on many assumptions (as pointed out by reviewer #2) - they will need to compare the characteristics of the 55k responders with the original random sample of 246k. Although, given the low response rate compared with the original sample (20%) they would still need to very cautious in making such a claim. The reason that epidemiological cohort studies are based on random samples is that a random sample should reflect the characteristics of the population being studied. If response is not 100% then, since the responders are not a random sample, there is likely to be bias in the results due to nonresponse. One can compare the characteristics of responder and non-responders in order to assess this bias and, if one has enough information one can adjust for this bias in a follow up study, the same thing applies. In order to adjust for bias, one still has to compare with the original sample, since the sub group who replied were not randomly sampled.

There seems to be no justifiable reason for not comparing responders with the original sample, given that most of the characteristics used in the weights were measured at baseline and thus the authors will have access to the values of these characteristics. It is not sufficient to quote previous work to justify this. If the authors are not able to do this, then they should remove this claim from the conclusions. It is also very unclear how much the new measures that were obtained from the baseline questionnaire affected response and also the probability weights. From what I can understand they may not affect them very much. Since most of the predictors of nonresponse were based on baseline (and thus more accurate) measures it might be better to use only the baseline measures in the first instance and then investigate how using the self-reported measures would affect these weight.

Response:
We appreciate the reviewer’s concern about addressing nonresponse to the first survey (“baseline”) and nonresponse to the first follow-up survey.

The reviewer questions why we have not compared responders to the 1st follow-up with the original sample, given that most of the characteristics used in the weights were measured at baseline. To clarify, only information obtained from the Defense Manpower Data Center was available on the invited sample; however, our weighting score included self-reported data that was not available on nonresponders to the first survey, including: deployment experience between 2001 and 2006, military status at follow-up, self-reported military exposures, smoking status, chronic drinking, self-reported
general health, major depressive disorder, early response to baseline questionnaire, age × military status at follow-up, and education × military status at follow-up. We would be much more limited in the information available to assign weights if we used only data from the Defense Manpower Data Center.

Nevertheless, we appreciate the importance of describing differences between the invited sample and the responders to the 1st follow-up survey. In the table below, we present the distribution of characteristics available on the invited sample, responders to the first survey and responders to the second survey (“the first follow up”) in order to more fully address the extent to which there are differences between the invited sample (which was a stratified random sample of the US military in the year 2000) and the responders to the second survey (which we also refer to in the paper as the 1st follow-up survey). When compared with the invited sample, responders to the first follow-up survey were slightly more likely to be female, older, non-Hispanic White or Asian/Pacific Islander, better educated, married, in the Army or Air Force, warrant or commissioned officers, and from health care or functional support and administration occupations. We have added the following sentence to the discussion, “Not surprisingly, many of the factors associated with response to the follow-up questionnaire were the same ones associated with response to the baseline questionnaire, namely female gender, older age, non-Hispanic White or Asian/Pacific Islander, higher education level, ever married, in the Army or Air Force, commissioned officers, and from health care or functional support and administration occupations.”

Thus, in response to the reviewer’s recommendation and to be more precise with our conclusions, we have revised the sentence in the abstract to read, “These findings suggest that prospective analyses from this cohort are not substantially biased by non-response at the first follow-up assessment.” and removed the sentence from the discussion (“If we accept as true the MAR assumption, then analyses of the Millennium Cohort Study should yield reasonably unbiased results based on follow-up nonresponse observed to date.”)
<table>
<thead>
<tr>
<th>Demographic and military characteristics obtained from the Defense Manpower Data Center</th>
<th>Original sample (n=256,400)</th>
<th>Responders to second survey (N = 54,960)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>76.0</td>
<td>73.3</td>
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</tr>
<tr>
<td>Female</td>
<td>24.0</td>
<td>26.7</td>
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<tr>
<td>Age group (years)</td>
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<tr>
<td>17-24</td>
<td>30.8</td>
<td>14.4</td>
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<tr>
<td>25-34</td>
<td>35.4</td>
<td>35.0</td>
<td></td>
</tr>
<tr>
<td>35-44</td>
<td>25.1</td>
<td>35.7</td>
<td></td>
</tr>
<tr>
<td>&gt;44</td>
<td>8.6</td>
<td>14.9</td>
<td></td>
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<tr>
<td>Race/ethnicity</td>
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<tr>
<td>White, non-Hispanic</td>
<td>64.7</td>
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<td>Black, non-Hispanic</td>
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<td>0.8</td>
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<tr>
<td>Hispanic</td>
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<td>5.8</td>
<td></td>
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<tr>
<td>Other</td>
<td>1.5</td>
<td>1.4</td>
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<tr>
<td>Education</td>
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<tr>
<td>Less than high school</td>
<td>7.6</td>
<td>5.4</td>
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<tr>
<td>High school diploma or equivalent</td>
<td>50.4</td>
<td>38.3</td>
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<tr>
<td>Some college</td>
<td>23.6</td>
<td>26.6</td>
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<tr>
<td>Bachelor's degree</td>
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<tr>
<td>Postgraduate</td>
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<td>10.9</td>
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<tr>
<td>Marital status</td>
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<td>Never married</td>
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<tr>
<td>Married</td>
<td>52.8</td>
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<tr>
<td>Divorced/widowed/separated</td>
<td>5.7</td>
<td>7.1</td>
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<td>Branch of service</td>
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<tr>
<td>Army</td>
<td>44.0</td>
<td>47.8</td>
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<tr>
<td>Navy/Coast Guard</td>
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<tr>
<td>Marines</td>
<td>7.2</td>
<td>4.1</td>
<td></td>
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<tr>
<td>Air Force</td>
<td>28.1</td>
<td>30.1</td>
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### Demographic and military characteristics obtained from the Defense Manpower Data Center

<table>
<thead>
<tr>
<th>Service component</th>
<th>Original sample (n=256,400)</th>
<th>Responders to second survey (N = 54,960)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Reserve/Guard</td>
<td>45.1</td>
<td>43.8</td>
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<tr>
<td>Active duty</td>
<td>54.9</td>
<td>56.2</td>
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<tr>
<td>Military pay grade</td>
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<tr>
<td>Enlisted</td>
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<td>72.9</td>
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<tr>
<td>Warrant officer</td>
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<td>2.1</td>
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<tr>
<td>Commissioned officer</td>
<td>14.3</td>
<td>24.9</td>
</tr>
<tr>
<td>Occupational category</td>
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<td></td>
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<tr>
<td>Combat specialists</td>
<td>20.9</td>
<td>20.4</td>
</tr>
<tr>
<td>Electronic equipment repair</td>
<td>8.0</td>
<td>9.2</td>
</tr>
<tr>
<td>Communications/intelligence</td>
<td>6.7</td>
<td>7.1</td>
</tr>
<tr>
<td>Health care</td>
<td>8.4</td>
<td>11.2</td>
</tr>
<tr>
<td>Other technical and allied specialists</td>
<td>2.4</td>
<td>2.5</td>
</tr>
<tr>
<td>Functional support and administration</td>
<td>17.9</td>
<td>20.2</td>
</tr>
<tr>
<td>Electrical/mechanical equipment repair</td>
<td>16.2</td>
<td>13.9</td>
</tr>
<tr>
<td>Craft workers</td>
<td>3.5</td>
<td>3.0</td>
</tr>
<tr>
<td>Service and supply</td>
<td>8.9</td>
<td>8.5</td>
</tr>
<tr>
<td>Students, trainees, and other</td>
<td>5.8</td>
<td>4.0</td>
</tr>
</tbody>
</table>