Author's response to reviews

Title: Lack of risk information causes overestimation of effectiveness in colorectal cancer screening: Analysis using the Analytic Hierarchy Process

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Author's response to reviews: see over
Dear Dr. James G Dolan and the Editorial Office

Thank you very much for re-reviewing our manuscript. We have addressed your comments with point-by-point responses, and re-revised the manuscript accordingly.

**Reviewers' comments:**

**Dr. James G Dolan:**

**Major compulsory revisions**

1. *Additional information is still needed about the study questionnaire.*
   The authors have clarified what the comparison questions were but it is still unclear exactly how the judgments were elicited. To make the methods more understandable, a brief summary or list of the comparison sets included in the study should be added to the manuscript; for example, a) effectiveness vs costs, effectiveness vs disadvantages, effectiveness vs costs, b) mortality reduction vs cancer detection, etc. An illustration that has elements substituted for the X and Y variables would also help, for example: “Which to you think is important…effectiveness or costs; Which do you think is more important… effectiveness or avoiding disadvantages, etc.

We appreciate your suggestion. The questions including the elements substituted for X and Y variables were presented as follows.

Q1. Which do you think is important, ‘effectiveness’ or ‘costs’ from the point of choosing colorectal cancer screening?
Q2. Which do you think is important, ‘effectiveness’ or ‘avoiding disadvantages’ from the point of choosing colorectal cancer screening?
Q3. Which do you think is important, ‘costs’ or ‘avoiding disadvantages’ from the point of choosing colorectal cancer screening?
Q4. Which do you think is important, ‘mortality reduction’ or ‘detection rate’ from
the point of effectiveness?
Q5. Which do you think is important ‘co-payment’ or ‘time cost’ from the point of costs?
Q6. Which do you think is important ‘complications’ or ‘false-positives/false-negatives’ from the point of avoiding disadvantages?
Q7. Which do you think is important ‘false-negatives’ or ‘false-positives’ from the point of avoiding false-positives/negatives?

2. More information is still needed about the subjects excluded due to high inconsistency values. Information about the number of inconsistent subjects in each group should be included as well as their demographic characteristics. This information is important to indicate the extent to which inconsistent judgments could have affected the study results or the study randomization procedure. It could be added to Table 1.

In Table 1, we have added full information about the inconsistent subjects.

3. It appears that the authors are referring to an immunohistochemical rather than a guaiac FOBT test. As these two types of FOBT tests differ in their sensitivity and specificity, it is important to make it clear in the manuscript exactly which kind of FOBT is included in the analysis.

As pointed out, FOBT in the present study means an immunohistochemical test rather than a guaiac test. We have added this comment to the Methods section.

4. The subjects’ reactions to the risk information could have been affected by how the information was presented to them, or framed. For this reason, one of the summary lists should be included as part of the study manuscript.

In the additional file, we have shown the “Information Sheet (originally in Japanese)” which was actually presented to the participants.

Discretionary revisions
1. Page 12: “We observed a significant change in priority with the
provision of risk information.” Although the provision of the risk information changed the preferred screening method for 8.4% of the subjects, more than 80% of subjects in both groups still preferred colonoscopy. I think including a more expanded discussion of the authors’ view regarding the significance of this change would strengthen the paper.

In the revised manuscript, we have added the following comments:

In the present study, the provision of the risk information changed the preferred screening method for 8.4% of the subjects. The priority for TCS in Group B can be regarded as an overestimation due to a lack of information. However, >80% of the subjects in Group A still preferred TCS in spite of the provision of risk information. These results suggest that many people can balance the concerns of disadvantages against the effectiveness of saving lives.

2. Some additional study limitations should be considered. In addition to the limitations noted, the results could have been affected by the way the information was formatted. It is also possible that excluding the inconsistent subjects could be a limitation if they were unequally distributed between the two study groups or had distinct demographic characteristics. As noted earlier, more information needs to be included in the paper about both how the information was presented to the subjects and the inconsistent subjects.

In the revised manuscript, we have added the following comments on study limitations:

The subjects’ reactions to the information, especially disadvantages, could have been affected by how the information was presented to them. Excluding the inconsistent subjects could be a limitation because of unequal characteristics between the consistent and inconsistent groups. Although statistically insignificant, the ratio of male is substantially high in the inconsistent group.

3. Both global and local priorities should be reported in table 2. Currently the data presented in table 2 are the priorities related to the global. This makes it hard to see if judgments regarding the costs and effectiveness sub-criteria were similar between the two study groups, as they should
be since there was no difference in information presented. Based on the data presented, it appears that the two groups differed in priorities assigned to the two effectiveness sub-criteria. The ratio between mortality detection rates and cancer detection rates in group A is 1.87, in group B it is 2.6.

I think it would be better to report both global and local priorities along with a table footnote explaining the difference and how the final scores were calculated. If there were any differences between the groups regarding the priorities assigned to the Effectiveness or Cost sub-criteria, this should be pointed out and the possible reasons for the difference discussed in the paper.

We have added the local priorities in Table 2 and a footnote explaining how to calculate the global priorities and overall priorities. The local priorities of ‘effectiveness’ sub-criteria differed between Group A and B. That is, the local priority of cancer detection in Group A (0.348) is higher than that in Group B (0.277). As you pointed out, they should be similar since there was no difference in the information presented. This disparity may have been caused by the inequality of the distribution of participants’ characteristics, particularly the difference in concerns about their own health. The number of ‘concerned a lot’ answers was relatively high in Group A.