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, Dr. Prasanta Dey and the Editorial Office

Thank you very much for reviewing our manuscript and offering valuable advice. We have addressed your comments as detailed in our point-by-point responses. We revised the manuscript accordingly.

[1] Comments from the Editorial Office:
1. We strongly encourage you to include an Acknowledgements section between the Authors’ contributions section and Reference list. Please acknowledge anyone who contributed towards the study by making substantial contributions to conception, design, acquisition of data, or analysis and interpretation of data, or who was involved in drafting the manuscript or revising it critically for important intellectual content, but who does not meet the criteria for authorship. Please also include their source(s) of funding. Please also acknowledge anyone who contributed materials essential for the study.

We have inserted an Acknowledgements section as follows: This study was supported by a Grant-in-Aid for Scientific Research from the Ministry of Health, Labour & Welfare, Japan.

[2] Reviewers' comments:
Dr. James G Dolan:
Major compulsory revisions
1. Additional information is needed about the questionnaire used to conduct the study. Although the content of the study questionnaire is fully described, it is unclear exactly what was asked of the study respondents and how it was presented. Including this information in the manuscript would help readers gain a better understanding of what
was done.
Details of the questions have been described as follows:
For their judgment of the relative importance between factor X and Y, subjects were asked the following questions.
Q: “Which do you think is important from the point of choosing colorectal cancer screening, ‘X’ or ‘Y’? Choose one answer from the following seven options.
Options:
1 X is extremely important.
2 X is strongly important.
3 X is moderately important.
4 Indifferent.
5 Y is moderately important.
6 Y is strongly important.
7 Y is extremely important.

2. Information about the consistency index results needs to be included. On page 9, it is reported that 68 respondents had consistency index values greater than the cutoff of 0.15 and were excluded from the analysis. No information is provided about the consistency index values of the 285 respondents who were included in the study. This information is important in judging the results of the AHP analysis and should be included in the study report. It is also important to report consistency index information separately for each study group and whether the patients who were excluded due to high consistency index values were equally distributed between the two study groups.
In the Results section, we added information about the consistency index values of Group A and B.

3. Additional information needs to be included about how the AHP analysis was performed. The manuscript currently does not include any information about the method used to calculate the AHP results. Was one of the commercially available software products used or a programmed spreadsheet? If the latter, the methods used to derive the priorities should be stated. For readers relatively unfamiliar with the AHP, it would be worthwhile including a brief expanded explanation of how the group decision-making process is done in addition to the brief
statement on page 9. This information would help them better understand and interpret the results presented. A brief footnote referring to this explanation would increase the understandability of Table 2. It would also be good to note that the table reports global priorities.

We used a programmed spreadsheet established using Microsoft Excel™ software. In the present study, we used a geometric mean method (GMM) to estimate individuals’ relative weights of each element. Aggregated weights of individual priorities were calculated with GMM for synthesizing individual decisions into a group decision. To derive the group weights for each element, we calculated the geometric mean from each individual pair-wise comparison matrix. A footnote referring to this explanation was also added in Table 2.

4. The characteristics of the two study groups need to be reported separately. Currently, Table 1 includes only information about the entire study group. This same information needs to be presented separately for each study group to make sure that the randomization process produced study groups that were equivalent with regard to these parameters.

The two groups were separated.

5. The implications of not including detection of polyps in the analysis needs to be discussed. A commonly stated objective of colorectal cancer screening programs is to identify and remove potentially pre-cancerous polyps. The fact that the model did not include polyp detection does not invalidate the results but needs to be acknowledged as a limitation of the model used for the study.

We included the following comments in the ‘Discussion’ section:

Another limitation is that the model we used did not consider the effects of polyp detection. One of the objectives of colorectal cancer screening programs is to identify and remove potentially pre-cancerous polyps.

Minor Essential Revisions

1. The perspective of the study model should be made explicit. Although the model presented seems to be intended to represent the patient point of view, I think it is worthwhile making this intention explicit to avoid potential confusion with cost-effectiveness analyses.
that are typically done from a societal perspective.
Thank you for this advice. Actually, this model represents the patient point of view.

2. The meaning of the overestimation of colonoscopy effectiveness presented as the primary result of the study needs to be discussed further. As stated, it seems to me that the magnitude of the overestimation could either be the difference between a priority of 0.603 and 0.652 or between an 89.2% versus an 80.2% likelihood of preferring colonoscopy. A more clear explanation of which result the authors are referring to when they use the term overestimation would improve the clarity of the manuscript.

In the revised manuscript, we added the following comment:
The priority of ‘effectiveness’ was higher in Group B (0.652) than in Group A (0.603), while the priority of ‘avoid disadvantage’ was lower in Group B (0.250) than in Group A (0.199). That is, a lack of risk information regarding perforation and bleeding increased the weight of ‘effectiveness’ and decreased the weight of ‘avoid disadvantages’.

Discretionary revisions
1. On Page 4, the term ‘selection problems’ in the phrase ‘We structured several selection problems into the hierarchy’ is confusing. Use of an alternative term or re-stating this phrase would help readers understand this part of the study better.

We reworded this phrase as follows:
We decomposed the decision problem into a hierarchy of more easily comprehended sub-problems.

2. The time needed for colonoscopy seems quite short. On page 8, the authors report that they estimated a colonoscopy would take about 2 hours and 15 minutes of a patient’s time. This seems to exclude travel and waiting time and any time to recover from sedation. (Most colonoscopies in the US are done under sedation and, in addition to the patient’s time, require the time of someone to drive them home.)

In fact, the time we presented did not include travel or waiting time. In Japan, most colonoscopies are done without sedation.
3. Several additional study limitations should be mentioned. In addition to the limitations already included in the manuscript and mentioned elsewhere in this review, it should be pointed out that much of the data used were estimates with broad ranges. It is possible that use of different estimates could have affected the study results. Because the same data were given to both groups, this would be more likely to affect the values of the calculated priorities than the differences in priorities between the two groups.

Thank you for these relevant observations. We revised aspects of the manuscript in accord with this advice.
Dr. Prasanta Dey:
Minor Essential Revision

1. This is an interesting study and it reads well. Although the significance of the study in terms of selection of specific test method for cancer diagnosis has been clearly stated, the significance of the research to the patients and clinicians in order to reduce overall morbidity and mortality needs to be further clarified.

Cancer screening exists to save lives. To reduce overall morbidity and mortality of cancer, it would be important to increase the rate of participation in screening programs. Several previous studies have indicated that the use of “decision-aids” significantly increased the rate of participation in colorectal cancer screenings [26, 27]. AHP can be utilized as a tool for decision aid.

2. The authors need to clarify the following points:
   1. What software was used for the AHP analysis?
      We used a programmed spreadsheet established using Microsoft Excel™ software.

   2. As per Saaty’s AHP model, the consistency ratio is 10% not 15%
      As pointed out, Saaty’s original model used a consistency ratio of 10% as a cut-off point. However, several previous reports, including Ref.24, used a consistency ratio of 15%.