Author's response to reviews

Title: Is population screening for abdominal aortic aneurysm cost-effective?

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Authors: Lars Ehlers, Jan Sørensen, Lotte Jensen, Merete Bech and Mette Kjølby

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Response: Below is given a point by point response to the comments from referee 3.

We have made a few changes in the manuscript due to the comments.

Referee 3: Some basic misconceptions are that age is an independent risk factor for AAA rupture. I am unaware of any evidence to support this. Age is a confounding variable as AAA gets larger with time and size is direct risk factor for rupture.

It seems that we have not explained this well enough in the text. We have now made a better explanation. We do not argue that age is an independent risk factor. We wish to highlight the bias in the decision analytical modelling studies from the use ‘memoryless’ models. This is a well known restriction of Markov models (the ‘Markov assumption’), and a topic which is often presented in economic discussions.

The problem is that hypothetical individuals in the models of AAA screening are assumed to face a constant probability of transiting to rupture when they have a large AAA no matter of how many years they have spent in this health state. One way to ‘build memory’ into the model is to implement time-dependency, but none of the studies have done so.

In this case the use of ‘memoryless’ models means that the average age of men dying of ruptured AAA is too low in the cohort simulations. A constant risk of rupture in each consecutive cycle gives a wrong distribution of death over time and a mean age at time of rupture that is much too low. Accordingly, the calculated number of ‘gained life-years’ due to screening and elective surgery will be too high.

In Denmark the mean age is 75 years at time of emergency surgery for rupture (for males ≥65).
Referee 3.: The statement about postop Qol is supported by an inappropriate reference and is still in conflict with the literature that I know and have published.

Response: We agree that the reference is not very good and should be deleted. We agree that the argument is in conflict with a large part of the literature and should be strengthened. The scientific quality of this body of clinical literature is not ideal. None of the randomised AAA trials have measured Qol in both arms before and after elective surgery. Only poorer designs have been published, such as case series or postal surveys. Thus we cannot be sure that Qol equals average population. This clinical literature is in conflict with public health evidence that smokers experience a lower Qol in their remaining years of life compared to non-smokers. AAA repair does not eliminate the impact on overall health from a history of smoking. Therefore we argue that at least further sensitivity analyses should have been made.

We have made minor changes in the text.

Referee 3.: The cost effectiveness of EVAR is increasingly well understood and justified.

Response: It is unlikely that EVAR is cost-effective for patients fit for open repair, but more likely an alternative for those unfit for conventional open repair. If the extra costs of EVAR are included in the calculations then the expected QALY gains should be added too. Nevertheless, EVAR is more expensive and will be used increasingly. A cost-effectiveness analysis of AAA screening should include these issues at least in a sensitivity analysis. We believe the text is sufficient as it is.
Referee 3.: There have been more contemporary reports about cost effectiveness of AAA screening that also conflict with this paper: Montreuil B et al. Can J Surg 2008, Kim LG et al Ann Inter Med 2007.

Response: We are already aware of these studies. Nothing needs to be added to our article. Kim et al has published an updated CEA with 7-year data on outcome from MASS (but still only short term hospital cost included). The result is to be expected. The study by Montreuil is a Canadian study based on the published evidence. Including this study in our review would not add much. We don’t see any reason to make an updated literature search.

Referee 3.: Furthermore, there are persistent grammatical and spelling errors, Table 1 and 2 are not numbered sequentially for some reason.

Response: The article was copy-edited by International Science Editing. We believe the numbers are correct.