

Author's response to reviews

Title: Dealing with uncertainties in environmental burden of disease assessment

Authors:

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Version: 2 **Date:** 17 March 2009

Author's response to reviews: see over

Dear editors, dear reviewers,

Thank you for considering our manuscript 'Dealing with uncertainties in environmental burden of disease assessment' for publication. We would like to express our appreciation for the thoughtful comments of the reviewers. Hereby we send you the revised version based on the comments of the reviewers. Below, we indicate how we have addressed these comments. We trust that we hereby have adequately addressed the key issues raised by the reviewers.

Sincerely,

Anne Knol
Arthur Petersen
Jeroen van der Sluijs
Erik Lebret

Reviewer's report 1

Title: Dealing with uncertainties: The case of environmental burden of disease assessment

Version: 1 **Date:** 12 February 2009

Reviewer: Annette Pruss-Ustun

Reviewer's report:

General points

- Timely and relevant topic, which should be of interest to all those dealing with environmental burden of disease estimates. Interesting structure and approach.

Specific points

<i>Comment made</i>	<i>Authors' response</i>
<i>Minor essential revisions</i>	
The argument made in the 2nd line of the introduction is misleading. Smith and co-workers estimate the GLOBAL impact on health of the environment, whereas Melse et al limit their estimates to the OECD. It is well-known that the impact of the environment in developing countries is much higher than in the OECD.	The quoted percentage from the Melse et al. study does concern the global impact. Their results are as follows: total environmental BoD in OECD region 2-5%, non-OECD 8-12%, world 7.5-11%. We have made this clear in the text.
Some issues made in Table 2 have little to do with uncertainty. Source one, "defining the environment", has to do with the clear explanation of scope and definition. So it is not a scenario uncertainty nor a value or methods unreliability. It would become an uncertainty only if the scope would not be explained or defined in the analysis.	In the (broad) typology of uncertainty used here, the fact that 'environment' can be defined in different ways is an uncertainty as such. If the scope of the analysis is not defined properly, this uncertainty starts to become problematic. But even if it is properly defined, the underlying uncertainty still exists. We have explained this in the text.
Table 2: I would propose deleting sources 1 and 2 and replace them by "health impacts which could not be quantified - either through incomplete exposure or exposure-response information. By the way,	Sources 1 and 2 in table 2 concern different types of uncertainties than the alternative proposed here. They are a form of context uncertainty, whereas this alternative is partly parameter uncertainty (exposure-

<p>the line "context uncertainty" is misplaced in table 2 (should go UNDER column headings).</p>	<p>response function missing) and partly input data uncertainty (exposure data missing). We have therefore chosen to keep the examples as they are. Source 7, 8 and 11 in the table resemble the proposed alternative.</p>
<p>Table 2: Not sure how source 6, "accounting for susceptibility of the individual" should be understood. Do you mean cases in which we have RRs which do not cover certain vulnerable groups, such as children, the elderly or immune-compromised individuals? Then you should rephrase it by "RR not studied/available/representative for certain population sub-groups".</p>	<p>We agree and have changed this description into "Accounting for susceptible groups if the available relative risk is not representative for this group"</p>
<p>Furthermore, ref 5 concluded (line 463) that currently global estimates can only be made for 3 environmental risk factors AT COUNTRY LEVEL (this must be specified, otherwise the statement is wrong).</p>	<p>This has been corrected</p>
<p><i>Discretionary revisions</i></p>	
<p>Line 470: R. Lucas, author of the ref 32, has just published a global eBOD study for UV radiation. By the way, she does not use UV exposure duration.</p>	<p>The reference has been added in the introduction.</p>
<p>Line 458 etc: Ref 5 is not a very good example for input data uncertainty. At least for the great majority of countries with nationally representative data, it's about as good as input data get. For the remaining countries with modelled data, that's indeed the case (and expert opinion does not come in here, other than in the model). By the way, the whole solid fuel use estimation is in detail outlined in another publication (Rehfuess E et al., about 2007 or 2008). As compared to national noise exposure data, for example, the mentioned survey data are much more reliable.</p>	<p>We agree that the input data for this specific issue is about as good as it gets for the countries that have representative data. Therefore, we only refer to those data that are modeled/ extrapolated. We have removed the reference to expert judgment, as this might be confusing. We have added the reference.</p>
<p>The structure of uncertainties is nice, and the proposed solutions are interesting. It would however be nice to illustrate the proposed approach with a practical application to eBOD - should you have it.</p>	<p>As far as we are aware, the methods proposed here have not all been implemented in one eBOD study. We have therefore chosen to take examples from different studies. We hope to apply these methods to future eBOD studies.</p>
<p>There are grading systems for the confidence in effectiveness of interventions, which cover various of the uncertainty parameters mentioned here, for example GRADE. Although not directly applicable here, it would have been relevant to discuss what are the limitations of existing systems of grading the evidence commonly used for evaluation of evidence.</p>	<p>We have included references to grading systems. However, we feel in-depth discussion on the various grading systems goes beyond the scope of this paper.</p>
<p>Table 2: Regarding source 4, "evidence is weak and contradicting", it might be useful to mention that in such cases one</p>	<p>This has been added.</p>

should consider not to perform an eBOD estimate	
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Level of interest: An article of importance in its field

Quality of written English: Acceptable

Statistical review: No, the manuscript does not need to be seen by a statistician.

Reviewer's report 2

Title: Dealing with uncertainties: The case of environmental burden of disease assessment

Version: 1 Date: 27 February 2009

Reviewer: David Briggs

Reviewer's report:

The paper offers a useful review of some of the issue relating to DALYs for health impact assessment, and especially to the sources of uncertainty in DALYs and ways of defining and dealing with them. It draws heavily on the ideas of Walker et al about types of uncertainty, and might benefit from a clearer explanation of how the typology suggested here relates to, or extends, their ideas.

Authors' response

The typology indeed draws from ideas of Walker et al., who themselves base their ideas on e.g. Funtowitz and Ravetz (1990) and Jeroen van der Sluijs (1997). We have chosen not to go into detail about the history of uncertainty typologies. However, we have included some information about how our typology differs from previous ones.

My main criticism of the paper as it stands, however, would be that the text is, at times, rather too bland and general (and sometimes rather slack). It would benefit from some attention to ensure that the arguments are clear, precise, well-justified and concisely stated. There is also a tendency towards the end of the paper to 'preach' about what ought to be done, rather than discuss the issues and methods for dealing with them, and evaluate the different options.

I have annotated the pdf highlighting some of these issues, and suggesting rewording in some cases, and will append this if the on-line review system allows me.

Authors' response

We have reviewed and partly revised the text and our argumentation and statements.

The grammatical suggestions made in the pdf have almost all been included in the revised manuscript. Further comments have been dealt with as follows:

<i>Line (in original manuscript)</i>	<i>Comment made</i>	<i>Authors' response</i>
162	Needs a reference - and recognition that other authorities might assign different weights to these effects.	Reference has been added, as well as some further examples.
174	References to examples would be useful.	References have been added
188	This sentence is rather bland. What is meant exactly by 'useful methods to deal with various uncertainties'? Some examples or explanation	Sentence has been rephrased.

	needed.	
240	The word 'value' in this term seems unfortunate, since it is ambiguous in implying either something qualitative (social values) or something quantitative (a number). Can a better term be found?	Within the scientific discipline of uncertainty research, the word 'value' is often used in this context, so we decided to stay in line. However, we have addressed this concern in the manuscript by explicitly stating that we refer to personal values or normative judgments
355	This sentence confuses me. How does a risk factor affect a hazard? Do you mean affect multiple health outcomes?	We have changed 'hazards' into 'health outcomes'
397	These aren't really alternatives. In most cases the RR is based on some sort of systematic review of the available epidemiological studies.	This has been rephrased
407	An age group <i>is</i> a sub-population.	This has been rephrased
408	Not strictly true. There are European studies - but it is evident that the USA studies (for various reasons) have been considered as the main source of evidence.	This has been rephrased
410	The authors tend, annoyingly, to sprinkle e.g.s around the text.	We have limited the amount of e.g.'s
438	Further research doesn't really seem to be a method for dealing with this issue - just a need given the problem.	This has been rephrased
440	I'm not clear what the authors are really trying to suggest here.	This has been left out of the revised version
446	Aren't all these just examples of the lack of good quality data?	Yes. This has been rephrased
447	Surely exposure response functions are equally important.	Yes, they are, but in our typology they are part of parameter uncertainty
456	And, in the case of <u>exposure</u> measurements, for a very small number of individuals. Behind what is being stated here is the bigger problem that, normally, one has to rely on indirect measurements of exposure - e.g. of environmental concentrations. Even most of the models are really only models of concentration in air (as in the example below) some more remote proxy, not of exposure.	We have added information about this problem, which is indeed one of the biggest in relation to exposure assessment.
467	It's not the <u>difference</u> in methods that causes uncertainty, but the errors in the methods (including sampling).	This has been rephrased
472	This is not really a means of 'measurement', but rather of estimation.	This has been rephrased
472	This is confusing. The use of ecological study designs does not necessarily mean that ambient UV measurement data are used. The comparison of relevance here is really between exposure estimates based on ambient measurements, and those based on self-reporting. This is not necessarily related to epidemiological study design.	This has been rephrased

478	The data are often only available at highly aggregated levels, while more specific (e.g. local) data suffer from the small-number problem, in that estimates for rare outcomes may be highly unstable.	This has been added
510	In what way does it 'support the process'?	This is described in the remainder of the paragraph; we have made this more clear
530	Why can it not be of low importance or no importance at all? This seems to imply that one has to agree with the original listing.	We agree and have added "low importance"
544	What determines its appropriateness? What does this therefore mean in this context?	This has been rephrased
549	Again, teasingly vague! I'm not clear what I'm meant to deduce from this information.	This has been rephrased
670	This last statement is rather a bland and forlorn cry - and not really the main conclusion of the paper. I suggest omitting it.	We have deleted this statement.

Level of interest: An article of importance in its field

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

Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests:

I am collaborating with some of the authors on projects relating to the material presented here. However, I have endeavoured to judge the paper critically and fairly.

Reviewer's report 3

Title: Dealing with uncertainties: The case of environmental burden of disease assessment

Version: 1 Date: 24 February 2009

Reviewer: Jerome Ravetz

Reviewer's report:

The paper is a very high quality, bringing clarity to some very important issues that are insufficiently discussed in the literature.

My comments are almost all on points of English style; I have a few suggestions on substantive points, which I am sure the authors will appreciate.

<i>Line (in original manuscript)</i>	<i>Comment made</i>	<i>Authors' response</i>
234/5	READ: In those cases, one may instead have recourse ... procedures.	This has been rephrased
369	READ: assessing the structure uncertainties of predictive models	This has been rephrased
376	READ: However, resources often limit the possibility of running extensive alternative calculations,	This has been rephrased
379/380	READ: is to be recommended.	This has been rephrased
404	READ: RR estimates are available only to a limited degree or not at all.	This has been rephrased
407	READ: exposure-response	This has been

		rephrased
428	READ: Alternative but still realistic ... DALYs[49]. This large variation should be a reminder of the need for caution in the use of such indicators for policy purposes. If the choice of policy is sensitive to the precise value of the indicator, then an indicator with a large concealed uncertainty may be worse than none at all.	This has been rephrased
620FF	READ: is the defining advantage of the measure, but it also presents pitfalls.	This has been rephrased
649	READ: uncertainties that are identified. If they are not, then the interface between science and policy needs to be re-designed, lest misdirected policies be based on a false precision of scientific inputs.	This has been rephrased; the additional sentence has been added to the next paragraph.
663	READ: For example, there should be a study of the disproportionate way in which the uncertainty in small severity weights (such as severe noise-related sleep disruption [50;51]) affects overall assessment uncertainty.	This has been rephrased
673	ADD Overall, there should be a study of the pitfalls of such aggregated indicators, and the development of methods whereby the hyper-sensitivity of decisions to overly precise indicators can be identified and prevented.	This has been added

Level of interest: An article of outstanding merit and interest in its field

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

Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests:

I declare that I have no competing interests

General points from the editors

Your manuscript will benefit from careful editing to avoid repetition and tighten up the language. Please avoid overuse of quotation marks, italics and parenthesis for emphasis. If something is worth stating, it should not be in parenthesis or quotations unless it is a quote taken from somewhere or one else. We shall send you a marked copy by separate email. We would be grateful if you could address the comments in a revised manuscript and provide a cover letter giving a point-by-point response to the concerns.

Please also ensure that your revised manuscript conforms to the journal style (<http://www.ehjournal.net/info/instructions/>). It is important that your files are correctly formatted. Please remove the line numbering, the page numbers, the key words section on the cover page and under the abstract and the outline of section headers on page 4. The acknowledgments and the list of abbreviations should be moved to the end of the manuscript. The list of abbreviations should be in paragraph format. Please use a single font size. On page 6, the abbreviation a.o. should be avoided. On page 9 the phrase "for a more detailed

introduction, the reader is referred to [21;22]" in parenthesis should be removed or rephrased leaving the reference. On the bottom of page 11, please remove the phrases table one and table two. The entry (Table 2, #) is unclear. The references should be left justified without issue numbers, the journals should be in italics and the article number and article title in bold. Please add a discussion section and shorten the conclusions to a paragraph highlighting the findings of the research and their health and policy implications. One final comment, please revise the title of your manuscript so that it conforms with the journal style. A subtitle, if needed, should indicate the study type.

Authors' response

We have checked the language and removed excess quotation marks and italics. We have only kept the italics for references made to the typology of uncertainty. We have addressed the manuscript formatting points