Author's response to reviews

Title: Consumer-Perceived Risks and Choices About Pharmaceuticals in the Environment: A Cross-Sectional Study

Authors:

Simone Dohle (sdohle@ethz.ch)
Victoria E. A. Campbell (campbelv@ucalgary.ca)
Joseph L. Arvai (arvai@ucalgary.ca)

Version: 2 Date: 25 January 2013

Author's response to reviews: see over
Reviewer 1

Major Compulsory Revisions:

a) The chapter “objectives of the present study” describes the different goals of the study in detail and gives a good overview. The stated hypothesis seems quite straightforward intuitively, but it does not follow directly from the introduction. The authors might include a respective passage about the influence of seriousness of an illness on drug choices in the introduction.

_In the revised manuscript, we explain in more detail why we assume that the severity of the illness may have an influence on drug choices. A section was added in the introduction (page 7). We explain that severity is an essential part in the Health Belief Model. In addition, severity is an important factor when people need to decide on medical treatments. Studies about generic drugs have also highlighted that the perceived severity can have an influence on generic drug choices._

b) The authors provide very detailed information about the applied methods. Reading the scenarios and looking at tables 3, 4, and 5, I was wondering about the rationales behind the percentages indicating benefits for health/agriculture and risks for the environment (e.g., decline in reproduction rate of rainbow trout). How were these values defined? Are these “realistic” values (e.g., from a medical/chemical/toxicological perspective)? Is 0% environmental impact a realistic assumption for a drug that should cure cancer?

_The scenarios and, in particular, the impact levels (e.g., 0% decline in reproductive rate) were hypothetical. We worked with environmental toxicologists at Michigan State University to identify specific ecological targets of certain pharmaceutical products (e.g., trout) as well as impact levels (increasing from 0%). However, the impact levels we ultimately chose were selected to capture a range of risks and benefits such that respondents would be forced to think carefully about possible tradeoffs. Also, NB: We don’t state the cancer drug has no environmental impact (0%) in general. Instead, we only state that one of the cancer drugs leads to no decline (0%) in the reproductive rate of Rainbow Trout. Given that different drugs have different modes of action, we think it is safe to assume that some drugs have no influence on the reproductive rate of Rainbow Trout._

c) In the discussion, the authors write that people were using the affect heuristic when they had to “balance health and environmental considerations”. Do you have any evidence for this, e.g., data on negative affect elicited by the different scenarios?

_Unfortunately, we didn’t include any measure of negative affect in the study. However, we cite other research that suggests a link between cancer and negative affect. We also added a sentence that points to the fact that negative affect was not measured directly, and we conclude that further research is needed to provide direct evidence of negative affect (page 22)._
d) In the chapter “objectives of the present study”, the authors write “two different scenarios were compared”. This is a bit misleading since participants were presented with three scenarios (later it becomes clear that these two scenarios both refer to human health but you could clarify that pharmaceuticals used in agriculture was an additional scenario).

We agree, this is misleading. We added that “pharmaceuticals used in agriculture” was a third scenario.

e) I was also wondering why you used three different scenarios, could you please include a respective explanation in your paper?

We justify the use of these three scenarios through the addition of background information on illness severity and drug choice, as well as improvements to the way we describe the three scenarios (as noted in the response to comment d). We included drug use in agriculture as a third scenario because of the concerns vis-a-vis the presence of antibiotics and other therapeutics in freshwater sources (which we discuss in the introduction); we have added additional text to further clarify why we included this particular scenario (p. 8).

f) In the case of common cold, one drug was called “Getaway” (which could be interpreted by participants in the sense that the disease should “get away” or maybe, participants did not take this drug seriously because of its name) while the other two drugs do not have such “meaningful” names. Could the names of the drugs have had an impact on choices?

When we created the names for the scenarios, we were confronted with a trade-off. Real names may evoke unintended associations. Using no names could have made the health-risk scenarios more unrealistic and abstract. Therefore, we decided to create hypothetical names. We added a sentence in the methods section that points to this trade-off (page 11).

g) In addition to the reported analyses, you could also include ANOVA tables in your manuscript.

After giving this comment much consideration, we elected to not include the ANOVA tables because the current paper already includes 6 tables. We are comfortable with the explanation of our ANOVA results in the main body of the manuscript.

h) Figure 1 is a bit difficult to interpret since the reader needs to go back to the methods section to find out about the different versions. Maybe you could include this information in the table (or the respective risk/benefit values).

Because the figure depicts percentages, we feel that a figure is more appropriate than a table. We believe that the figure could be confusing because it is not clear what “Option 1” and “Option 2 means. Therefore, we added “Option 1 was always
more effective, while Option 2 was more environmental friendly” to the figure caption (page 35).

i) The authors write in the discussion that price is an important factor for people’s food choices. I can imagine, that this might also be the case for buying drugs (at least for OTC drugs for diseases that are not very serious). What changes would you have expected if price had been included as an additional factor in the different scenarios (common cold, cancer, agriculture)?

Price was not included in our study because we felt at the time it would not have been meaningful in all scenarios. Although we agree that it could be a relevant driver of choices in certain scenarios (namely OTC drugs and antibiotics in agriculture). We have added a short section on page 23, which both introduces these ideas and calls for subsequent research in this area.

Reviewer 2

1) (Minor Essential Revision) Abstract, paragraph 4 (Conclusions): The sentence “pharmaceuticals with large benefit for humans” is very vague. Does this refer to an individual compound, or to a compound group? Antibiotics cure diseases that range from insignificant to life-threatening. I would suggest to link it with the health risk that is being addressed through the compound, and not with the compound, as it is now.

We changed the sentence and deleted “pharmaceuticals with large benefit for humans”.

2) (Minor Essential Revision) Section “Toxicological effects of pharmaceuticals in the environment”, paragraph 1: Statements are too conclusive. Whereas I would agree that re. current knowledge pharmaceuticals do not pose a severe threat to humans (e.g. WHO report 2012), the jury is still out on the environmental effects. Not enough science has been done in this field.

We agree that further research efforts should focus on the environmental effects. We added three references that are in line with the statement that not enough science has been done in this field (page 4).

3) (Minor Essential Revision) Section “Risk management”, para 1: I get the point, but it is not being expressed correctly. The last sentence establishes a connection between frequency of detection and actual environmental risk, which is not there. One could argue that consumers guess quite correctly the difference in environmental hazard that these different compounds pose.

We agree. The last sentence was changed. We added that painkillers also have severe ecological consequences. The conclusion that people’s risk perception differs markedly from the actual environmental risks of pharmaceuticals makes more sense now.
4) (Minor Essential Revision) Section “Participants”: 29 should be changed for 39.

29 was changed to 39. Thank you for pointing this out.

5) (Major Compulsory Revision) Section “Results – Support of Environment Policy”: The direct comparison of the two scenarios does not work. The questions asked were too different: on the one hand there is an “environmental policy” that is compulsory and that can require the patient to take a less effective drug for his/her cancer treatment, on the other hand we have an environmental policy that is based on providing information which the patient can decide or not to act upon. Apart from a qualitative exploration of these differences and the difference in responses, I don’t think one can make more general statements, along the lines of “different support for environmental policy”. Not all policy is equal.

The section was changed according to the reviewers comment. However, we kept the ANOVA results, because theses results are interesting (e.g., gender effect) even though the scenarios might not be directly comparable.

6) (Minor Essential Revision) Section “Discussion”, para 2: The first two sentences convey a wrong impression: they equate being aware of the risks with recognising the severity of the problem. Two different things. I also believe the evaluation of the risk perception of consumers could be less speculative.

We believe the wrong impression might be due to the fact that it is not clear that the two sentences refer to the first part in the questionnaire (risk perceptions and evaluations of different risks to the natural environment). Therefore, we changed this section to emphasize the statement refers to the evaluations.

7) (Major Compulsory Revision) Section “Discussion”, para 5: The difference between the Option 1 and Option 2 answers for the cancer treatment is not very high. Clearly respondents are more in favour of Option 1 (less environmentally favourable), but the acceptance for Option 2 is surprisingly similar. I believe the first sentence of this paragraph should be toned down, to reflect a certain, minor preference of consumers for more effective/less environmentally friendly options in cases of significant health risk. However, the small difference in the values for Option 1 and 2 in the cancer scenario, coupled with the high acceptance for less effectiveness in the case of the simple cold, show that as soon as the health risk is smaller people are (surprisingly) willing to accept a trade off in favour of the environment. (I personally agree that a patient’s health comes first, but in my opinion the responses do not justify as clear a statement as the one that you provide at the beginning of the paragraph.) One could see this to indicate that, if people are this supportive, a policy that would prescribe the most environmentally friendly drug when drug effectiveness is similar would receive quite widespread support.
We are not in complete agreement with the reviewer on this point. The choice task in the cancer scenario supported a clear preference for Option 1 (more than 60% in all versions), in addition the ANOVA results indicate that participants were more satisfied with Option 1 in the cancer scenario (as compared to the common cold scenario). However, we agree that the results from the direct choice task in the common cold scenario suggests that people are less willing to accept a drug with negative environmental impacts when faced with a less severe disease. We believe, however, we are safe in assuming that consumers have strong preferences for more effective/less environmentally friendly options in cases of significant health risk. In addition, the question regarding the environmental policy demonstrated that consumers were rather opposed to a policy requiring doctors to prescribe the drug with the lowest environmental impact.

8) (Major Compulsory Revision) Section “Conclusions”, first sentence: I believe this statement has to be toned down (“hardly considered” is far too strong wording when one compares the answers of Option 1 and Option 2 in the cancer scenario). As I mentioned above, I believe the data shows a surprising willingness to consider environmental criteria, albeit not in situations when there is a serious health risk involved. Again, I would argue that the decision is not related to the pharmaceutical (“pharmaceuticals with large benefits...”), but to the perceived health risk. Whereas in this example they go hand in hand, in other cases they don’t. The wording “pharmaceuticals with large benefits for humans” does not do justice to the issue: I would argue that it is not a quality of the object (pharmaceutical), but a function of the relation of the subject to it (perceived health risk), on which the decision hinges.

The wording “pharmaceuticals with large benefits for humans” was changed in accordance with the reviewer’s comment. The word “hardly” was kept (see previous comment).

9) (Major Compulsory Revision) Section “Conclusions”, second sentence: The wording is too imprecise to my taste. What does that mean, “to balance health and environmental considerations”? The study determines that people are willing to accept trade offs re. The effectiveness of their treatment for the sake of the environment, and I believe that this should be made clear.

The sentence was changed in accordance with the reviewer’s comment.

10) (Major Compulsory Revision) Section “Conclusions”: Conclusions in general can be expanded.

Thank you for bringing this to our attention, We have expanded the conclusion in response to the comment from this reviewer.