Author's response to reviews

Title: Lessons from the Removal of Lead from Gasoline for Controlling Other Environmental Pollutants: A Case Study from New Zealand

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Response to Reviewers Comments on: Wilson & Horrocks "Lessons from the Removal of Lead from Gasoline for Controlling Other Environmental Pollutants: A Case Study from New Zealand"

We thank the reviewers for their helpful comments. These have helped us to further improve the manuscript. Specific responses to the comments are detailed below.

Reviewer 1: Bruce Lanphear

This is an interesting manuscript that illuminates the challenges of translating environmental health research to policy using a case study of leaded gasoline in New Zealand. The authors are to be commended for compiling a complex literature into a cohesive review.

1. I think it would be valuable if the authors summarized 5 or more specific recommendations in the concluding section of the manuscript that are currently sprinkled throughout the article. By forcing themselves to focus on the recommendations, the authors may want to consider other innovative recommendations or strategies, especially in an increasingly "flatter" world.

Our response: We have expanded the last section on "Conclusions and Recommendations" to address additional points:

> "Strengthening of policymaking processes on environmental health issues will also require appropriate in-house technical expertise in central government, adequate resourcing to resist industry pressure, and openness to input from the expertise in civil society such as non-governmental organisations and universities."
>
> "For small countries such as New Zealand the lack of appropriate government agencies to address such environmental health issues could also be ameliorated in the future through the provision of strong technical support from international bodies such as the WHO. These bodies can also develop relevant international treaties such as the Framework Convention for Tobacco Control."

We are however, hesitant about making more definitive recommendations given that this is the first such analysis of the leaded petrol phasedown in New Zealand.

2. Should there be an international society of scientists, public health officials and policymakers that try to enhance the use of research to accelerate policy to protect public health from environmental chemicals? Should there be an international agreement or accord indicating that countries which ban chemicals for domestic use not be allowed to market it elsewhere? Are there examples in the EU or

elsewhere? (The authors might disagree with all of these flippant ideas and certainly shouldn't feel compelled to include any of my specific examples, but I think a list of specific recommendations at the end of the manuscript would enhance the objective of the manuscript.)

Our response: We agree that there are advantages to international level approaches – especially for small countries. Hence we have added comments about the potential greater role for WHO in this area (and the example of the Framework Convention for Tobacco Control) – see the response to the first point above.

3. Page 10, 1st paragraph, the authors suggest that: "The New Zealand experience illustrates the weakness in decision-making that comes when no single government agency akin to the United States EPA has overall responsibility for an environmental health issue." While there is no doubt some truth to this statement, there are and have been considerable delays in promulgating effective standards in the US, even with a single agency. First, the EPA refused to consider lead a criteria pollutant until it was sued by NRDC. Then, as previously noted, leaded gasoline was initially regulated for the purpose of protecting the catalytic converter, not human health. The current air lead standard is 1.5 microgram/cm3, whereas WHO recommends an air lead standard of 0.5 microgram/cm3. So having a single agency may be necessary or desirable, but it isn't sufficient. The authors should consider a more nuanced recommendation that recognizes that having a single agency is important, but it isn't sufficient.

Our response: We agree (thank you) and have added additional points on the potential limitations of an EPA like organisation. We have also referred to more international approaches (such as via the WHO – as detailed above).

Reviewer 1 - Discretionary Revisions

4. Abstract: Suggest revising "Background" to: "Despite international evidence and high quality original research conducted in this country on the harm to child cognitive function and behaviour from lead exposure, it took over two decades to achieve the removal of leaded gasoline in New Zealand."

Our response: We agree and have made this suggested change.

5. The authors might consider citing an interesting article that describes how France had to "reinvent" lead poisoning due to children's exposure to residential lead hazards in 1985, as though it had never been previously described or studied elsewhere. One of the points made by the authors is that, too often, we fail to learn from the experiences and research conducted in other countries (Fassin, D, et al. AJPH 2004;94:1854-1863). Do the authors have a potential solution they could propose that would accelerate the international translation of environmental health research? A paragraph discussing the global elimination of lead gasoline

would be a valuable addition to the discussion section of this manuscript. Most readers are unaware of the progress or obstacles for the global elimination of leaded gasoline. If the authors are unfamiliar with the status of global elimination, they can find it by contacting Jim Rochow, who is with Global Lead Network, at jrochow@aeclp.org The web-site is: http://www.globalleadnet.org/about/international.cfm. The phase-out of leaded gasoline in the United States began in the 1970s primarily because leaded gasoline caused problems with the catalytic converter, not because it was a human toxicant. (see: Needleman HL. The removal of lead from gasoline: historical and personal reflections. Environmental Research 2000;A84:35:20-35). This may be trivial point, but it would provide a more realistic perspective about the accelerated timetable in the United States.

Our response: We have added into the *Background Section* (second paragraph) more detail on the final stages of the leaded gasoline global phaseout. We have also added in the Fassin and Naudé reference provided by the reviewer (into the last section). As to the potential value of an international approach – we have now added in reference to the WHO as discussed above (as well as the current United Nations initiative on the final leaded gasoline phaseout). With regard to the reasons for the EPA's first action (to protect catalytic converters), we have now added this information into the Table (along with the statements of General Motors on the need for a leaded gasoline phaseout to protect catalytic converters).

6. In conclusions and recommendations: The authors fault powerful industry interests, absence of a precautionary principle and weak policymaking machinery. What about the medical and pediatric societies? What about epidemiologists or public health groups? Are they free of any fault? Were they strong advocates to eliminate leaded gasoline? Was their policy efforts sustained? Did they consider lead poisoning a problem? Did they worry about leaded gasoline or other sources of lead? (I realize that the statements of the Royal Societies were described in the manuscript, but I would be surprised if the government ignored physicians if they spoke with a sustained and concerted voice.)

Our response: In this article we focus on structural issues, on government and industry since we consider that these are the key areas in this New Zealand case study. However, we plan to more fully study and describe the role of other players in future work. Even so, in this article we consider that we have still appropriately mentioned some of the relevant researchers and organisations eg, the studies by epidemiologists/researchers, the "NZ Association of Scientists", the "Royal Society of New Zealand", the group "Friends of the Earth", and the "Environmental Defence Society".

Reviewer 2 Bill Kovarik (Discretionary Revisions only)

7. One revision I would suggest - there is a statement that the findings are consistent with findings elsewhere. This is absolutely correct. Perhaps if this could be

explained a little more, it would help readers move from the specific case in New Zealand to the more general case.

Our response: We agree and have expanded this paragraph with additional references added (eg, to the leaded paint issue and the rediscovery of the lead hazard problem in France).

Reviewer 3 Shilu Tong

8. It remains unclear why policymakers are not effective in countering industry arguments. Although the authors mentioned a few reasons, how important is each of them in the government decision-making process?

Our response: We have explained some of the potential reasons: (i) The policymakers did not have a strong precautionary approach framework; (ii) They did not make optimal use of the research evidence (from NZ or overseas); (iii) there was weak technical capacity within the government departments (and relatively few staff); and (iv) multiple agencies were involved. The complexity of these issues makes us wary about putting relative weights on the importance of these reasons. For this to be justified we would probably need far more research evidence eg, multiple key informant interviews and more comprehensive examination of official documentation.

9. The authors indicated that the Senior Toxicologist was the only person who had expertise in the health risk assessment in the Department of Health at that time. What is his/her role in environmental health policymaking and risk management?

Our response: We have elaborated to say that this position involved providing technical advice to senior public health officials. We have also elaborated that there were no staff with specific training in environmental health epidemiology. Further details on the specific skill profiles of the Department of Health's staff is probably not justified given the desirability of keeping the article at a manageable length.

10. A substantial editing is required. For example, "The capacity within the Department of Health for independent analysis of the leaded gasoline and vehicle fuel alternatives issues ..." (p6) should be changed into "The capacity within the Department of Health for independent analysis of the issues about the leaded gasoline and vehicle fuel alternatives ..."

Our response: We agree and have made this suggested change. We have also gone throughout the whole text to improve the wording. A professional editor has also now critiqued the manuscript for us and improved its readability.

11. Relevant reference(s) should be provided in many places. For example, "The lag between the United States Environmental protection Agency's (EPA) launch of its

initiative to phase-out lead from gasoline in 1973 (Ref) to the start of New Zealand's phase-down in 1986 (Ref) ..." in p3.

Our response: We agree and have improved the cross-referring to Table 1 (where relevant references are cited). In other parts of the manuscript we have also improved the referencing (or cross-referring to the Table which contains the references).

Final comment

Thank you again to the reviewers for providing this feedback and the opportunity to revise the manuscript.