Reviewer's report

Title: Use of point-of-sale data to track usage patterns of residential pesticides

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Reviewer: Jane Hoppin

Reviewer's report:

General

This paper addresses an important topic in assessing exposure to residential pesticide: obtaining use reports. The authors have employed a useful strategy to use marketing information to assess patterns of permethrin use by the general population. This strategy, while not novel, is rarely used in environmental research and the authors should be commended for tackling this difficult issue. However, the authors don't fully address the general utility of this information in assessing human exposure and they don't fully discuss the limitations of this method. A main limitation is the incomplete coverage of this reporting system; the authors acknowledge this to some extent, but could explore this further since pesticides applied by commercial applicators may not be identified in this manner, nor will pesticides purchased at locations other than home stores.

Major Compulsory Revisions (that the author must respond to before a decision on publication can be reached)

The strongest parts of this paper are the methods and the results. The weakest are the introduction and discussion; not only are they far too long, but the citations are inappropriate (e.g., EPA data should be cited for pesticide registration history, not a Poverty report). In the first paragraph of the introduction, there are two conflicting statements about the number of active pesticide ingredients on the market (600 vs. 900); the 900 has an EPA reference, so it seems more believable, but the authors need to go through the document and find appropriate primary references for their statements.

Additionally the authors have overstated the ease with which information on agricultural use of pesticides is available. There is no mandated reporting in the US, some states do require this information. Use of GUP and RUP differs. It would be better for the authors to state that while there is some albeit limited reported of ag use information of pesticides there is even more limited information on the use of residential pesticides.

In both the abstract and the introduction, the authors state "... have been shown to be more pervasive than exposures to agricultural pesticides." But pervasive was never defined. Are these more widespread? Are the concentrations higher? Some more definitions of terms and some data to support the contentions would help the argument.

The abstract needs to be recast to focus on what the manuscript is about. I was looking for more information on methods and what you found rather than introductory material.

The introduction should indicate what year the pesticide information is for. As chemicals come and go from the market, it's important to know what calendar year is being referenced.

References in the introduction should be revised, including Ref 1, 2 (an EPA reference should be...
here for EPA estimates). Ref 5 (Fenske) doesn't support the statement that pesticides used in the
home are more pervasive than ag applied pesticides since he found that kids in ag homes had
higher levels of OP metabolites.
Ref 2 and 8 don't support the statement about pyrethroids (particularly Ref 8). Is the statement for
Ref 10 necessary? Ref 11 cannot be able to support the statement on increased popularity with the
banning of chlorpyrifos given that CP was banned in 2000 and this paper was published in 1990. Is
there a more recent review on pyrethroid health effects than 12? Ref 14 is a reference on pyrethroid
toxicity, not on pesticide use. Can a more appropriate reference (e.g., Farm Chemicals Handbook or
EPA registration info be cited?) Ref 15 is wrong.

The statement "While use and exposure to pesticides applied in agricultural settings have been well
categorized...." is incorrect. The authors should phrase this to reflect the actual state of affairs. not
well characterized, but more studied than in homes until recently.

In discussing references to home-use pesticides, the authors should include work from the MN
Children's study (Sexton et al. Environ Health Perspect, 2003; Adgate et al. J Exp Anal Env
Epidemiol, 2000)

Ref 7 does this refer to measured values in homes, or model estimates? The authors should
indicate.

In discussing the NHANES study, the authors state "This study measured human exposures to
multiple chemicals in an attempt to identify predictors of exposure and understand what chemicals
pose the greatest ... risks." The authors should indicate what the NHANES found.

In the methods and results, it would be helpful for further exploration of the potential underestimate
by the sampling frame. This would help readers identify the generalizability of the results.

In discussing the results, the authors should comment on whether the changes they observe are due
to actual changes in purchases or just changes in purchasing habits (e.g, bought from a store not in
the framework).

I'd like to see the authors suggest how to apply this for future analyses.

Discussion: It was unclear to me why EPA couldn't in theory obtain this kind of information through
some kind of post marketing surveillance requirement. Maybe a better discussion about what is
publicly available or what is CBI and how to make more specific data available would help.

The impact of CP coming off the market should be discussed earlier in the discussion. That's a good
marker of the utility of this exercise and should be presented earlier. (In this para on page 22, the ref
to 2 should be to an EPA reference)

The discussion of the NY PUR is a bit heavy handed. If access is granted for health based research,
 isn't that a start down the road to answering the questions raised here? Given the paucity of national
data on this topic, researchers should be encouraged to explore options, even if it requires an IRB
approval.

Conclusion, 2nd sentence: While MOST ag and commercial pesticides are regulated by EPA...
Under FIFRA, they ALL are and the sentence should be changed to address that.

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Minor Essential Revisions (such as missing labels on figures, or the wrong use of a term, which the
author can be trusted to correct)
The capitalization of all the types of stores was distracting and it seems inappropriate.

Define "sales channels" "adulticide"

Typo on units sold. Did Midwest units really go from 13,000 to 104,000 in a 1 year period.

References to the Oregon PUR should be included.

Discretionary Revisions (which the author can choose to ignore)

What next?: Unable to decide on acceptance or rejection until the authors have responded to the major compulsory revisions

Level of interest: An article whose findings are important to those with closely related research interests

Quality of written English: Acceptable

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'