Author's response to reviews

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

Authors:

Nyree Bekarian (nyree1@gmail.com)
Devon Payne-Sturges (payne-sturges.devon@epa.gov)
Stuart Edmondson (stuart@kellyreg.com)
Bill Chism (chism.bill@epa.gov)
Tracey J Woodruff (woodruff.tracey@epa.gov)

Version: 2 Date: 16 August 2005

Author's response to reviews: see over
Dear Drs. Black and Hoppin,

We are pleased to have had the opportunity to improve our manuscript per your suggestions. We have reviewed and revised our paper and hope that our responses to your comments, and our revisions, are adequate. The following are your comments, each followed by our response.

Reviewer #1, Dr. Kathleen Black, University of Medicine and Dentistry of NJ

Comment 1: Abstract: Is the Mass Merchant channel included? Later in the paper (p. 12) a statement is made that the Mass Merchant channel was dropped.

Response: The reference to the separate sales channels has been removed from the abstract and replaced with ‘...sales data for home-use permethrin-containing pesticides sold by retail stores in the United States from January 1997 through December 2002…’ Mass merchant channel was dropped from the analysis.

Comment 2: Introduction: The introduction needs to be more focused. Many studies have been done on pesticides in homes, some after residential application, and a more extensive review of that database would be helpful. The data on chlorpyrifos seems to be unnecessary except for citing the withdrawals in 2000 and 2005. The data on pyrethroids can be better organized (some data on the persistence is cited in the discussion). Please clarify the meaning of most common (i.e., in most formulations or by pound AI).

Response: The introduction has been revised in order to be more streamlined, including the discussion on chlorpyrifos which was condensed to just pertinent information. Additionally, we have expanded the discussion on studies looking at home-use pesticides, namely the NHEXAS and Minnesota Children’s Health Study. These studies consisted of survey data, which included information on time-activity, behavioral characteristics, and pesticide usage information, as well as data from actual pesticide measurements in the home. We discuss the major pesticide findings concluded by these studies. While all previous studies done on this topic are important in the understanding of tracking efforts for home-use pesticides, we have limited the discussion of studies to the ones that are mentioned in the introduction in order to not weigh the introduction down with too much background.

Comment 3: Introduction: Under Tracking Home-use Pesticides clarify the reporting systems (compulsory, voluntary, residential, commercial) and distinguish from surveys (NHANES, NOPES, NHEXAS). How does point of sale system differ/improve these?

Response:
Language has been added on pages 4 and 5 in the sub-heading Tracking Home-use Pesticides to clarify whether reporting under state and national tracking systems is voluntary. We have also clarified that the state tracking systems are reporting systems while national systems are survey and measurement based studies. The point of sale system differs on these systems by making new data available to us: amounts of pesticides purchased by homeowners and renters in the US.

Comment 4: Materials and Methods: The VISTA data source needs more extensive discussion. Is reporting voluntary, who does report, etc.? Clarify the three sales channels (Hardware stores includes smaller scale, franchises and Mom & Pop?). If the mass merchant channel wasn’t used, then it needs to be stated here.

Response: Clearer definitions of the sales channels have been added in parentheses after each sales channel. We also added language that states that reporting to VISTA is voluntary and that reporting is done by individual retail companies.
We have also added a discussion on the Mass Merchant channel and the fact that it was dropped from analysis.
Please refer to the VISTA subsection of the Materials and Methods section on page 8.

Comment 5: Materials and Methods: p. 11, second full paragraph, the products that were dropped represented 17% of the data. Does this mean 17% of the total number of entries? Do you know the impact of this on the total pounds AI or units? This goes back to market coverage.

Response: One of the main concept that we are going for in this paper is to show that point-of-sale data is useful to compare relative types of usages and potential exposures by region, not absolute exposures. To this point, we have reinforced this idea throughout the paper. We have also removed the discussion on percent of data dropped from the study on pg 11 as this discussion is not relevant to the overall goal of the paper.
While it would be great to have a more complete picture of what is covered by marketing data, the point of sale approach described here can give us a snapshot of what pesticides people are purchasing for indoor and outdoor use. If used as a tool to get a big picture view of pesticide sales trends, then not having the Mass Merchant data represented here does not affect the overall goal of the project.

Comment 6: Results: The results do not have to be a complete description of the permethrin sales but rather an illustration of the type of data that can be obtained through the linkage of the VISTA and KRS systems. The authors should select the most important findings to illustrate the usefulness of the data. Any data on the impact of the mass merchant channel on overall estimates should be presented.
Generally, a lot of the results, in every section, are a reiteration of graphs. The text should contain only the most important information from the graph (is there a clear trend, the reported increases/decreases seem to only compare 1997 to 2002 in many cases). Also, is
the data pounds of product (first sentence) or pounds of active ingredient?

Response:
To remedy the problem of reiteration in the results section, we have edited out much of the text describing the graphs. We have also clarified that pounds sold refers to pounds of active ingredient sold.

With respect to the mass merchant channel, given the fact that we do not have a complete dataset of the mass merchant channel, and have no information on the percentage of the mass merchant channel that is covered by VISTA (that being protected under privacy laws), it would be impossible to come up with an accurate estimate of the impact that omission of the mass merchant channel has on the overall estimate of sales. That said, we have constructed an extrapolated model that shows what sales figures may have looked like had the company reporting in the mass merchant channel continued reporting and if sales followed the established trends. Since we don’t have any data to support this extrapolation or the estimates derived from them, we are not comfortable showing a chart in reference to this model or discussing it in the results section. We have added this discussion into the discussion section of the paper where we use the mass merchant story as an example of the limitations of this type of data. Please see the second half of page 20 in the discussion section.

Below is a chart illustrating the change in sales (in lbs) when the large company in the mass merchant channel discontinued reporting in 2000.
reported sales in pounds of permethrin dropped from just over 45,000 lbs of active ingredient sold in 1999 to 3512 lbs sold in 2000; a 14-fold difference. If sales of permethrin in pounds continued on the established trend from 1997-1999 in the mass merchant channel, a roughly linear trend, then projected sales in pounds in 2002 would have been about 58,000 lbs, vs. the 4051 lbs reported by Vista, and combined projected national sales for that year would have about 88,000 lbs, about 3 times as much as just the home center and hardware channels combined.

Comment 7: Discussion: The discussion should be centered on the pros and cons of the methodology (using point of sale data to estimate residential pesticide use). Are these overestimates or underestimates of pesticide use? This was started on p. 18 but not covered comprehensively. No data was presented in the results section to show the impact of the various channels on reporting or how much of the market they cover. Can the data be related to any other source (the Oregon system/NHEXAS) or in any way validated? The introduction of West Nile Virus and issues of chlorpyrifos cancellation distract unless a point can be made that the database is sensitive to changes.

Response:
We have removed the discussion on West Nile Virus to bring more focus to the discussion. We have also revised the discussion to reflect the main themes of the paper which are stated starting on page 17.

Comment 8: Discussion: P. 18/19: Please clarify the impact of the mass merchant channel on the analysis.

Response:
Please see the response to comment 5.

Comment 9: Discussion: P. 20/21 The discussion should focus on the point of sale database rather than increases/decreases in permethrin sales. Did West Nile virus affect residential use or largely governmental/commercial pesticide spraying? Did changes occur in all regions as WNV spread? Since the restriction on chlorpyrifos use was nationwide, were equivalent effects seen in all regions at the same time?

Response:
Since this database focuses on the sale of residential-use pesticides available for over-the-counter purchase, we do not have information on government or commercial purchases. Also, we do not have the tools or the information to overlay WNV data with our data. This type of analysis would be out of the scope of this paper, which is focused on relative comparisons of pesticide use. The decision to use chlorpyrifos vs. permethrin is largely dependent on the weather and type of pest and is not meant to answer a cause and affect question relating chlorpyrifos and permethrin. In discussing chlorpyrifos and the fact that it was banned from residential-use pesticides, we were not attempting to prove that the increases in sales seen for permethrin products were absolutely linked to the banning of chlorpyrifos. What we were doing in bringing up the points that the trend lines for permethrin sales tend to increase after the chlorpyrifos ban and spike for outdoor
sales in the South in 2001 is to illustrate the type of information that can be gleaned from this type of data and show that this type of data can be used to pinpoint interesting trends that may warrant further investigation.

**Comment 10:** Ways to improve this method: This appears to focus on ways to use this data (and other data needed) for exposure assessments rather than improving the database methodology. The discussion continues with a brief survey of other reporting systems with limited reference to the point of sale method.

**Response:**
We refocused the discussion and removed the “Ways to improve this method” subsection from the paper.

**Comment 11:** Conclusion: Again, the point of sale data is not a surrogate for exposure information. The data may, depending on the resolution and other data available, indicate residential pesticide use.

**Response:**
We have revised the Conclusion to reflect that the point of point-of-sale database is for pesticide sales tracking and not to be used as a surrogate for exposure measurements.

---------------------------------------------------------------------------------------------------------------------------------------

**Minor Essential Revisions (such as missing labels on figures, or the wrong use of a term, which the author can be trusted to correct)**

**Comment 1:** Abstract: The statement that contact with residues on household surfaces is more pervasive than exposure to agricultural pesticides is not supported in the paper, particularly if you consider dietary exposure.

**Response:**
The word ‘pervasive’ has been taken out of the abstract

**Comment 2:** Abstract: The point of sale data is not an alternative to exposure assessments, but can be used with other data to provide estimates and prioritize exposure assessment studies.

**Response:**
The abstract has been revised and edited and this contention has been restated to reflect the purpose of the paper.

**Comment 3:** Introduction: Please explain the difference between the first sentence (600 AI) and the sixth sentence (900 AI).

**Response:**
This discrepancy was corrected. The correction can be found on page 1, line 3 of the first paragraph.
Comment 4: Introduction: The fifth sentence what do you mean by more pervasive? Where does dietary exposure fit in? While many studies show the presence of pesticides in homes, the point of reference [5] (please correct typo to include Lu C as author) was that children of agricultural families could be exposed to pesticides through pathways other than residential use of pesticides (take home dust from nearby farmland). It does not support your statement.

Response: In the first paragraph of the introduction, the word pervasive has been replaced by the statement that “Several studies have shown that human exposures due to pesticides used inside the home are greater and occur more frequently than those exposures due to agriculturally applied pesticides.” The Fenske paper was not an appropriate citation for this statement. It has been replaced with a paper by Berkowitz et al, 2003 that found that pesticide exposures to people (namely pregnant women and children) occur more in the home, especially in urban settings, than in occupational or rural settings.

Comment 5: Materials and Methods: Please clarify Figure 1: Did KRS already have the EPA information listed or did you do a separate match?

Response: KRS already had the EPA information listed. They then matched the UPC’s with EPA information

Comment 6: Materials and Methods: Kelly Registration Systems: If KRS represents only 33 states, how did this affect interpretation of VISTA data? Could you have missed some permethrin formulations because states do not report to KRS?

Response: The analysis of which products were Permethrin formulations came from EPA data. The data obtained from each state gave us the link between the UPC’s and products, which in turn were matched to EPA products. The fact that only have 33 states are represented may have caused some UPC’s to be not be collected, e.g. regional veterinary products, but usually the quantity of these types of sales are insignificant

Comment 7: Identifying products: Please clarify how the 565 products became 115. Are the extra 450 the same products under different names? Will the same product be known by different names in different regions/states but have the same UPC?

Response: The extra 450 products are ‘alternate brand names,’ which means they are the same basic chemical formulation, but are marketed under a different name, and can include the difference between one scent and another. This may happen from region to region, but may even occur within the same store or chain of stores in the same region. In almost all
cases, if a product has a different name, it will have a different UPC (considering how it is used for inventory control purposes, if all scents were the same UPC, the store would never know which product really got sold, or how many ‘vanilla’ scent are left in stock). From a manufacturing point of view, the same thing applies. What will sometimes happen, though, is that a manufacturer will discontinue production of Product A and create a new and improved product, to which they may assign the same UPC. This is so they do not have to renegotiate with stores for shelf-space – they simply substitute products. This is heavily frowned upon by UCC (Universal Code Council) who regulate UPC’s, but they are an advisory body, not a rule-enforcing agency.

**Comment 8:** Description of sales channel belongs in the VISTA system.

**Response:**
We have moved the description of the sales channels from the end of the Materials and Methods sub-section to the VISTA sub-section on pg. 8.

**Comment 9:** Results: Please check the figures of pounds sold: The 257,000 pounds in the text does not seem to correspond with the graph (it seems twice as high).

**Response:**
The number 257,000 is actually 2700 (correct in the graph) and was corrected in the text to reflect that in the Results section under Pounds Sold (pg. 13).

**Comment 10:** Popular Formulations: The section actually refers to application type, according to the definitions in Table 2 and should reflect that in the title of the section and graph.

**Response:**
The subsection Popular Formulation was changed to Popular Application Types in the Results section, pg. 16.

**Comment 11:** Discussion: The database concerns only sales, not pesticide use.

**Response:**
This discrepancy has been corrected, largely by the revision of the discussion.

**Comment 12:** Discussion: P. 18 No data has been presented on exposures, only the purchase of products for indoor and outdoor use. Also, need citation for most time is spent indoors.

**Response:**
We have changed the language of the discussion to reflect that the paper is about tracking of household pesticide sales, not about exposures. The statement regarding time spent inside the home has been edited out of the text so no longer needs citation.
**Comment 13:** Discussion: P. 18/19 - Please clarify: Would estimating the mass merchant channel give an estimate 12% higher or 3 times greater?

**Response:**
Please see the response to comment 5 in the first section of comments. The restructuring of the discussion should clarify that it is not absolute sales comparisons that we are focusing on, rather relative comparisons that give a general overview of residential pesticide sales.

**Comment 14:** Discussion: P. 19 Second full paragraph is a repeat of point made on p. 17.

**Response:**
This issue has been resolved since the Discussion section was revised.

**Comment 15:** Discussion: P. 24 Please include other sources of exposure. Residential application of pesticides is only one source of exposure. While pretreatment of goods applications, drift from agricultural applications, take-home exposure from occupational use and dietary exposure.

**Response:**
We have added dietary exposures from food as well as drift from agricultural applications and pesticides tracked in by individuals to the list of potential other sources of pesticide exposure in the home. This discussion is now on page 22 of the paper.

Discretionary Revisions (which the author can choose to ignore)

**Comment 1:** Merging datasets: How many unique entries were made in the database?

**Response:**

**Comment 2:** Description of sales channel: Point out that the sales figures represent the 48 contiguous states and DC.

**Response:**
This text has been added on page 9 in the Description of the Sales channel in the first sentence.

**Comment 3:** Results: In terms of exposure, the data on pounds AI would be most useful. Do the authors believe units being sold in helpful (does it represent more use in more homes?) and needs as much detail? Are the data on national sales in dollars necessary?

**Response:**
**Comment 4:** Results: Indoor v. Outdoor: The phrase more popular is misleading. More pounds AI and more units are purchased.

**Response:**
The phrasing in this section (pg 13) has been edited and now reads: More pound and more units of indoor-use permethrin-based pesticide products are purchased than outdoor use products.

**Comment 5:** Results: Seasonal Trends: The regional use data is more interesting and helpful in targeting exposed populations. Did the regions differ in seasonal use? For Figure 5, since the annual trends are close, graphing the average units (or pounds AI) purchased each month for each region would be interesting and would demonstrate the usefulness of the database.

**Response:**
Figure 5 is no longer in the paper. However, there is no difference in seasonal use between regions. With the exception of a few weeks lag representing changing of seasons, they were not vastly different from each other.

**Comment 6:** Results: Popular Formulations: Again, would replace "popular" with a more appropriate term. Also, application type is an important factor in exposure and it would be interesting to see both in pounds AI and units sold.

**Response:**
Please see corrections on page 16.

**Comment 7:** Discussion: First paragraph: For exposure assessments, it would be useful to know how many homes are represented by the purchases (individual buyers). This would compromise consumer privacy and is one reason that the point of sale database needs to be supplemented with other data. This should be brought up in the pro/con of using point of sale data.

**Response:**

**Comment 8:** Discussion: P. 18: Please note that outdoor use of pesticide results in indoor exposures due to the tracking in of pesticides. Since more permethrin (by pounds and units) is sold for indoor use and people spend most time indoors, an exposure assessment following indoor application would be a priority.

**Response:**
Tracking in of pesticides was mentioned in this section.
Comment 9: Discussion: P. 22 Instead of improved formulation I would suggest changed. Mixing two pyrethroids may have improved negative health effects as well as improved efficacy. Can the database be used to distinguish combined formulations (where more than one AI is applied) from single formulation pesticides? The difference in trends between pounds AI and units sold is important to discuss, but cannot be interpreted without more data. The increase in the number of units may also reflect smaller units being manufactured, perhaps at the same formulation. The smaller sizes (and perhaps smaller prices) may be more appealing to residential consumers.

Response:
Wording has been changed here to ‘formula alterations’

Comment 10: Discussion: P. 24 The first paragraph mixes different databases and reiterates the point made on p.19 about public access. Should public access to this combined VISTA/KRS database be made publicly available or do we need a residential (homeowner) reporting system?

Response:
Since the discussion has been revised, this issue has been taken care of.

Reviewer #2: Dr. Jane Hoppin, National Institute of Environmental Health Sciences

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

Comment 1: 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.

Response:
We have tightened and restructured both the introduction and the discussion. The references have been corrected as has the statement on page 3 regarding the number of active pesticide ingredients on the market (which is 900).

Comment 2: 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.

**Response:**
We have adjusted the language in the discussion on availability of information on agricultural-use pesticides to say simply that this area has been studied more than the use of residential pesticides and also that more information tends to be available about the production and sale of pesticides intended for agricultural use than for those intended for residential use. This discussion appears on pages 4 and 5 in the introduction under the sub-heading 'tracking home-use pesticides.'

**Comment 3:** 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.

**Response:**
The term ‘pervasive’ has been taken out of the abstract and introduction and replaced with Several studies have shown that human exposures due to pesticides used inside the home are greater and occur more frequently than those exposures due to agriculturally applied pesticides.

**Comment 4:** 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.

**Response:**
The abstract has been revised and all unnecessary background information was taken out.

**Comment 5:** 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.

**Response:**
This information was added into the last paragraph of the introduction. The study period is from 1997 to 2002.

**Comment 6:** 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.

Response:
References 1 and 2 are now both primary EPA references. Ref 5, the Fenske paper, was not an appropriate citation for this statement. It has been replaced with a paper by Berkowitz et al, 2003 that found that pesticide exposures to people (namely pregnant women and children) occur more in the home, especially in urban settings, than in occupational or rural settings. Ref 6, Landrigan et al, does support the statement that ‘Pyrethroids have largely replaced organophosphate pesticides (OPs)’. A paper discussing finding from the NOPES study was used as a reference to the statement ‘until recently [OPs] were the most widely use active ingredients found in household pesticide formulations’. The risk assessment for permethrin is due to be released late in 2005. Many of the other synthetic pyrethroids are on the same time schedule or later. So the Office of Pesticide Programs won’t have anything that can be released.

The statement for reference 10 (which is no longer the same reference 10 and read ‘Negative health effects caused by chlorpyrifos exposure include neurotoxicity through inhibition of acetylcholine esterase, which, if severe enough, can be fatal) has been removed.

The statement ‘The availability and use of pyrethroids in and around the home is widespread and they have become more popular since the banning of chlorpyrifos and other OPs’ previously supported by ref 11 is no longer in the paper, neither is the reference. For reference 10 (He et al 1994, which was previously re 12) we have kept that reference in and added references 12-14 to support. The EPA risk assessment for permethrin is due to be released late in 2005. Many of the other synthetic pyrethroids are on the same time schedule or later. So the Office of Pesticide Programs won’t have anything very recent that can be released.

For the statement: ‘it is effective against head lice, fleas, ticks, mites, cockroaches, and other pests’ The agrochemicals handbook 1983 has been cited. For the statement: ‘Permethrin tends to be relatively persistent and can remain active for several weeks after application’, The farm chemicals hand book 2001 was cited. The citation for the statement: ‘While use and exposure to pesticides applied in agricultural settings have been studied more thoroughly, less is known about the uses, exposures, or human health effects of pesticides used in or around the home’ was fixed.

Comment 7: The statement "While use and exposure to pesticides applied in agricultural settings have been well characterized...." 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.

Response:
The language in this sentence has been changed to reflect that more studies have been done looking at agricultural use of pesticides than on residential use of pesticides. The
new sentence, found in the first line of the first paragraph in the subsection Tracking Home-use Pesticides in the introduction reads: While use and exposure to pesticides applied in agricultural settings have been studied more thoroughly, less is known about the uses, exposures, or human health effects of pesticides used in or around the home.

**Comment 8:** 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)

**Response:**
The portion of the intro that lists references to home-use pesticides has been taken out of the paper.

**Comment 9:** Ref 7 does this refer to measured values in homes, or model estimates? The authors should indicate.

**Response:**
Ref 7, which is now ref 5 (Pauluhn), refers the popularity of permethrin in pesticide products intended for household use because of its favorable chemistry. This is discussed in more detail on page 22, in the discussion section.

**Comment 10:** 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.

**Response:**
We believe that the reviewer is referring to NHEXAS study in this comment. We have added more information on preliminary conclusions from NHEXAS. Since final conclusions have not been published on this study, we were only able to comment on preliminary findings that have been published in peer review journals. We have also commented on the pesticides that the study looked at as well as various household medium that the pesticides are found. Please see page 6, second paragraph.

**Comment 11:** 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.

**Response:**
Do to the limitations of the database, ie the omission of the mass merchant data and the relatively short study period of 5 years; it would be very difficult to speak to the amount by which this database would underestimate sales of home-use pesticides. The overall theme of this paper is to describe a method that would allow us to look at relative purchasing of pesticides, not absolute amounts purchased or used.
Comment 12: 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).

Response: Due to limitations of the database, this would be impossible for us to answer. Please see the response to comment 11.

Comment 13: I'd like to see the authors suggest how to apply this for future analyses.

Response:
This analysis of point-of-sale data was undertaken to determine if clear and accurate information could be obtained in this manner. If resources become available in the future the EPA would be interested in evaluating the sales of other home and garden pesticides and to evaluate other sources of point-of-sales data.

Comment 14: 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.

Response:
While the EPA is always interested in better information to help inform our decisions this would require regulatory approval, additional budget appropriations, and a clear understanding of its value in making risk and benefit decisions. Even if such information were available without additional resources the EPA would not be able to expend the resources to properly analyze the information.

Comment 15: 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 paragraph on page 22, the ref to 2 should be to an EPA reference)

Response:
An appropriate EPA reference has been added to cite this discussion, please see page 18.

Comment 16: 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.

Response:
The statement regarding the NYPUR is actually in favor of more general access to the database. As it stands, access is mostly restricted to health-based research and not much more. While this is a start towards a greater understanding of pesticide use in residential areas, it would be better if more groups (i.e. NGOs and others) were granted access to these types of data as well.
**Comment 17**: 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.

**Response:**
The word MOST has been changed to ALL in the second sentence of the conclusions.

--------------------------------------------------------------------------------------------------------------------------

Minor Essential Revisions (such as missing labels on figures, or the wrong use of a term, which the author can be trusted to correct)

**Comment 1**: The capitalization of all the types of stores was distracting and it seems inappropriate.

**Response:**
The capitalizations were removed from the names of the sales channels.

**Comment 2**: Define "sales channels" "adulticide"

**Response:**
The term ‘adulticide’ no longer appears in the paper and the term ‘sales channel’ has been defined (see page 8)

**Comment 3**: Typo on units sold. Did Midwest units really go from 13,000 to 104,000 in a 1 year period.

**Response:**
This description of results is no longer in the paper.

**Comment 4**: References to the Oregon PUR should be included.

**Response:**
The reference to Oregon PUR was present but was cited in the endnotes as PURS Oregon. This has been corrected and now reads Oregon Department of Agriculture and is a reference to the PURS.