Sabine,

I think the manuscript is great and I agree with your interpretations of the data. However, I didn't get to discuss with Lorenz because he has been very busy this week. He will get back to you once he reviews the manuscript. The attached file is describing the method of obtaining dose response curves and threshold doses. Feel free to comment/edit. I am still working on producing confidence intervals for the threshold doses. I will keep you posted about the progress.

Have a good weekend!

---
Ge (Gloria) Tao, Ph.D. | 617-395-5026

Gloria and Lorenz

I have attached a draft of the ozone dose-response manuscript. Please let me know what you think of it, particularly the analysis and figures, and my interpretations of the data. Also, there is a piece of the methods that I am hoping that you could fill in. After you take a look at it, I will send it to the other authors for a full review. We are hoping to give this to the ozone workshop experts by next week.

Gloria, please do the analysis that would produce confidence intervals or SDs for the threshold doses - I think that reviewers are going to ask for those anyways, so we might as well get started on them.

Thanks for all of your work on this project,

Sabine
Great! I look forward to it!

Best,

---

Ge (Gloria) Tao, Ph.D. | 617-395-5026

---

From: Sabine Lange [mailto:Sabine.Lange@tceq.texas.gov]
Sent: Friday, March 06, 2015 3:45 PM
To: Gloria Tao
Subject: RE: Questions for ozone dose-response analysis

Thanks. I should be sending you the manuscript soon to take a look at.

---

From: Gloria Tao [mailto:GTao@gradientcorp.com]
Sent: Friday, March 06, 2015 2:39 PM
To: Sabine Lange
Subject: RE: Questions for ozone dose-response analysis

Sabine,

The second BSA should be airway surface area. I am sorry for that typo.

Mercet et al. 1994 reported their results as mean ± SE, where SE=SD/√n. I conversed 320 cm² to 0.032 m², then used 0.032×√9=0.096 to converse SE to SD.

Best,

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Ge (Gloria) Tao, Ph.D. | 617-395-5026

---

From: Sabine Lange [mailto:Sabine.Lange@tceq.texas.gov]
Sent: Thursday, March 05, 2015 5:43 PM
To: Gloria Tao
Subject: Re: Questions for ozone dose-response analysis

I'm still thinking about this, because I would like to offer in the paper a threshold that is set from a lower confidence interval or SD line. I will keep thinking.

In the meantime, I have questions about the following answer to my question about why BSA was not a good surrogate for respiratory surface area:

In the EPA dataset, BSA is 1.96 ± 0.15 m² (mean ± SD). In Mercer et al. 1994, total airway surface area from trachea to bronchioles was reported as 2,471 ± 320 cm² in human lungs. (mean ± SE and sample size is 9). It is equivalent to 0.2471 ± 0.096 m² (mean ± SD). The SD to mean ratio is 7.65% for BSA, while it is 38.85% for BSA. Therefore, respiratory surface area is more much more variable than BSA. Using BSA as a surrogate does not reflect the true variability among individuals.

I have two questions: In the third sentence you state that there is a ratio of 7.65% for BSA, and 38.85% for BSA. Should the second BSA be airway surface area?

My next question has to do with your conversion from cm² to m². I notice for the mean estimate that you just divide by 10,000, but for the SD it changes by a factor of 3,333. How was this calculated?
Hi Sabine,

I am afraid it may not be a good idea. I do not have the equations of the curves for the upper and lower CI’s. SAS only outputs confidence intervals as point estimates for each input dose level. The curves were plotted by connecting points. Although it is possible to obtain doses where CI curves intercept with the thresholds using a graph reading software, the accuracy and the interpretation of this method is questionable. Please let me know if you agree.

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Ge (Gloria) Tao, Ph.D. | 617-395-5026

Thanks Gloria, this is excellent.

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Please let me know if this works, or if it doesn’t make any sense,

Sabine

Hi Sabine,

Please see the attached word file and plots. Let me know if you have any questions.

Best,

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Ge (Gloria) Tao, Ph.D. | 617-395-5026
Gloria,

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Thanks again for all of your good work on this project,

Sabine

Sabine Lange, Ph.D.
Toxicologist, Toxicology Division
Texas Commission on Environmental Quality
(512) 239-3108
Sabine.Lange@tceq.texas.gov
Sabine Lange

From: Gloria Tao <GTao@gradientcorp.com>
Sent: Monday, March 09, 2015 12:03 PM
To: Sabine Lange
Cc: Lorenz Rhomberg
Subject: RE: Questions for ozone dose-response analysis

Sabine,

Thank you for sending the manuscript. I will discuss the manuscript with Lorenz and will get back to you this week. In the meantime, I will work on calculating confidence intervals and will get back to you as soon as possible.

Best,

---
Ge (Gloria) Tao, Ph.D. | 617-395-5026

Sabine Lange

From: Sabine Lange [mailto:Sabine.Lange@tceq.texas.gov]
Sent: Monday, March 09, 2015 11:03 AM
To: Gloria Tao
Cc: Lorenz Rhomberg
Subject: Re: Questions for ozone dose-response analysis

Gloria and Lorenz

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Sabine

From: Gloria Tao <GTao@gradientcorp.com>
Sent: Friday, March 6, 2015 2:46 PM
To: Sabine Lange
Subject: RE: Questions for ozone dose-response analysis

Great! I look forward to it!

Best,

---
Ge (Gloria) Tao, Ph.D. | 617-395-5026
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To: Gloria Tao
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Sabine

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Ge (Gloria) Tao, Ph.D. | 617-395-5026

---

From: Sabine Lange [mailto:Sabine.Lange@tceq.texas.gov]
Sent: Wednesday, March 04, 2015 11:45 AM
To: Gloria Tao
Subject: RE: Questions for ozone dose-response analysis

Thanks Gloria, this is excellent.

I have only one question, about the threshold confidence intervals/std devs. I would be satisfied with the threshold concentrations using the upper and lower CI’s from the dose-response curves. Can this be done? I guess that I am assuming that you have the equations of the curves for the upper and lower CI’s, because then it seems like you could just calculate the threshold doses the same as you did before. I acknowledge that this may be different that the 95% CI for the threshold itself, but I will present it accurately, as the threshold for the upper and lower CI curves.

Please let me know if this works, or if it doesn’t make any sense,

Sabine

---

From: Gloria Tao [mailto:GTao@gradientcorp.com]
Sent: Wednesday, March 04, 2015 10:34 AM
To: Sabine Lange
Cc: Lorenz Rhomberg
Subject: RE: Questions for ozone dose-response analysis

Hi Sabine,

Please see the attached word file and plots. Let me know if you have any questions.

Best,
From: Sabine Lange [mailto:Sabine.Lange@tceq.texas.gov]
Sent: Friday, February 27, 2015 3:40 PM
To: Gloria Tao
Cc: Lorenz Rhomberg
Subject: Questions for ozone dose-response analysis

Gloria,

I am in the process of writing up the ozone dose-response manuscript, and I have a few questions and some figure changes for you. I am hoping to get this manuscript written in the next week, and I will send it to you and Lorenz for your comments first (I particularly want to make sure that I haven’t misinterpreted anything), and after I get your comments I will send it to the other authors.

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(512) 239-3108
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Hi Sabine,

Please see the attached for updated sensitivity plots with regression functions and p-values.

Have a good night!

---

Ge (Gloria) Tao, Ph.D. | 617-395-5026

From: Sabine Lange [mailto:Sabine.Lange@tceq.texas.gov]
Sent: Tuesday, February 10, 2015 4:06 PM
To: Gloria Tao
Subject: Re: Sensitivity plots of individual data

This is great Gloria, thanks! Is there anyway to determine if those associations are statistically significant?

---

Ge (Gloria) Tao, Ph.D. | Biostatistician
617-395-5026 | gtao@gradientcorp.com

Celebrating 30 Years of Commitment to Science and the Environment

Gradient | 20 University Road | Cambridge, MA 02138 | 617-395-5000 | www.gradientcorp.com

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Hi Sabine,

Please see the attached for the sensitivity plots of individual data. The IDs "1_H, 2_H,..., 22_H" are data from the Horstman study, the rest are from the EPA dataset. Let me know if you need anything else.

Have a nice day!

---

Ge (Gloria) Tao, Ph.D. | Biostatistician
617-395-5026 | gtao@gradientcorp.com

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Gradient | 20 University Road | Cambridge, MA 02138 | 617-395-5000 | www.gradientcorp.com

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Sabine,  

The results are organized by ID. If an individual was exposed more than once, the FEV1 measurements were entered in the same row. For short exposure experiments, most individuals only have been exposed once. We have more data for long exposure experiments, but the data are sparse at 160 ppb, 180 ppb, 240 ppb. We may get 20 individuals both exposed to 0 ppb and 80 ppb to create a correlation plot. But for 80 ppb vs 240 ppb, we probably only have 3 individuals were exposed to both concentrations. I think we need at least 10 individuals exposed to both concentrations of interest to get a reliable estimate of correlations. Judging by the excel data, I guess only the cases for 0 ppb vs 80 ppb, 0 ppb vs 120 ppb and 80 ppb vs 120 ppb of long exposure experiments will have enough individuals. If such results of partial concentrations based on partial individuals are useful to you, I could definitely perform the analysis. Let me know your thoughts.

Gloria Tao | Gradient

Gloria,

I’m sorry that I missed this analysis the first time around, and thank you for explaining it to me. I see that in the excel file you highlight those people that are exposed to the same concentration twice. I am more interested in people who have been exposed to ozone twice (not necessarily the same concentration), because I think that we can still estimate their responsiveness from that. Does your assessment of the paucity of data (that you described in your last email) still apply if we look at people who have been exposed more than once, not necessarily to the same dose?

Thanks

Sabine

Sabine,
Thank you for your feedback. I did look at the reproducibility of ozone decrements in individuals. In the zip file I sent, there was an excel file named "all_sensitivity_Sabine" presenting the results. I attached it again with this email.

The McDonnell data were compiled from 15 studies looking at difference ozone exposures. As shown in the results, very few individuals had been exposed more than once (especially for short exposure experiments). Given this fact, the value of analyzing reproducibility has been greatly diminished. Although it is possible to graph the responses from different exposures against one another, each graph would be based on a different set of individuals and some graphs may have too few individuals to estimate correlation. Therefore, I suggesting not analyzing reproducibility of individual data.

Please let me know your thoughts about this issue.

Have a good day!

Gloria

Gloria Tao | Gradient

From: Sabine Lange [mailto:Sabine.Lange@tceq.texas.gov]
Sent: Monday, February 02, 2015 9:40 AM
To: Gloria Tao
Subject: RE: Ozone D-R Data

Gloria,

Thanks so much for this data analysis.

There was one task that I don’t see included in the individual analysis: we had discussed (back in December) looking at the reproducibility of ozone decrements in individuals (from studies where the same individuals were exposed more than once). So for instance, rating people as to whether or not they were more than one SD away from the mean, and then looking to see if, in another exposure, they were also predictably more than one SD away from the mean. Alternatively, you could probably graph the responses from different exposures against one another and look for a correlation. I had also been told that one could do an analysis of order, but I am not familiar with that analysis.

Please let me know if we need to talk about this further, and if you can do the analysis,

Sabine

From: Gloria Tao [mailto:GTao@gradientcorp.com]
Sent: Friday, January 30, 2015 3:38 PM
To: Sabine Lange
Cc: Lorenz Rhomberg; Julie Goodman
Subject: RE: Ozone D-R Data

Sabine,

Please see the attached for results of mean data analysis and individual data analysis. They cover all the tasks we have discussed so far. Let me know if you have any questions.

Have a good weekend,

Gloria
Sabine Lange

From: Gloria Tao <GTao@gradientcorp.com>
Sent: Monday, February 02, 2015 9:42 AM
To: Sabine Lange
Subject: RE: Ozone D-R Data
Attachments: all_sensitivity_Sabine.xlsx

Follow Up Flag: Follow up
Flag Status: Completed

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To: Sabine Lange
Cc: Lorenz Rhomberg; Julie Goodman
Subject: RE: Ozone D-R Data
Attachments: Final mean analysis.zip; Individual data analysis for Sabine 01-13-2015.zip

Follow Up Flag: Follow up
Flag Status: Completed

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From: Sabine Lange [mailto:Sabine.Lange@tceq.texas.gov]
Sent: Monday, January 26, 2015 9:36 AM
To: Gloria Tao
Cc: Lorenz Rhomberg; Julie Goodman
Subject: Re: Ozone D-R Data

Gloria,

Thanks for looking at this data with Lorenz and getting back to me.

2. That is fine.
3. I agree with your logic that we should exclude the 4 hour data.
4. Just let me know how the asthma analysis comes out.
5. That is fine.
6. I agree with your assessment of BSA and lung size, and that it is more appropriate to use L/min. Is this also true in children, or is it more appropriate to scale to BSA in their case? The reason I had suggested including this analysis is because most if not all of the other analyses have done this using BSA, and I was asked several times at my poster about whether the curves, etc look the same when taking into account BSA. Basically, I am trying to head off reviewers comments.
7. I'm glad that you agree with my method of data gathering - it took me a little while to get that all figured out.

Let me know if you have any more questions/comments.

Sabine
Hi Sabine,

I have discussed with Lorenz. We have the following suggestions/questions regarding some bullet points from your last email.

2. This file includes the sensitivity analyses – previously we had the meta-analysis data and the athletes data as sensitivity analyses, but I’m not sure that we really need that for the paper. The data is still in this file, but it has been grayed out.
   
   The athletes study (Gong 1986) only contains 3 data points. It is not plausible to fit a D-R curve using such small sample size. We suggest to just plot the data points with the D-R curves of healthy adults as we did for your poster, but do not conduct any statistical analysis on this study.

   The meta-analysis study (McDonnell 1994), may have covered studies already in the final dataset. Combining data of the meta-analysis with healthy adults will result in double counting of certain studies. Moreover, it is not plausible to create D-R curves for the meta-analysis study alone, considering the small sample sizes (4 for long exposure experiment, 6 for short exposure experiment). Therefore, we suggest excluding the meta-analysis study (McDonnell 1994) from the analysis.

3. There is more asthmatic data, which falls into long exposure & short exposure categories. There are also several studies that use a 4 hour timepoint, which is not currently included in our main analysis. I included another 4 hour paper (Aris 1993) – maybe we can use the healthy people from these studies to decide whether this data belongs with the long or the short, and then include the asthmatics in whichever comparison is most appropriate. I also have adolescent data, which we may or may not use – when I graph it, there is not a clear dose-response (the times and exercise levels are low). At the least this should be looked at separately, if not discarded completely.

   Although regression analysis can tell us if two groups have the same D-R trend (Like what we did for long exposure and short exposure), it will not work properly using small sample sizes for 4 hour studies. There are two data points in Aris 1993 (healthy), one data point in Arjomandi 2005 (asthmatic), and four data points in Balmes 1997 (two healthy and two asthmatics). We suggest excluding all the 4 hour studies from the analysis.

4. If you can, I am hoping to have a dose-response curve, equation, etc for the asthmatic data.

   We will try to model the asthmatic data. But we cannot guarantee results given the small sample sizes. We will also use regression analysis to test if it is appropriate to combine data of asthmatic adolescents and asthmatic adults. If so, the sample size can be increased.

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   This study (McDonnell 1987) only contains two data points. We suggest only plot the data points with the D-R curves of healthy adults, but not perform any statistical analysis on this study. The same is for applies to the children study (McDonnell 1985).

6. There are different papers in the L/min and L/min m2 groups for the sensitivity analysis, because these studies didn’t all give both types of information. These can be analyzed separately.

   Lorenz suggests that the ventilation ratio metric (L/min m2) is not appropriate for the inhaled dose we are considering, and therefore should not be used in D-R modelling. Suppose ozone is Category 1 gas, it reacts in respiratory tract and does not become systemic. The inhaled dose depends on the respiratory tract surface area but has nothing to do with body surface area (BSA). Moreover, BSA is not necessarily correlated with respiratory tract surface area, especially for adults. A big person with large BSA could have similar respiratory tract surface area to a slender person.
with small BSA. Therefore, dividing BSA from ventilation rate may bias the estimate of total dose. Please let us know if 
you agree with this suggestion.

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for the older sensitivity studies. Because of this, I wrote up an explanation as to how exactly I derived the data, 
depending on the type of data reported in the study (see below). There are codes underneath the study author of each 
study (P, VP, V, VC) that correspond to these different types of data. Please take a look at this and make sure that it 
seems correct.

Lorenz and I agree with your method of obtaining mean and SD.

Best,

Gloria

Gloria (Ge) Tao, Ph.D. | Biostatician
617-395-5026 | gtao@gradientcorp.com

---

From: Sabine Lange [mailto:Sabine.Lange@tceq.texas.gov]
Sent: Tuesday, January 20, 2015 5:41 PM
To: Gloria Tao
Subject: Ozone D-R Data

Gloria,

I think that I have finally waded through all of the papers and have a final version of the data. There are a few things to 
consider:

1. This file also includes the main analysis data that I sent before
2. This file includes the sensitivity analyses – previously we had the meta-analysis data and the athletes data as 
sensitivity analyses, but I’m not sure that we really need that for the paper. The data is still in this file, but it has 
been grayed out.
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studies that use a 4 hour timepoint, which is not currently included in our main analysis. I included another 4 
hour paper (Aris 1993) – maybe we can use the healthy people from these studies to decide whether this data 
belongs with the long or the short, and then include the asthmatics in whichever comparison is most 
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dose-response (the times and exercise levels are low). At the least this should be looked at separately, if not 
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at this and make sure that it seems correct.

I think that is it for now, I will let you know if I think of anything else. Please tell me if you have any questions,

Sabine

Method for collecting ozone mean data from papers:
This data analysis uses mean percent decrement of FEV\textsubscript{1} and SD of percent decrement of FEV\textsubscript{1}

- P - If percent decrements are reported, then I use them; some studies did not report the variance, and so I could not use it.
- V - If only volume in liters is reported, then I obtained mean percent decrement of FEV\textsubscript{1} by dividing the final volume by the initial volume (then subtract 1 and multiply by 100 to get the percent). This does not allow calculation of a SD.
- VP - If volume only is reported, but individual data is given, then I calculated the percent decrement for each person, then took the mean and SD and used those.
- VC - If the change in volume and the initial volume are reported, I can calculate the mean percent decrement in FEV\textsubscript{1} by dividing the change in volume by the initial volume. If a SD in change in volume is reported, then this produces a reliable estimate of percent change SD by dividing the volume change by the final volume ($r^2 = 0.972$).
Hi Sabine,

I have discussed with Lorenz. We have the following suggestions/questions regarding some bullet points from your last email.

2. This file includes the sensitivity analyses – previously we had the meta-analysis data and the athletes data as sensitivity analyses, but I’m not sure that we really need that for the paper. The data is still in this file, but it has been grayed out.

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Lorenz suggests that the ventilation ratio metric (L/min m2) is not appropriate for the inhaled dose we are considering, and therefore should not be used in D-R modelling. Suppose ozone is Category 1 gas, it reacts in respiratory tract and does not become systemic. The inhaled dose depends on the respiratory tract surface area but has nothing to do with body surface area (BSA). Moreover, BSA is not necessarily correlated with respiratory tract surface area, especially for adults. A big person with large BSA could have similar respiratory tract surface area to a slender person with small BSA. Therefore, dividing BSA from ventilation rate may bias the estimate of total dose. Please let us know if you agree with this suggestion.

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Lorenz and I agree with your method of obtaining mean and SD.

Best,

Gloria

Gloria Tao, Ph.D. | Biostatician
617-395-5026 | gtao@gradientcorp.com

From: Sabine Lange [mailto:Sabine.Lange@tceq.texas.gov]
Sent: Tuesday, January 20, 2015 5:41 PM
To: Gloria Tao
Subject: Ozone D-R Data

Gloria,

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1. This file also includes the main analysis data that I sent before
2. This file includes the sensitivity analyses – previously we had the meta-analysis data and the athletes data as sensitivity analyses, but I’m not sure that we really need that for the paper. The data is still in this file, but it has been grayed out.
3. There is more asthmatic data, which falls into long exposure & short exposure categories. There are also several studies that use a 4 hour timepoint, which is not currently included in our main analysis. I included another 4 hour paper (Aris 1993) – maybe we can use the healthy people from these studies to decide whether this data belongs with the long or the short, and then include the asthmatics in whichever comparison is most appropriate. I also have adolescent data, which we may or may not use – when I graph it, there is not a clear dose-response (the times and exercise levels are low). At the least this should be looked at separately, if not discarded completely.
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the study author of each study (P, VP, V, VC) that correspond to these different types of data. Please take a look at this and make sure that it seems correct.

I think that is it for now, I will let you know if I think of anything else. Please tell me if you have any questions,

Sabine

Method for collecting ozone mean data from papers:

- This data analysis uses mean percent decrement of FEV₁ and SD of percent decrement of FEV₁
  
  o P - If percent decrements are reported, then I use them; some studies did not report the variance, and so I could not use it.
  
  o V - If only volume in liters is reported, then I obtained mean percent decrement of FEV₁ by dividing the final volume by the initial volume (then subtract 1 and multiply by 100 to get the percent). This does not allow calculation of a SD.
  
  o VP - If volume only is reported, but individual data is given, then I calculated the percent decrement for each person, then took the mean and SD and used those.
  
  o VC - If the change in volume and the initial volume are reported, I can calculate the mean percent decrement in FEV₁ by dividing the change in volume by the initial volume. If a SD in change in volume is reported, then this produces a reliable estimate of percent change SD by dividing the volume change by the final volume ($r^2 = 0.972$).
Sabine,

- Thank you for your quick responses. Once you get the sensitive studies ready, we can use regression analysis to test if healthies from sensitive studies exhibits the same trend as healthies from healthy studies, if they are the same, we should put them in one curve, if not, we create separate curves. The same is for asthmatics. It is the same idea as we did regression analysis to determine that exposure duration did make a difference in the dose-response relationship.

- Thank you for your clarification, I really appreciate it.

- The little bit lag in the current figure is not statistically significant. If we choose to use linear regression model, that lag will be dropped. One more problem with linear regression curve is that it does not plateau at high total dose. In your poster, the short exposure curve dose not decrease to under 20%, but the new one does. We should go with the final complete data once we decide whether to include healthies from sensitive studies.

- Thank you for extending the deadline. I hope everything will go smoothly from here. Good luck!

Best,

Gloria

**Gloria (Ge) Tao, Ph.D. | Biostatistician**
617-395-5026 | gtao@gradientcorp.com

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**From:** Sabine Lange [mailto:Sabine.Lange@tceq.texas.gov]
**Sent:** Thursday, January 15, 2015 1:10 PM
**To:** Gloria Tao
**Subject:** RE: Ozone dose-response work

Gloria,

I am still inputing data for the sensitive analysis, but hopefully I will get that to you in the next few days.

As for your questions:

- I hadn’t realized that you included the data from the healthy people in the “sensitive” studies, but that was a good idea. I am of two minds about doing that now – we could do as you suggest and include the healthies in the main analysis, or we could create a separate curve of the healthies vs the asthmatics from those sensitive studies (since I now have enough studies to do a D-R curve of asthmatics). Which do you think would be better? I suppose that we could do both.
• You have a keen eye for the data ;-). Before I gave you the “Final Main Analysis D-R Data” file, I went back through all of the papers and made absolutely sure that I had all of the data correct. Sorry, I should have explained that when I sent it to you. I had made a few errors in transcribing data from papers to the spreadsheet, or in assuming resting ventilation rates (which are rarely provided). There were one or two more changes that I made in addition to Folinsbee 1978, but that was a big one. With Folinsbee I had incorrectly used a total mean ventilation rate (ie. Exercise + rest) as an exercise-only ventilation rate. I had also found that the paper itself provided a total dose (which is now what the doses are), and they closely corresponded to the calculations of the ventilation rates that are now provided. Here is the link for the paper, I invite you to look at it yourself to confirm (two sets of eyes are always better than one):
http://books.google.com/books?hl=en&lr=&id=pzxOiEacQkYC&oi=fnd&pg=PA125&dq=Pulmonary+function+changes+in+ozone#v=onepage&q=Pulmonary%20function%20changes%20in%20ozone&f=false
If you look at Table 2 on page 129, it shows the total effective dose of ozone in the table, and the total ventilation rate in the far left column.

• I looked at the graph, and it looks like there is a lag in the short-term data curve (from anti-oxidant buffering?), before it becomes linear. Regardless, I think that the data is correct, so whatever the model says I will go with. If we add the healthy data from the sensitive studies, that may change again.

• Jan 30 is fine – I have also been lagging in my timelines, because this is more complicated than I anticipated.

Sabine

From: Gloria Tao [mailto:GTao@gradientcorp.com]
Sent: Thursday, January 15, 2015 10:31 AM
To: Sabine Lange
Subject: RE: Ozone dose-response work

Sabine,

I am still working on the tasks and would like to clarify some issues with the data.

In the last D-R modelling analysis of healthy subjects I did for your poster, I included D-R data of healthy subjects from the "Sensitivity Analyses" section of the excel file you sent me before. In the recent excel file, "Final Main Analysis D-R data", you did not include D-R data of healthy subjects from studies also evaluated sensitive population (e.g. Holz 1999). Could you please let me know if you want to include these studies? I recommend including them because it is important to avoid "cherry picking" in analyzing meta data and the observations of healthy subjects from studies evaluated both healthy and sensitive subjects are comparable to the observations of healthy subjects from studies evaluated healthy population only. Please let me know if you have your reasons of excluding them.

I notice there are discrepancies between the file "Final Main Analysis D-R data" and "Lange O3 Dose Response". For example, the total dose of the last observation of Folinsbee (1978) from "Final Main Analysis D-R data" is 2200, but it is 1459.5 from "Lange O3 Dose Response". I notice you have changed the ventilation rate. Could you please confirm that you did so by further examination of related papers and we should use the data from "Final Main Analysis D-R data".

Due to the differences mentioned above, the D-R data of "Final Main Analysis D-R data" is different from what we had for your poster. Using "Final Main Analysis D-R data", the fitted curve of long exposure studies still is a sigmoid curve as before, but the short exposure data exhibits a linear trend instead of a sigmoid shape (see the attached, figure 1 of final main analysis.tif). This could be caused by the above issues about the data, or the linear trend is real because ozone concentrations are much higher in short exposure studies such that antioxidant is depleted immediately and there is no buffering effect as observed at low total doses in long exposure studies. Please let me know what do you think.

I know that we have been aiming for Jan 15th to finish all the tasks. However, I'm afraid we cannot make it at this point. Is it possible to extend the deadline for two weeks and aim for Jan 30th instead?
Gloria,

Thanks for your quick response and your good questions.

1. I think that the table just needs to be in L/min. The number with BSA is not so useful for comparing to actual exercise ventilation levels.
2. Your idea for statistical testing sounds good to me, as long as when you determine the expected FEV1 decrement for the adults (based on the short exposure data, I presume), you don't lose the variance of that number (that is, comparing the childrens number which is mean +- StDev to an expected adult FEV1 +- StDev).
3. Please do number 2 with both L/min and L/min m2

Sabine

Sabine,

Thank you for sending the data. I will send you results as I finish them.

1. Yes. Will you need the table based on L/min or L/min m2?

2. There are no observations of adults at the same dose of children. We could calculate an expected FEV1 decrement of adult using the D-R curve at the dose of children's experiment, then perform a t-test to see if the observations of children are significantly different from the expected FEV1 decrement of adult at the same dose. Let me know if you like this idea.

3. Sure. Will #2 be based on L/min or L/min m2 or both?

4. No problem.

Best,

Gloria
Gloria,

Thanks for this analysis. There are a few things that I would like to ask you to do with it, and I have some more data for you.

1. For the McDonnell individual data analysis that you sent me, can you make a table of the doses at which 0, 5, 10 and 15% FEV1 decrements occur, as you have done before, based on the short and long exposure lines? This will help us compare to the mean analysis.
2. Is there a way that you can do statistical analysis to see whether or not the children are statistically significantly different from the adults?
3. The body surface area for children is much lower than for adults - can you do this analysis using the dose of ppm L/m2 BSA, instead of ppm L (just as we are planning to do with the mean analysis). This basically divides all of the adult doses by ~2, but the children by ~1.5. Unless the paper gives the measured VE in L/min m2, I just divide the L/min by the BSA given in the paper. In the case of the McDonnell childrens' study, the exercise VE is given in L/min m2, and I use a default resting VE of 6 L/min m2.
4. I have attached a spreadsheet that gives the final main analysis mean doses and FEV1 decrements, in dose units of both ppm L and ppm L/m2 BSA. Please do the initial analysis, and the BSA analysis that we discussed (the first bullet point) using this final dataset. Hopefully by the end of the week I will have data from asthmatics that we should be able to do an identical analysis on.

Thanks, and please ask if you have any questions.

Sabine

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Gloria,  
The attached is our response to address task 2 listed below. I also attached the figures related to the analysis. Each figure has two versions, with and without equations. I am still working on task 4 and will get it to you as soon as possible.

Have a good weekend!

Gloria

---

Gloria (Ge) Tao, Ph.D. | Biostatistician  
617-395-5026 | gtao@gradientcorp.com
Sabine Lange

From: Gloria Tao <GTao@gradientcorp.com>
Sent: Thursday, January 15, 2015 10:31 AM
To: Sabine Lange
Subject: RE: Ozone dose-response work
Attachments: Figure 1 of final main analysis.tif

Follow Up Flag: Follow up
Flag Status: Completed

Sabine,

I am still working on the tasks and would like to clarify some issues with the data.

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Gloria (Ge) Tao, Ph.D. | Biostatistician
617-395-5026 | gtao@gradientcorp.com

From: Sabine Lange [mailto:Sabine.Lange@tceq.texas.gov]
Sent: Tuesday, January 13, 2015 1:48 PM
To: Gloria Tao
Subject: Re: Ozone dose-response work

Gloria,
Thanks for your quick response and your good questions.

1. I think that the table just needs to be in L/min. The number with BSA is not so useful for comparing to actual exercise ventilation levels.
2. Your idea for statistical testing sounds good to me, as long as when you determine the expected FEV1 decrement for the adults (based on the short exposure data, I presume), you don’t lose the variance of that number (that is, comparing the childrens number which is mean +- StDev to an expected adult FEV1 +- StDev).
3. Please do number 2 with both L/min and L/min m2

Sabine

From: Gloria Tao <GTao@gradientcorp.com>
Sent: Tuesday, January 13, 2015 12:34 PM
To: Sabine Lange
Subject: RE: Ozone dose-response work

Sabine,

Thank you for sending the data. I will send you results as I finish them.

1. Yes. Will you need the table based on L/min or L/min m2?

2. There are no observations of adults at the same dose of children. We could calculate an expected FEV1 decrement of adult using the D-R curve at the dose of children's experiment, then perform a t-test to see if the observations of children are significantly different from the expected FEV1 decrement of adult at the same dose. Let me know if you like this idea.

3. Sure. Will #2 be based on L/min or L/min m2 or both?

4. No problem.

Best,

Gloria

Gloria (Ge) Tao, Ph.D. | Biostatistician
617-395-5026 | gtao@gradientcorp.com

From: Sabine Lange [mailto:Sabine.Lange@tceq.texas.gov]
Sent: Tuesday, January 13, 2015 12:24 PM
To: Gloria Tao
Subject: Re: Ozone dose-response work

Gloria,

Thanks for this analysis. There are a few things that I would like to ask you to do with it, and I have some more data for you.
1. For the McDonnell individual data analysis that you sent me, can you make a table of the doses at which 0, 5, 10 and 15% FEV1 decrements occur, as you have done before, based on the short and long exposure lines? This will help us compare to the mean analysis.

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Thanks, and please ask if you have any questions.

Sabine

---

From: Gloria Tao <GTao@gradientcorp.com>
Sent: Friday, January 9, 2015 2:10 PM
To: Sabine Lange
Cc: Lorenz Rhomberg; Julie Goodman
Subject: RE: Ozone dose-response work

Hi Sabine,

The attached is our response to address task 2 listed below. I also attached the figures related to the analysis. Each figure has two versions, with and without equations. I am still working on task 4 and will get it to you as soon as possible.

Have a good weekend!

Gloria

Gloria (Ge) Tao, Ph.D. | Biostatician
617-395-5026 | gtao@gradientcorp.com
Sabine Lange

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To: Sabine Lange
Subject: RE: Ozone dose-response work

Sabine,

Thank you for sending the data. I will send you results as I finish them.

1. Yes. Will you need the table based on L/min or L/min m2?

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3. Sure. Will #2 be based on L/min or L/min m2 or both?

4. No problem.

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Sent: Tuesday, January 13, 2015 12:24 PM
To: Gloria Tao
Subject: Re: Ozone dose-response work

Gloria,

Thanks for this analysis. There are a few things that I would like to ask you to do with it, and I have some more data for you.

1. For the McDonnell individual data analysis that you sent me, can you make a table of the doses at which 0, 5, 10 and 15% FEV1 decrements occur, as you have done before, based on the short and long exposure lines? This will help us compare to the mean analysis

2. Is there a way that you can do statistical analysis to see whether or not the children are statistically significantly different from the adults?

3. The body surface area for children is much lower than for adults - can you do this analysis using the dose of ppm L/m2 BSA, instead of ppm L (just as we are planning to do with the mean analysis). This basically divides all of the adult doses by ~2, but the children by ~1.5. Unless the paper gives the measured VE in L/min m2, I just divide the L/min by the BSA given in the paper. In the case of the
McDonnell childrens' study, the exercise VE is given in L/min m2, and I use a default resting VE of 6 L/min m2.

4. I have attached a spreadsheet that gives the final main analysis mean doses and FEV1 decrements, in dose units of both ppm L and ppm L/m2 BSA. Please do the initial analysis, and the BSA analysis that we discussed (the first bullet point) using this final dataset. Hopefully by the end of the week I will have data from asthmatics that we should be able to do an identical analysis on.

Thanks, and please ask if you have any questions.

Sabine

From: Gloria Tao <GTao@gradientcorp.com>
Sent: Friday, January 9, 2015 2:10 PM
To: Sabine Lange
Cc: Lorenz Rhomberg; Julie Goodman
Subject: RE: Ozone dose-response work

Hi Sabine,

The attached is our response to address task 2 listed below. I also attached the figures related to the analysis. Each figure has two versions, with and without equations. I am still working on task 4 and will get it to you as soon as possible.

Have a good weekend!

Gloria

Gloria (Ge) Tao, Ph.D. | Biostatistician
617-395-5026 | gtao@gradientcorp.com
Hi Sabine,

The attached is our response to address task 2 listed below. I also attached the figures related to the analysis. Each figure has two versions, with and without equations. I am still working on task 4 and will get it to you as soon as possible.

Have a good weekend!

Gloria

Gloria (Ge) Tao, Ph.D. | Biostatistician
617-395-5026 | gtao@gradientcorp.com

Thanks for your feedback on my task list.

Consider repeating the main analysis using the body surface area numbers (based on questions at my poster) – I have these numbers in the attached excel sheet – Gloria
   - I think that just the graphs would be sufficient here - we just want to show that the pattern is the same whether or not we use the body surface area numbers (at least that is what it looks like when I graph it)

Analyze the individual data obtained from McDonnell – Gloria/Lorenz
   - Just the dose-response model similar to the group means analysis is fine. As for the healthy young adults, there is one McDonnell study with children, and the individual data for that one is publicly available, if you wanted to plot that on the graph.

Analyze time course/exposure-type data (eg. Triangle versus square exposure), and the dose at -1% FEV1 in different exposure protocols – this data is also in the excel sheet, and was obtained by estimating from graphs in papers – Sabine & Gloria
I think that this one is worth a phone call to discuss what I mean - I am in the office next Monday and Tuesday (Dec. 29 and 30), and then not until Jan. 5.

Look at individual data for 10% FEV1 decrements at all doses (including filtered air), and for individual consistency of response – Gloria/Lorenz
- This one is probably easier to discuss over the phone as well.

I would like the products as they are made, to speed up the writing process.

Talk to you soon, and happy holidays!

Sabine

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From: Gloria Tao <GTao@gradientcorp.com>  
Sent: Friday, December 19, 2014 12:00 PM  
To: Sabine Lange  
Cc: Lorenz Rhomberg; Julie Goodman  
Subject: RE: Ozone dose-response work

Sabine,

I talked to Lorenz about the task list. We think we can deliver most of the tasks by the second week in January. However, we could estimate the time and effort needed better if you can be more specific about the product of each task you are looking for. Please see the details for each task below.

- Consider repeating the main analysis using the body surface area numbers (based on questions at my poster) – I have these numbers in the attached excel sheet – Gloria

  I can definitely deliver this by January. Are you looking for the same products as we did for the poster, which include a dose response graph of healthy individuals and equations, a dose response graph with sensitive population but no equations, a table of total doses corresponding to 0,-5,-10,-15 FEV1 % change.

- Analyze the individual data obtained from McDonnell – Gloria/Lorenz

  We can produce a dose response model similar to the one used in group mean analysis using Concentration×Time×Ventilation as dose metric by the proposed time. However, if you are looking for a more in-depth analysis with alternative metrics of dose and covariates, we are afraid that we would need more time to conduct the analysis. Note that McDonnell data are based on healthy young adults. We cannot analyze sensitive population using such data.

- Analyze time course/exposure-type data (eg. Triangle versus square exposure), and the dose at -1% FEV1 in different exposure protocols – this data is also in the excel sheet, and was obtained by estimating from graphs in papers – Sabine & Gloria

  About the exposure-type data analysis, I could produce a similar dose response model but stratify by exposure-type (or both exposure-type and exposure-length) instead of exposure-length to see if exposure-type makes a difference in responses. This analysis will to be done using group mean data since McDonnell data are only based on square exposure design. I can deliver the results by the proposed time. Let me know if you want to do any other analysis.

  Could you please give a more detailed explanation of why you are interested the doses at -1% FEV1 decrement? Lorenz and I do not see the need to do this analysis since -1% FEV1 decrement is not clinically significant. What about -5% or -10%?
• Look at individual data for 10% FEV1 decrements at all doses (including filtered air), and for individual consistency of response – Gloria/Lorenz

We could produce a table of individuals with 10% FEV1 decrements and corresponding doses, and identify individuals who were observed more than once and evaluate consistency. We can deliver the results by the proposed date. Let us know if this is what you are looking for.

Would you prefer us sending you products of each task as we finish it, so that you can review and give feedback as we working on other tasks? Or would you prefer compiled results in the form of a memo when we finish all the tasks?

Happy Holidays!

Gloria

Gloria (Ge) Tao, Ph.D. | Biostatician
617-395-5026 | gtao@gradientcorp.com

From: Sabine Lange [mailto:Sabine.Lange@tceq.texas.gov]
Sent: Wednesday, December 17, 2014 11:42 AM
To: Gloria Tao
Subject: RE: Ozone dose-response work

That is a good question. Does the second week in January seem reasonable? I think that drafting the manuscript should be pretty fast, once we have the data in place.

From: Gloria Tao [mailto:GTao@gradientcorp.com]
Sent: Wednesday, December 17, 2014 10:38 AM
To: Sabine Lange
Subject: RE: Ozone dose-response work

Sabine,

Thank you for the detailed task list. I will read your drafted paper and let you know if I think of anything to add. I understand that the paper need to be ready before the workshop. Considering the time of writing and editing, do you have a date in mind that these tasks need to be done by?

Best,

Gloria

Gloria (Ge) Tao, Ph.D. | Biostatician
617-395-5026 | gtao@gradientcorp.com

From: Sabine Lange [mailto:Sabine.Lange@tceq.texas.gov]
Sent: Wednesday, December 17, 2014 11:25 AM
To: Gloria Tao; Lorenz Rhomberg
Cc: Michael Honeycutt; Michael Dourson; Julie Goodman
Subject: Ozone dose-response work

Gloria and Lorenz,

I have been going through the plans for the ozone dose-response paper, and I wanted to touch base with you about the work that has been done, and what still needs to be done.
I have drafted a potential results section for the paper, and it has allowed me to look at the flow of the information, and to identify any holes. I have attached this draft – there are a lot of blank spaces in it, because we haven’t finished the analyses yet, but I think that it hits the high points. I don’t think that we are at the point where this document should be edited for wording, it is intended for informational and big picture purposes only. At the end of the document I have made a to-do list, which I am repeating below with the person I think should be the primary responder:

- Define the methods by which papers were chosen for the analysis, and add more if necessary
  - Sabine
- Consider repeating the main analysis using the body surface area numbers (based on questions at my poster) – I have these numbers in the attached excel sheet
  - Gloria
- Analyze the individual data obtained from McDonnell
  - Gloria/Lorenz
- Analyze time course/exposure-type data (eg. Triangle versus square exposure), and the dose at -1% FEV1 in different exposure protocols – this data is also in the excel sheet, and was obtained by estimating from graphs in papers
  - Sabine & Gloria
- Complete other endpoint analysis of the data (mostly just data mining from papers)
  - Sabine
- Look at individual data for 10% FEV1 decrements at all doses (including filtered air), and for individual consistency of response
  - Gloria/Lorenz
- Finish inputting numbers into final time/exercise tables
  - Sabine

As is suggested in this list, I have attached an excel spreadsheet that includes all of the numbers I have gathered up to this point, as well as some graphs of those numbers. I have also attached the poster that I presented at SRA (I apologize, I should have sent this earlier). Please let me know if you think that there is something in this list/paper that doesn’t need to be done (or has been adequately done by someone else), or if there is something you think that we should add. We want to get this paper written and ready in a timely fashion so that it can be used in the ozone discussions. If you have any questions please let me know.

Happy Holidays!

Sabine

Sabine Lange, Ph.D.
Toxicologist, Toxicology Division
Texas Commission on Environmental Quality
(512) 239-3108
Sabine.Lange@tceq.texas.gov
Sabine,  

Please see the attached graphs.  

Best,  

---  
Ge (Gloria) Tao, Ph.D. | 617-395-5026

Gloria,  

I was wondering if you could send me two graphs: the individual data graphs (with all of the individual points), with the mean curves and the 95% CI, with the long and short data/curves on different graphs.  

Thanks  

Sabine
Sabine Lange

From: Gloria Tao <GTao@gradientcorp.com>
Sent: Tuesday, March 24, 2015 12:22 PM
To: Sabine Lange
Subject: RE: Questions about statistics for the ozone dose-response paper

Sabine,

Please see below for my answers. Let me know if you need anything else.

1) Using regression analysis, exposure duration is significantly associated with %FEV1 decrements (p-value<0.0001). It means when exposure duration changes from short to long, the %FEV1 decrements will change statistically significantly. This is equivalent to the conclusion that the long exposure and short exposure curves are significantly different.

2) It was not pair-wise comparison. When an individual was exposed to filtered air and one or more ozone concentrations, we used %FEV1 decrement measurements of one experiment as dependent variable and those of another experiment as independent variable, and performed linear regression analysis. For each linear regression analysis, we used paired individual data from two experiments.

Best,

---
Ge (Gloria ) Tao, Ph.D. | 617-395-5026

Sabine Lange

From: Sabine Lange [mailto:Sabine.Lange@tceq.texas.gov]
Sent: Monday, March 23, 2015 10:06 AM
To: Gloria Tao
Subject: Questions about statistics for the ozone dose-response paper

Gloria,

I just got back Julie and Lorenz’s revisions on the manuscript, and they had a few stats questions:

1) What statistical test did you use to compare the long and short-exposure curves?
2) For the analysis of consistency of responses between individuals, how did you apply linear regression to a pair-wise comparison? (this is Julie’s question – I assume that it wasn’t a pairwise comparison, but I want to make sure).

Thanks

Sabine

Sabine Lange, Ph.D.
Toxicologist, Toxicology Division
Texas Commission on Environmental Quality
(512) 239-3108
Sabine.Lange@tceq.texas.gov
Sabine Lange

From: Gloria Tao <GTao@gradientcorp.com>
Sent: Monday, March 30, 2015 1:40 PM
To: Sabine Lange
Subject: RE: Ozone short exposure sensitives graph
Attachments: Short sensitive shape.tif

Great idea! I think it looks a lot better now 😊

Best,

---
Ge (Gloria ) Tao, Ph.D. | 617-395-5026

From: Sabine Lange [mailto:Sabine.Lange@tceq.texas.gov]
Sent: Monday, March 30, 2015 2:33 PM
To: Gloria Tao
Subject: RE: Ozone short exposure sensitives graph

Sorry – the unfilled blend a bit into the background – how about a light grey fill?

From: Gloria Tao [mailto:GTao@gradientcorp.com]
Sent: Monday, March 30, 2015 1:20 PM
To: Sabine Lange
Subject: RE: Ozone short exposure sensitives graph

Sure. Let me know if the attached graph is better.

Best,

---
Ge (Gloria ) Tao, Ph.D. | 617-395-5026

From: Sabine Lange [mailto:Sabine.Lange@tceq.texas.gov]
Sent: Monday, March 30, 2015 2:14 PM
To: Gloria Tao
Subject: RE: Ozone short exposure sensitives graph

Sorry to keep bothering you, but looking at this, it is hard to distinguish the shapes – maybe make all of the sensitives as non-filled, and the healthy as filled?

From: Gloria Tao [mailto:GTao@gradientcorp.com]
Sent: Monday, March 30, 2015 12:35 PM
To: Sabine Lange
Subject: RE: Ozone short exposure sensitives graph

Sabine,

Please see the attached graph.
Gloria,

Can you give me a version of the attached graph that uses different shapes, instead of all of the different colours? I want to make it friendly to people who are red-green colour blind.

Thanks

Sabine
Sabine Lange

From: Gloria Tao <GTao@gradientcorp.com>
Sent: Tuesday, April 14, 2015 11:28 AM
To: Sabine Lange
Subject: RE: Question about dose-response analysis and shape of curves

Sabine,

Thank you for letting me know that the workshop went well. I am still working on getting confidence intervals of the threshold doses. Hopefully I can get them to you before submission.

We chose the sigmoid shape based on the biological mechanism. The group mean long duration data did plateau and the sigmoidal curve fit the data quite well. For the individual level data, the graph may seem like the response continues to go down. But remember the fitted curve is the average response. There must be more data points above the curve than those below the curve so that the curve reaches plateau. The graph seems like the response continues to go down because a lot of points above the curve are overlapping. The individual data did exhibit a lot of viability. It can add uncertainty to model fitting. But it is the same case for any other curves. I don't think there is another curve that will fit substantially better than the sigmoidal curve.

Best,

---
Ge (Gloria) Tao, Ph.D. | 617-395-5026

From: Sabine Lange [mailto:Sabine.Lange@tceq.texas.gov]
Sent: Tuesday, April 14, 2015 11:08 AM
To: Gloria Tao
Subject: Question about dose-response analysis and shape of curves

Gloria,

I wanted to let you know that our dose-response analysis was very well received at the ozone workshop last week. Thanks for all of you hard work on this. I am modifying the paper based on the input from workshop steering committee and the attendees, and I will send it out for another round of revisions from the authors before submitting it for publication. We are thinking of submitting to Inhalation Toxicology.

Anne Smith asked a question about the shapes of the curves: was the sigmoidal shape the best fit (not including the group mean short duration data), or did we choose the sigmoid shape because it fits the biological mechanism? It seems like another non-parametric fit is also plausible, so she was wondering if another curve would fit better than sigmoidal, because it seems like the response continues to go down at high doses instead of plateauing like the sigmoid curve does.

Thanks,

Sabine

Sabine Lange, Ph.D.
Toxicologist, Toxicology Division
Texas Commission on Environmental Quality
(512) 239-3108
Sabine.Lange@tceq.texas.gov
Sabine, 

There were actually 541 people with 864 measurements. Sorry about the mistake.

Best, 

---

Ge (Gloria) Tao, Ph.D. | 617-395-5026

Within the next few days?

I also have a quick question: for the McDonnell dataset, are there 541 people in the dataset, or 541 measurements?

Thanks

Sabine 

Sabine, 

It won't take very long since I only need to modify my code instead of writing from scratch. Do you have a deadline in mind?

Best, 

---

Ge (Gloria) Tao, Ph.D. | 617-395-5026
Gloria,

At the workshop, the point was raised that we had not subtracted filtered air responses from the ozone responses for the dose-response modeling. We did this intentionally and explained our reasoning, but the panel thought that there was value in doing the analysis both ways.

So, I was wondering if you could take the individual data sets (short and long) and subtract each individual's filtered air response from their ozone response, and redo the curves, with the equations and the threshold doses. Can this be done, and in a timely manner? Would it take you very long?

Thanks,

Sabine

Sabine Lange, Ph.D.
Toxicologist, Toxicology Division
Texas Commission on Environmental Quality
(512) 239-3108
Sabine.Lange@tceq.texas.gov
Sabine Lange

From: Gloria Tao <GTao@gradientcorp.com>
Sent: Wednesday, April 22, 2015 2:57 PM
To: Sabine Lange
Subject: RE: Dose response analysis
Attachments: Subtract FA.docx; curves and data.TIF; curves and data w.Eq.tif; curves only.TIF; data without impute FA.TIF; long exposure.TIF; short exposure.TIF

Sabine,

Please see the attached for the dose response modeling of individual data after subtracting each individual’s filtered air response from their ozone response.

Best,
---
Ge (Gloria ) Tao, Ph.D. | 617-395-5026

From: Sabine Lange [mailto:Sabine.Lange@tceq.texas.gov]
Sent: Thursday, April 16, 2015 10:36 AM
To: Gloria Tao
Subject: RE: Dose response analysis

Next Wednesday should be fine.

From: Gloria Tao [mailto:GTao@gradientcorp.com]
Sent: Thursday, April 16, 2015 9:35 AM
To: Sabine Lange
Subject: RE: Dose response analysis

Will next Wednesday be Okay?

There were 541 records. Since some people participated in more than one experiments, the number of people should be less than 541.

Best,
---
Ge (Gloria ) Tao, Ph.D. | 617-395-5026

From: Sabine Lange [mailto:Sabine.Lange@tceq.texas.gov]
Sent: Thursday, April 16, 2015 10:28 AM
To: Gloria Tao
Subject: RE: Dose response analysis

Within the next few days?

I also have a quick question: for the McDonnell dataset, are there 541 people in the dataset, or 541 measurements?

Thanks
Sabine

From: Gloria Tao [mailto:GTao@gradientcorp.com]  
Sent: Thursday, April 16, 2015 9:19 AM  
To: Sabine Lange  
Subject: RE: Dose response analysis

Sabine,

It won’t take very long since I only need to modify my code instead of writing from scratch. Do you have a deadline in mind?

Best,

---

Ge (Gloria ) Tao, Ph.D. | 617-395-5026

Sabine Lange, Ph.D.  
Toxicologist, Toxicology Division  
Texas Commission on Environmental Quality  
(512) 239-3108  
Sabine.Lange@tceq.texas.gov

From: Sabine Lange [mailto:Sabine.Lange@tceq.texas.gov]  
Sent: Wednesday, April 15, 2015 5:24 PM  
To: Gloria Tao  
Subject: Dose response analysis

Gloria,

At the workshop, the point was raised that we had not subtracted filtered air responses from the ozone responses for the dose-response modeling. We did this intentionally and explained our reasoning, but the panel thought that there was value in doing the analysis both ways.

So, I was wondering if you could take the individual data sets (short and long) and subtract each individual’s filtered air response from their ozone response, and redo the curves, with the equations and the threshold doses. Can this be done, and in a timely manner? Would it take you very long?

Thanks,

Sabine
Sabine Lange

From: Gloria Tao <GTao@gradientcorp.com>
Sent: Wednesday, April 22, 2015 4:19 PM
To: Sabine Lange
Subject: RE: Dose response analysis
Attachments: overlay short.tif; overlay long.tif; overlay all.tif

Sabine,

Please see the attached graphs.

Best,
---
Ge (Gloria) Tao, Ph.D. | 617-395-5026

---
From: Sabine Lange [mailto:Sabine.Lange@tceq.texas.gov]
Sent: Wednesday, April 22, 2015 4:17 PM
To: Gloria Tao
Subject: RE: Dose response analysis

Gloria,

Thanks for this analysis. Could you make a graph that has the curves + CI from the individual data sets for long and short exposure, for both the curves that do not subtract filtered air, and those that do subtract filtered air?

Sabine

---
From: Gloria Tao [mailto:GTao@gradientcorp.com]
Sent: Wednesday, April 22, 2015 2:57 PM
To: Sabine Lange
Subject: RE: Dose response analysis

Sabine,

Please see the attached for the dose response modeling of individual data after subtracting each individual’s filtered air response from their ozone response.

Best,
---
Ge (Gloria) Tao, Ph.D. | 617-395-5026

---
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To: Gloria Tao
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Ge (Gloria) Tao, Ph.D. | 617-395-5026

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Sabine

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Best,

---
Ge (Gloria) Tao, Ph.D. | 617-395-5026

Gloria,

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So, I was wondering if you could take the individual data sets (short and long) and subtract each individual’s filtered air response from their ozone response, and redo the curves, with the equations and the threshold doses. Can this be done, and in a timely manner? Would it take you very long?

Thanks,

Sabine

Sabine Lange, Ph.D.
Toxicologist, Toxicology Division
Texas Commission on Environmental Quality
(512) 239-3108
Sabine.Lange@tceq.texas.gov