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Examination of factors influencing the heterogeneity in response of heart rate
variability to exposure to traffic related air pollution in the Atlanta Commuter's
Exposure Study

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By

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B.S. Environmental Science
University of North Carolina at Chapel Hill
2010

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An abstract of
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Rollins School of Public Health of Emory University
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Abstract

Examination of factors influencing the heterogeneity in response of heart rate
variability to exposure to traffic related air pollution in the Atlanta Commuter's
Exposure Study
By Kristen Jarman

The Atlanta Commuter's Exposure (ACE) Study was established to examine the particulate and gas phase pollutants that commuters are exposed to, as well as the associated health endpoints. In this paper the association between heart rate variability (HRV) and exposure to traffic related air pollution is examined, including an examination of interaction by several different covariates of interest. The ACE study is a panel study of 42 non-smoking study participants, 21 clinically diagnosed asthmatics and 21 non-asthmatics. Heart rate variability was measured before, immediately after, 1, 2 and 3 hours after a 2 hour scripted commute on a highway around Atlanta during the morning rush hour. Measurements of HRV were altered in the time point immediately after the commute, including a statistically significant decrease in SDNN and r-MSSD and a significant increase in LF/HF. A priori covariates of interest, based on a review of the literature on heart rate variability and traffic related air pollution, were examined, including age, sex, baseline FEV1, BMI, day of the week of the commute, season of the commute, noise level, and change in cortisol from baseline. The primary explanatory variable for the heterogeneity of response is asthma status. Participants with asthma had a larger response to the commute exposure in each endpoint. The results also suggest modification by sex, age, baseline FEV1, BMI, day of the week, noise and cortisol change. Even with modification by each of these factors, however, the general trends in the data persist, a sharp change in HRV immediately after the commute that goes back towards the baseline measurement at each subsequent time point.

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Appendix

Introduction

Exposure to traffic related air pollution is known to increase the risk of cardiovascular morbidity and mortality[1-3]. An important mechanism of exposure to traffic-related air pollution for many people is likely to be while they are in their vehicles, especially since concentrations on highways and in vehicles are higher than measured ambient concentrations[2]. For workers in the United States, the mean travel time to work is 25 minutes with more than 50% of commuters leaving for work between 6:00 am and 8:59 am, leading to a large portion of the workforce exposed to traffic related air pollution in high concentrations for nearly an hour each work day[4].

A portion of the cardiovascular response to air pollution is mediated through the autonomic nervous system[1,5]. Autonomic nervous system response may be triggered when inhalation of particles generates a reaction of pulmonary nerves which, in turn, activates the sympathetic nervous system. If a reaction of the sympathetic nervous system is not balanced by a reaction in the parasympathetic nervous system an autonomic imbalance is created, which leads to a change in heart rate variability (HRV)[1,5].

A recent review of the literature by the Health Effects Institute found that there is "evidence for a causal association between exposure to traffic-related pollutants and the dysregulation of autonomic control of HRV" but that effect modification and confounding by stress and noise were an important concern that has not been adequately addressed in some studies[2].

Heart rate variability is characterized using a quantitative set of autonomic activity markers. Heart rate variability is recorded using an electrocardiogram and these recordings are used to derive quantitative measures of heart rate variability[6]. These measures are typically divided into two classes, time domain and frequency domain[6]. Time domain metrics are based on the time between successive heart beats and their statistical attributes, while frequency domain metrics are based on the power within each area of the frequency spectrum[6]. A commonly used time-domain metric is the standard deviation of the normal to normal heart beat interval (SDNN), it is appropriate for the estimate of overall heart rate variability[6]. The root mean square of the standard deviation of normal to normal intervals (r-MSSD) is a time-domain HRV metric that estimates "high frequency variations in heart rate"[6]. In the frequency domain, the low frequency (LF) component most closely represents sympathetic cardiac regulation and high frequency (HF) most closely represents parasympathetic cardiac regulation[6,7]. Their ratio, LF/HF, represents the balance of the overall autonomic system, which may change according to the response of the autonomic nervous system to exposure to stress, noise and traffic related air pollution[6,7].

The Atlanta Commuter Exposure (ACE) Study was designed to examine the particulate pollutants that commuters are typically exposed to, as well as the associated acute health effects. Study participants completed two separate, 2 hour commutes around Atlanta during the morning rush hour from approximately 7 am to 9 am. Several traffic related particulate air pollution constituents were measured during the commute, and multiple health endpoints, including HRV, were measured

before, and at several time points after the commute exposure. The current analysis further examines the association between the commute exposures and corresponding changes in heart rate variability metrics.

Existing literature concerning heart rate variability and traffic pollution are limited in their generalizability because most studies only address narrow sub-population at a time, often seniors with preexisting heart disease[1], but some studies do address younger and healthier populations. A study in Mexico City found that short term exposure to air pollution was associated with significant reductions in HRV among 16 people followed for several days[7]. A study of a group of 40 young adults exposed to noise and traffic related pollution found that the effects of air pollution were amplified at high noise level[8]. In a study in Taipei similar in design to ACE, a decrease in HRV was found with increasing levels of particulate matter (PM) during a 2 hour commute in rush hour, but the authors noted that they were concerned about the effect of the observation on the autonomic system[9].

In this paper the association between heart rate variability (HRV) and exposure to traffic related air pollution is examined, including an examination of interaction by several different covariates of interest. A thorough examination of effect modification by age, sex, baseline forced expiratory volume in 1 second (FEV1), BMI, day of the week of the commute, season of the commute, noise level, and change in cortisol from baseline will be completed. A previous study on the same data found a decrease in SDNN and r-MSSD immediately after the commute, and found that asthma status is an important explanatory variable in the response of HRV to exposure to the commute. It is the objective of this study to determine if

any factors of interest change the observed decrease in HRV as measured by SDNN and r-MSSD or if any of the factors of interest are effect modifiers of the response of HRV to exposure to the commute, as measured by SDNN, r-MSSD and LF/HF.

Methods

Study Design and Participants

The ACE study included 42 participants utilizing a panel-based design, 21 of whom were clinically diagnosed with asthma, and 21 of whom reported that they have never been diagnosed with asthma. Each of the study participants drove a similar route around Atlanta for 2 hours in their personal vehicles, approximately between 7am and 9am, completing a total of 80 commutes. The commutes started and ended at Emory University, and study personnel accompanied study participants during the commute. In order to minimize exposure to traffic pollution before the study, participants were required to live within 15 minutes of the Rollins School of Public Health at Emory University, with one exception. One participant, who lived approximately 20 miles from Emory University, was met at their home to begin the observation period and commute. Four participants dropped out of the study after completing only one commute. The Emory University Institutional Review Board approved the study.

Study participants were a convenience sample that was recruited with flyers posted at Emory University and at the Centers for Disease Control and Prevention in Atlanta, as well as by word of mouth, such that the study participant group included colleagues of the primary investigator.

To be included in the study, a subject was required to have legal access to a properly insured vehicle and have a valid driver's license at the time of the commutes. Study participants were excluded if they were diagnosed with diabetes, had ever suffered a myocardial infarction, had ever been outfitted with an implantable cardioverter-defribrillator or pacemaker, were currently taking digoxin or beta blockers for treatment of hypertension or cardiac arrhythmias, or diagnosed with any other non-asthma pulmonary disease, such as COPD. Additionally, study participants were excluded if they had a FEV1 less than 70% of the expected baseline. If the subject was asthmatic they were excluded if they could not tolerate a bronchodilator withhold (24 hours for salmetrol, formoterol, fluticasone, 4 hours for albuterol, levalbuterol). Study participants were also excluded if they reported being pregnant, smoking tobacco or were residentially exposed to environmental tobacco smoke.

Health Measurements

Baseline measurements for the health metrics of interest were assessed by study staff around 6:30 am on the day of the commute. A trained phlebotomist took blood samples for biomarkers, and study staff began electrocardiogram (ECG) monitoring of the participant. Heart rate and heart rate variability endpoints were measured by a 5 lead Holter monitor (2010 Plus Philips Healthcare, Eindhoven, Netherlands) electrocardiogram continuously throughout the commute exposure from the time of the initial baseline measurements. Continuous ECG data was used to derive several metrics of HRV for 10 minute components, including time and spectral domain components by a professional trained in ECG data analysis.

Baseline 10 minute HRV metrics were measured while the participant was in a

sitting position, before the commute was started. The time domain metrics include

the SDNN and r-MSSD. The spectral domain component of interest was the ratio of

low frequency to high frequency power(LF/HF), a measure of autonomic nervous

system balance[6].

Exposure Measurements

For the purpose of this study the overall effect of exposure to traffic related

air pollution during the commute is of interest, and the difference in heart rate

variability at baseline versus immediately after commute, as well as 1, 2 and 3 hours

post-commute. Linear mixed modeling allows comparison of correlated

observations, such as HRV measurements in the same individual over time. Each

time point after the commute exposure is compared to the referent time point, pre-

exposure, with mixed modeling.

The age of each individual was calculated as the date of the commute minus

their date of birth, in years. FEV1 was measured using an OHD KoKo spirometer

(Occupational Health Dynamics, Birmingham, AL, USA), and is presented as a percent

of the predicted values for the specific age, race and sex of the participant[10]. Body mass

index units are kg/m^2. Salivary cortisol difference was calculated as the salivary

cortisol concentration measured in the saliva obtained immediately after the

commute minus the cortisol concentration measured in the saliva pre-commute. The

cortisol difference calculation is such that the difference is negative where the

cortisol level post commute is lower, and positive where the cortisol level post

commute is higher. The noise level is the mean noise in decibels measured

throughout the commute. Season is defined as cool and warm, where cool is

between October 15 and March 15, and warm is the rest of the year.

Statistical Methods

Data analysis was conducted using a linear mixed effect model to examine

whether there is a change in HRV measurements between the pre-commute and

post-commute time points. Each metric of HRV was log transformed. *A priori*

covariates of interest, based on a review of the literature on heart rate variability

and traffic related air pollution[1,2,6-9,11-26], were examined, including age, sex, baseline

FEV1, BMI, day of the week of the commute, season of the commute, noise level

(average over the commute) and change in salivary cortisol.

The general form of the model is:

$$\ln(Y_{ijk}) = \beta_0 + b_{0i} + \sum_{j=1}^{4} \beta_j\,(time_j) + \gamma(commute_k) + \sum_{j=1}^{4} \delta_j\,(time_j * asthma\ status)$$

$$+ \delta_5(commute * asthma\ status) + \varepsilon_{ijk}$$

Where Y_{ijk} is the HRV metric for subject i at time j. Each model included a

fixed effect for each time point after the commute (time$_j$, j=1,2,3 or 4 for

immediately after, 1, 2 and 3 hours after, respectively) and the commute (commute$_k$,

first or second, k=1,2). A random intercept for each individual was used (b_{0i}), and

the subject ID was used as the cluster to allow the mixed model to use an individual

as their own control. Subject ID was included in the model as a random effect and a

spatial power covariance structure was used. Asthma status was included as an

interaction term with time and commute in each model because previous analysis of

the same data indicated that asthma status is an important explanatory variable in

the effect of air pollution on heart rate variability in this study population.

A stratified model for each variable of interest was used to determine if there was a different response of HRV to the commute exposure across strata. The same covariates were then used in a model as fixed effects, and their interaction term with the time point of measurement and the commute was also considered for inclusion in the model as a fixed effect.

Each continuous variable (age, FEV1, BMI, cortisol difference, and noise level) was characterized several ways including into below and above median, tertiles and quartiles. BMI was additionally divided into the categories (underweight, normal, overweight and obese) published by the Centers for Disease Control and Prevention[27]. Noise was additionally divided into above and below 65 decibels at the request of the principle investigator. Cortisol difference was also divided into categories that were less than or equal to zero and above zero. A number of strata for each continuous variable were considered so that the evaluation of effect modification was as robust as possible.

Modification assessed via stratified models.

Stratified models were run such that a separate model was calculated for each strata of the variable category of interest. For example, to examine effect modification by sex, a separate model was run for both females and males. To examine effect modification by categories above and below the mean of age, a separate model was run for each age group. An estimate of each time point was then calculated for each strata for healthy and asthmatic participants, and plotted in a graph over time with the other strata.

Modification assessed via interaction term models.

Interaction terms were included in the models and run for each different variable of interest with both the time points of interest and the commute. Interaction was considered by each variable of interest (sex, age, baseline FEV1, BMI, day of the week, noise, cortisol difference, and season) in a model with interaction terms for asthma status as well. Estimates for each category at each of the time points for both asthmatic and healthy groups were then generated. A chunk test was also conducted for all interaction variables for each variable of interest. The estimates were also plotted by time to examine the association between the variable of interest and commute exposure visually.

All statistical analyses were conducted using SAS 9.3 (SAS, Cary, NC). Statistical significance was determined using an alpha level of 0.05.

Results

A total of 80 commutes were completed by 42 individuals. The study group included 21 participants with asthma and 21 participants without asthma. The two groups were similar with respect to most demographic and health attributes (Table 1). The distribution of sex between the group with and without asthma was similar, and the distribution of race was exactly the same. The participant group with asthma was slightly younger (mean age 30.38 years) than the healthy group (mean age 35.38 years), but this difference was not significant. The average length of time between the two commutes for the same individual was 153 days but there was a large range, between 14 and 434 days. Commutes were approximately evenly split between cool and warm season, and relatively evenly split between Tuesday,

Wednesday, Thursday and Friday, although 35% of completed commutes occurred on Friday.

The baseline health measurements for each commute are summarized in Table 2. Heart rate, salivary cortisol and baseline FEV1 were not significantly different between the asthma and non-asthma group. SDNN was significantly higher in the asthmatic group than the non-asthma group (p=0.05), as was r-MSSD (p=0.02). The ratio of LF to HF was not significantly different between the two groups (p=0.09). Table 3 summarizes the cut points for the categories used for continuous variables.

Stratified Results

Statistically Significant

SDNN. When stratified on asthma status, the decline in SDNN in the time point immediately after the commute was statistically significant for both the asthmatic   (-38% (-48%, -28%) p<0.001) and healthy groups (-23%, (-33%, -11%) p<0.001). The decline in SDNN for subjects with asthma continued to be significant though the follow up period, while SDNN for non-asthmatics was not different from the baseline measurement at either 1, 2 or 3 hours after the commute (Figure 1).

r-MSSD. Stratification by asthma status for r-MSSD showed that the asthmatic group exhibited a significant decline from baseline in r-MSSD which was substantially different from the healthy group (asthmatic group -35% (-46%, -20%), non-asthmatic group -2% (-18%, 18%)), who did not show a decline in r-MSSD (Figure 1).

LF/HF Ratio. Stratification on asthma status showed that there was a significant increase in the ratio of LF to HF in the time point immediately following the commute (33%, (6%, 66%) p=0.01), but for the time points 1, 2 and 3 hours after the commute the increase in LF to HF is not significant (Figure 1). For healthy participants there was no change in LF to HF ratio (p=0.85 immediately after commute).

Strong suggestion of Interaction

SDNN. When stratified by sex, change in SDNN was not different among males and females, but asthma status does not appear have an effect in females, while asthmatic men had a much steeper decline in post-commute SDNN and did not exhibit return to pre-commute levels as quickly as men who did not have asthma. The decrease in SDNN between the pre-commute and post-commute time points among healthy people during the cool season was not as large as the decrease among healthy people during the warm season, or among asthmatics in either season, but this difference was not significant. Commutes completed on Tuesday and Thursday among healthy people did not have a measureable decline in SDNN, but all asthmatic groups exhibited a decline in SDNN, and there was a decline in healthy groups on Wednesday and Friday. Stratification on the change in cortisol by tertiles, quartiles and positive or negative cortisol change showed that for the healthy groups with the lowest change in cortisol, or where cortisol decreased, SDNN increases after baseline (but not significantly), rather than decreasing as it did in each other groups (Figure 2).

r-MSSD. When stratified on sex, the only group that had a significant decline from baseline for each of the follow up time points was asthmatic men ($p<0.001$). None of the other groups (asthmatic and healthy females, and healthy males) exhibited a measureable decline from baseline in any of the time points. When stratified by FEV1, the healthy participants in the highest category of FEV1 had no decrease in r-MSSD, contrary to the overall trend, but this difference was not significant. Stratification by BMI into groups by halves, tertiles and quartiles all showed the asthmatic group with the highest BMI had the steepest decline in r-MSSD, although the difference between the groups was only significant when categorized by above and below the median BMI.

LF/HF Ratio. For asthmatics, the lowest age group showed a larger increase in LF to HF ratio compared to other age groups, although the difference from other age groups was not measureable. Asthmatic groups with higher baseline FEV1 had larger increases in LF/HF, but this difference from other groups was not significant. Similarly the lowest BMI group for asthmatics showed a larger increase in LF to HF ratio than the other BMI categories, although this difference was not measureable.

Non-significant interaction.

SDNN. SDNN response stratified by age did not show differences across strata; overall the asthmatic groups and non-asthmatic groups appeared to have similar regardless of age group. Similar to age, there did not appear to be a difference in response across baseline FEV1, BMI, or noise categories.

r-MSSD. Modification in effect by age did not appear to show any differences across age groups. Stratification by day of the week, mean noise level and season did not appear to show difference in response of r-MSSD. Stratification by cortisol change did not show any coherent patterns across the different methods of stratification.

LF/HF Ratio. Stratification by sex and cortisol change did not show a difference in response of the LF to HF ratio to the commute. Finally, stratification by noise did not show a consistent response across groupings.

Interaction Models

Significant interaction

SDNN. In models with interaction by asthma status only the results were similar to the stratification by asthma status. Healthy participants had a statistically significant decline in SDNN only at the time point immediately after the commute. Participants with asthma had a statistically significant decline from baseline across all of the follow-up time points. Including terms for interaction with sex did not appear to show a large difference in response to exposure the commute. The lowest age categories for healthy participants (Quartile 1: 21-25 years) showed a less pronounced decline in SDNN compared to other age groups, and the highest age category (Quartile 4: 40-60 years) for asthmatic participants showed the steepest decline immediately after the commute.

r-MSSD. The interaction model results for r-MSSD with asthma status showed similar results to those shown in the stratified model; participants with asthma had

a significantly steeper declines immediately after the commute than healthy participants. Measurements of r-MSSD at 1, 2 and 3 hours after the commute were not different from the baseline for either group, and chunk tests of interaction by asthma status was also null. Interaction by sex was significant (chunk test: p=0.002) Healthy females had no decrease in r-MSSD and asthmatic men had the largest decrease in r-MSSD immediately after commute (-50% (-61%, -36%) p>0.001). Including interaction with changes in cortisol was significant based on the chunk test for the categories split into tertiles (p=0.001) and quartiles (p=0.018).

LF/ HF Ratio. The ratio of LF to HF was significantly higher compared to baseline in participants with asthma at the time point immediately after the commute (33% (9%, 64%)), and was not significantly different from baseline values at any time point for healthy participants (2%, (-18%, 27%)). The test for interaction by asthma status was not significant. Day of the week was significant based on the test for interaction (p=0.005), but there does not appear to be a coherent trend to the day of week results. Response by age is significant when divided into tertiles (p=0.014) and quartiles (0.002). Subjects in the lowest age groups exhibit a larger increase (significant in the asthmatic and healthy group in the lowest quartile of age) in LF/HF, and younger age groups have a decrease in LF/HF (suggested but not significant). The test for interaction was significant for baseline FEV1 characterized by tertiles (p=0.045) and quartiles (p=0.021). In general the higher the baseline FEV1, the larger the increase in LF/HF. There is a similar effect of BMI interaction, where the lowest quartile of BMI was observed with the largest increase in LF/HF, and all underweight participants had a

significantly different response of LF/HF to exposure to the commute than the rest of the study participants. Underweight participants had an increase of LF/HF after the commute, which did not come back down after exposure during the follow up period. When cortisol change was categorized by quartiles and tertiles, it also interaction was significant based on the chunk test (p=0.021, quartiles), such that the middle tertile of cortisol change has the highest increase in LF/HF after the commute, and the 2nd quartile has the highest increase in LF/HF after the commute. The other groups in each categorization of cortisol change are otherwise similar. Noise did appear to have a clear pattern of response modification, when categorized according to its quartile distribution, although in the 3rd quartile of noise, both healthy and asthmatic subjects showed a higher increase in LF/HF than the other groups and the test for interaction for above and below the median is significant (p=0.010).

Non-significant Interaction

SDNN. None of the chunk tests examining interactions between SDNN and any of the variables of interest were significant (Table 4). There were several interaction terms that were significant individually, but overall interaction included in each model was consistent with the null. When interaction terms were included for baseline FEV1, BMI, noise and day of the week, there was no suggestions of a difference in response and correspondingly, formal tests of interaction were consistent with the null. Similarly, interaction term models including season were not significant. The increase in SDNN among the group with the lowest cortisol change that was observed in the stratified models was no longer evident in the

interaction models, where the group with the lowest cortisol has a decrease (but not significant) in SDNN immediately post-commute.

r-MSSD. Including interaction by age, baseline FEV, noise, season, day of the week and BMI with time did not show changes in the response of r-MSSD to the commute.

LF/ HF Ratio. Interaction by sex and season were not significant for the ratio of LF to HF.

Estimates of percent change from baseline at each time point for selected categorizations and each endpoint of interest are included in Figure 3 and the Appendix.

Discussion

The results of this study suggest that exposure to traffic related air pollution is inversely associated with HRV as measured by SDNN and inversely associated with short term component estimates of HRV as measured by r-MSSD. We found a statistically significant decline in SDNN from the baseline measured before the commute to HRV measurements taken immediately after the commute for the entire group of study participants. We also found a statistically significant decline in r-MSSD and increase in LF/HF immediately after commutes among asthmatics, but not among the healthy group. These findings further support the growing evidence that a portion of the response to traffic exposures may be mediated through the autonomic nervous system, as suggested in previous reviews examining this association[1]. After a robust consideration of effect modification by several different

covariates of interest, the general trend of the response of HRV to exposure to traffic

related air pollution persisted.

These results are similar to a number of previous studies on the association

between HRV and traffic related air pollution. A recent study in Mexico City of 16

people followed for several days found significant acute changes in HRV after short

term exposures to traffic related emissions[7]. Another study in Taipei where 60

young adult participants were exposed to traffic related air pollution while they

were passengers in a study vehicle driven on large roads found a decrease in SDNN

and r-MSSD with in car $PM_{2.5}$[9]. A review of the literature in 2010 found "evidence

that ambient PM air pollution exposure rapidly reduces HRV"[1].

A study of North Carolina Highway Patrol troopers reported an association

between exposure to $PM_{2.5}$ during their shift and HRV parameters the next morning,

indicating a possible lasting effect of pollution on HRV[21]. A study of taxi drivers in

China found that exposure to the group of young adults to traffic related air

pollution during their shift was associated with altered cardiac function, with

decreases in 5 minute SDNN and r-MSSD and increases in 5-minute LF/HF

associated with exposure[25]. A study of traffic controllers in Sao Paulo, Brazil

similarly found that in healthy non-smoking workers SO_2 was associated with a

decrease in SDNN[16]. In a study of diabetic passengers exposed to traffic related air

pollution on a busy highway, fine PM and black carbon were associated with an

increase in LF/HF[19]. Finally, an important study by Adar published in 2007 found

short term negative associations between $PM_{2.5}$ and SDNN, and positive associations

between $PM_{2.5}$ and LF/HF[12].

Health Status. Similar to our findings in an initial analysis of the data[22], asthma status appears to be the primary explanatory variable describing heterogeneity of response of HRV to exposure to traffic related air pollution (Figure 1). Several previous studies have found effect modification of SDNN by different diseases and medications, including Adam et al (2012) where HRV was only associated with PM_{10} in patients taking ACE inhibitors[11]. In previous studies, use of certain medications, both beta-blockers and bronchodilators, have been found to modify the effect of air pollution on HRV[15,28]. These previous studies are consistent with the current findings and support the hypothesis that asthma status modifies the effect of exposure to the commute on HRV, as measured by SDNN, r-MSSD and LF/HF.

Sex. Sex is known to influence several different metrics of HRV[29]. Sex was also included as a covariate of interest because previous studies controlled for sex, some mentioned sex as a potential confounder, and some included sex as a covariate of interest [7-9,17,24]. Sex was a significant effect modifier of r-MSSD based on the chunk test of interaction, leading to the suggestion that sex is related to the way that the short term components of HRV respond to exposure to air pollution[6]. Additionally since r-MSSD was associated with the HF component of HRV, a decrease in r-MSSD may be associated with an increase in LF/HF, if both parts of the autonomic nervous system have a similar response[19]. The influence of sex on response of HRV to exposure to air pollution is further supported since asthmatic men showed a significantly larger decrease in SDNN immediately after the commute than any other group.

Age. Age was controlled for, included as a covariate of interest, or a potential confounder in many previous studies[7-9,12,13,18,21-26], and its inclusion as a covariate of interest in this study was supported by the fact that many of the previous studies of HRV and traffic pollution were done in an elderly population, likely because the elderly are a sensitive population[1]. Heart rate variability is also known to decline with increasing age[29]. Although age did not appear to be an important explanatory variable for any of the end points of interest, it is possible that this is because there was a relatively small range of ages within the study participants in this study of predominantly young and middle aged adults.

Baseline FEV1. As a measure of baseline pulmonary function, FEV was used to examine if pulmonary function changes the response of HRV to traffic related pollution in this study. FEV1 was found to modify the effect of air pollution on SDNN in a previous study of ambient air pollution in a population of adults with cardio and pulmonary disease[28]. FEV1 was found to be a significant effect modifier in our study for LF/HF only, which is contrary to the previous findings. However, our population did not include anyone with FEV1 lower than 70% of the reference value so it is possible that if our population had included a wider range of FEV1 values, we may have seen an effect in the other endpoints as well.

BMI. Several previous studies also either controlled for BMI or examined it as a variable of interest [8,9,13,14,16,20,24,28,30]. Higher BMI is associated with a larger decrease in r-MSSD and lower BMI was associated with a higher increase in LF/HF in this study. Additionally, BMI by quartiles and CDC categories was found to be a significant effect modifier. Higher BMI has been shown to decrease HRV[18], which

would explain why different strata of BMI did have the same response of HRV to air pollution exposure.

Day of the Week. Day of the week was included as a control variable or a covariate of interest in several studies[8,9,12,20,24,26]. Although day of the week appeared to be related to SDNN in the stratified models and related to LF/HF in interaction models and interaction terms for LF/HF were significant, no plausible explanation for the observed pattern was determined.

Season. Several previous studies have controlled for season[13,14,17,20,24,26,30]. Zanobetti et al. (2010) controlled for season by including date in the model, and Wu (2013) controlled for exposure during the warm and cool season[24,26]. Additionally, season was of interest because previous studies[24] found temperature and air pollution associated with a decrease in SDNN. Temperature in the vehicle during the commute was not available, so season is a possible proxy.

Noise. A recent review by the Health Effects Institute concluded that exposure to noise with exposure to traffic related air pollution needed further examination before it was possible to definitively conclude that a causal association exists between air pollution and HRV[2]. A study in China found that traffic related air pollution and noise were both associated with HRV and that high noise levels increased the effect of air pollution on HRV through interaction[8]. Stratification on several different categorizations of noise did not appear to show that different levels of noise exposure during the commute changed the response of HRV to the exposure. Noise did not appear to modify the effect of traffic pollution on SDNN or r-MSSD, but dividing it above and below the median did show significant interaction

with the time from exposure for LF/HF. Effect modification by noise on the response of HRV was of concern a priori, but based this analysis, noise does not appear to dramatically modify the effect of traffic related air pollution on HRV.

Change in Cortisol. Similar to noise, the Health Effects Institute review noted that the modification of HRV response by stress had not be adequately addressed[2]. Riediker et al. (2004) controlled for stress by including the number of incidents that occurred during the shift and the number of citations issued during the shift[21]. In a study of passengers exposed to traffic related pollution during a commute, similar results were found to the results of this study, which may mean the effect of stress is negligible compared to the effect of traffic exposure on HRV[19]. The increase in SDNN in the time point immediately after exposure for groups with the lowest change in cortisol indicates that for participants that were less stressed after the commute than before, SDNN may not be negatively impacted by exposure to traffic pollution, however, this trend did not persist once change in cortisol was included as interaction in the model. Although the stratification in r-MSSD and LF/HF did not show any obvious trends, interaction of time points with cortisol change was significant for both endpoints. The lowest category of cortisol change by halves, tertiles and quartiles had the highest increase in LF/HF which persisted through the follow up period.

Explanation for Null Results. When a covariate of interest was not found to be modify the association between traffic related air pollution and HRV there are several possible explanations. Most obviously, it is possible that there is truly no association between the covariate and HRV, by any metric. Another possibility is

that the effect was slight, and that there was not sufficient statistical power in the ACE study to detect the association. Additionally, it is possible that the range of observations for the covariate in our study was too narrow. For example, the narrow range of the age of participants in the ACE study is likely not representative of the full range of responses from the full range of possible ages.

   Strengths and Limitations. As noted in Chuang et al (2013), by putting pollution monitoring devices and study staff in the car, we "cannot exclude" the idea that these observations may have had an effect on HRV response. Additionally, since the commute was the exposure of interest, specific pollutants were not included in the model. Shields et al (2013) notes that there is a heterogeneous effect of pollutants on HRV[7]. Studies have considered the effect of many different pollution constituents on HRV including lead, volatile organic chemicals, calcium, nickel, iron, $PM_{2.5}$, PM_{10}, sulfate, nitrate and ozone[24,31-34].

   A strength of this study is that the study participants were exposed in a real world exposure scenario, and so the results are a realistic depiction of the response to traffic pollution in everyday commuters.

Conclusion

   The primary explanatory variable for the heterogeneity of response of HRV to traffic related air pollution was asthma status. Participants with asthma had a larger response to the commute exposure in each endpoint. The results also suggest modification by sex, age, FEV1, BMI, day of the week, noise and cortisol change. Even with modification by each of these factors, however, the general trend in the data

persists; a sharp change in HRV immediately after the commute that returns to the

baseline measurement at each subsequent time point.

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Tables

Table 1: Characteristics of the subjects of a Panel Study of Traffic-Related Air Pollution in Atlanta, GA among subjects with and without asthma

	All (n=42)		Asthmatic n=21		Healthy n=21		
	N(mean)	%(SD)	N(mean)	%(SD)	N(mean)	%(SD)	p-value
Commutes	80	100	41	51.25	39	48.75	
Sex							0.12
Female	21	50	13	30.95	8	19.05	
Male	21	50	8	19.05	13	30.95	
Race							1
Caucasian	26	61.9	13	30.95	13	30.95	
Other	16	38.1	8	19.05	8	19.05	
Age (years)	32.88	9.73	30.38	10.18	35.38	8.79	0.10
BMI (kg/m^2)	23.62	3.66	22.8	2.12	24.44	4.64	0.15
Time Between Commutes (days)	152.84	105.22	146.3	107.46	160.11	105.27	0.69
Season							0.66
Cool	41	51.25	22	27.5	19	23.75	
Warm	39	48.75	19	23.75	20	25	
Day of the Week							0.13
Tuesday	17	21.25	13	16.25	4	5	
Wednesday	20	25	8	10	12	15	
Thursday	15	18.75	7	8.75	8	10	
Friday	28	35	13	16.25	15	18.75	

Table 2: Baseline (pre-commute) Health Measurements of the subjects of a Panel Study of Traffic-Related Air Pollution in Atlanta, GA among subjects with and without asthma

	All (n=80)		Asthmatic (n=41, 51%)		Healthy (n=39, 49%)		
	Mean	SD	Mean	SD	Mean	SD	p-value
Heart Rate (bpm)	70.93	13.51	70.45	12.84	71.52	14.53	0.77
SDNN, 10 minute (mm^2)	94.09	32.39	101.67	29.38	85.47	33.98	0.05
r-MSSD, 10 minute (mm^2)	61.47	36.64	71.69	39.77	50.24	29.59	0.02
Ratio of LF to HF	1.04	0.48	0.93	0.44	1.15	0.51	0.09
FEV1	94.81	15.58	91.43	14.23	98.29	16.32	0.06
Salivary Cortisol (pg/mL)	726.14	605.53	800.21	693.66	638.18	476.57	0.25

Table 3: Strata cut points for variables of interest in a Panel Study of Traffic-Related Air Pollution in Atlanta, GA

| | | | | | STATUS | | | | | |
| | | All | | | Asthmatic | | | Healthy | | |
		N	Min	Max	N	Min	Max	N	Min	Max
Age	**By Median**									
	Below	40	21.0	31.1	28	21.0	31.1	12	22.7	29.4
	Above	40	31.4	59.5	13	31.4	59.5	27	31.4	58.0
	By Tertiles									
	1st Tertile	26	21.0	26.8	18	21.0	26.8	8	22.7	25.4
	2nd Tertile	28	27.3	37.7	13	27.3	36.0	15	27.3	37.7
	3rd Tertile	26	38.0	59.5	10	38.4	59.5	16	38.0	58.0
	By Quartiles									
	1st Quartile	20	21.0	25.3	14	21.0	25.3	6	22.7	25.1
	2nd Quartile	20	25.4	31.1	14	25.4	31.1	6	25.4	29.4
	3rd Quartile	20	31.4	39.6	5	31.4	39.6	15	31.4	38.6
	4th Quartile	20	39.9	59.5	8	39.9	59.5	12	41.5	58.0
Baseline FEV1	**By Median**									
	Below	38	65.04	92.35	21	65.04	92.06	17	66.99	92.35
	Above	37	93.6	134.11	17	95.3	119.26	20	93.6	134.11
	By Tertiles									
	1st Tertile	25	65.04	89.49	16	65.04	89.49	9	66.99	88.97
	2nd Tertile	25	89.78	101.05	11	89.78	101.05	14	90.32	99.38
	3rd Tertile	25	101.14	134.11	11	101.14	119.26	14	101.69	134.11
	By Quartiles									
	1st Quartile	20	65.04	84.51	13	65.04	84.51	7	66.99	83.29
	2nd Quartile	18	86.15	92.35	8	86.15	92.06	10	87.07	92.35
	3rd Quartile	19	93.6	106.69	11	95.3	106.69	8	93.6	106.64
	4th Quartile	18	106.9	134.11	6	107.06	119.26	12	106.9	134.11
BMI	**By Median**									
	Below	40	17.5	23.0	22	17.5	22.8	18	19.3	23.0
	Above	40	23.0	39.0	19	23.0	26.8	21	23.2	39.0
	By Tertiles									
	1st Tertile	26	17.5	22.1	14	17.5	22.1	12	19.3	20.9
	2nd Tertile	29	22.4	23.9	19	22.5	23.9	10	22.4	23.7
	3rd Tertile	25	24.3	39.0	8	25.1	26.8	17	24.3	39.0
	By Quartiles									
	1st Quartile	20	17.5	21.1	8	17.5	21.1	12	19.3	20.9
	2nd Quartile	20	21.7	23.0	14	21.7	22.8	6	22.4	23.0
	3rd Quartile	20	23.0	24.6	11	23.0	23.9	9	23.2	24.6
	4th Quartile	20	25.1	39.0	8	25.1	26.8	12	25.1	39.0
	CDC Categories									
	Underweight	2	17.5	17.5	2	17.5	17.5	-	-	-
	Normal	58	19.3	24.6	31	19.6	23.9	27	19.3	24.6

	Overweight	16	25.1	28.0	8	25.1	26.8	8	25.1	28.0
	Obese	4	32.2	39.0	-	-	-	4	32.2	39.0
Mean Noise	**By Median**									
	Below	35	62.2	72.0	22	62.2	72.0	13	66.4	71.9
	Above	34	72.0	81.9	14	72.0	75.8	20	72.1	81.9
	By Tertiles									
	1st Tertile	22	62.2	70.6	13	62.2	70.6	9	66.4	70.3
	2nd Tertile	23	70.7	72.3	17	70.7	72.3	6	70.7	72.2
	3rd Tertile	24	72.4	81.9	6	72.7	75.8	18	72.4	81.9
	By Quartiles									
	1st Quartile	18	62.2	69.6	11	62.2	69.5	7	66.4	69.6
	2nd Quartile	17	69.8	72.0	11	69.9	72.0	6	69.8	71.9
	3rd Quartile	16	72.0	73.0	11	72.0	72.9	5	72.1	73.0
	4th Quartile	18	73.2	81.9	3	75.4	75.8	15	73.2	81.9
	By 65 decibels									
	Below	2	62.2	64.2	2	62.2	64.2	0	.	.
	Above	67	65.2	81.9	34	65.2	75.8	33	66.4	81.9
Cortisol Change										
	By Median									
	Below	31	-1244.9	597.6	24	-1059.2	585.9	7	-1244.9	597.6
	Above	32	602.2	3431.2	12	602.2	2103.9	20	664.4	3431.2
	By Tertiles									
	1st Tertile	20	-1244.9	301.0	16	-1059.2	301.0	4	-1244.9	189.7
	2nd Tertile	22	307.2	927.9	14	307.2	927.9	8	471.4	890.6
	3rd Tertile	21	945.7	3431.2	6	945.7	2103.9	15	1031.0	3431.2
	By Quartiles									
	1st Quartile	16	-1244.9	203.5	12	-1059.2	203.5	4	-1244.9	189.7
	2nd Quartile	15	244.8	597.6	12	244.8	585.9	3	471.4	597.6
	3rd Quartile	16	602.2	1192.7	8	602.2	954.9	8	664.4	1192.7
	4th Quartile	16	1236.7	3431.2	4	1311.7	2103.9	12	1236.7	3431.2
	Positive Change									
	No	12	-1244.9	-8.2	9	-1059.2	-8.2	3	-1244.9	-71.0
	Yes	51	1.1	3431.2	27	1.1	2103.9	24	189.7	3431.2

Table 4: Chunk tests of interaction for variables of interest in a Panel Study of Traffic-Related Air Pollution in Atlanta, GA

| | Outcome of Interest | | |
| | SDNN | r-MSSD | LF/HF |
Interaction Variables of Interest	p-value	p-value	p-value
Asthma Status	0.152	0.114	0.087
Gender	0.471	0.002	0.880
Age (above and below median)	0.218	0.747	0.134
Age (tertiles)	0.545	0.869	0.014
Age (quartiles)	0.411	0.747	0.002
FEV1 (above and below median)	0.191	0.956	0.062
FEV1 (tertiles)	0.790	0.109	0.045
FEV1 (quartiles)	0.537	0.147	0.021
BMI (above and below median)	0.923	0.464	0.712
BMI (tertiles)	0.232	0.792	0.324
BMI (quartiles)	0.809	0.433	0.007
BMI (CDC categories)	0.732	0.645	<0.001
Day of the Week	0.906	0.189	0.005
Mean Noise (above and below median)	0.311	0.910	0.010
Mean Noise (tertiles)	0.235	0.697	0.095
Mean Noise (quartiles)	0.154	0.649	0.197
Mean Noise (above and below 65 decibels)	0.607	0.665	0.923
Change in Cortisol (above and below median)	0.378	0.222	0.016
Change in Cortisol (tertiles)	0.200	0.001	0.061
Change in Cortisol (quartiles)	0.455	0.018	0.021
Cortisol (positive or negative)	0.296	0.371	0.131
Season	0.250	0.314	0.565

Figures

Figure 1a. Percent Change in SDNN (mm^2) from baseline and time relative to commute by asthma status from a stratified model in participants in a Panel Study of Traffic-Related Air Pollution in Atlanta, GA
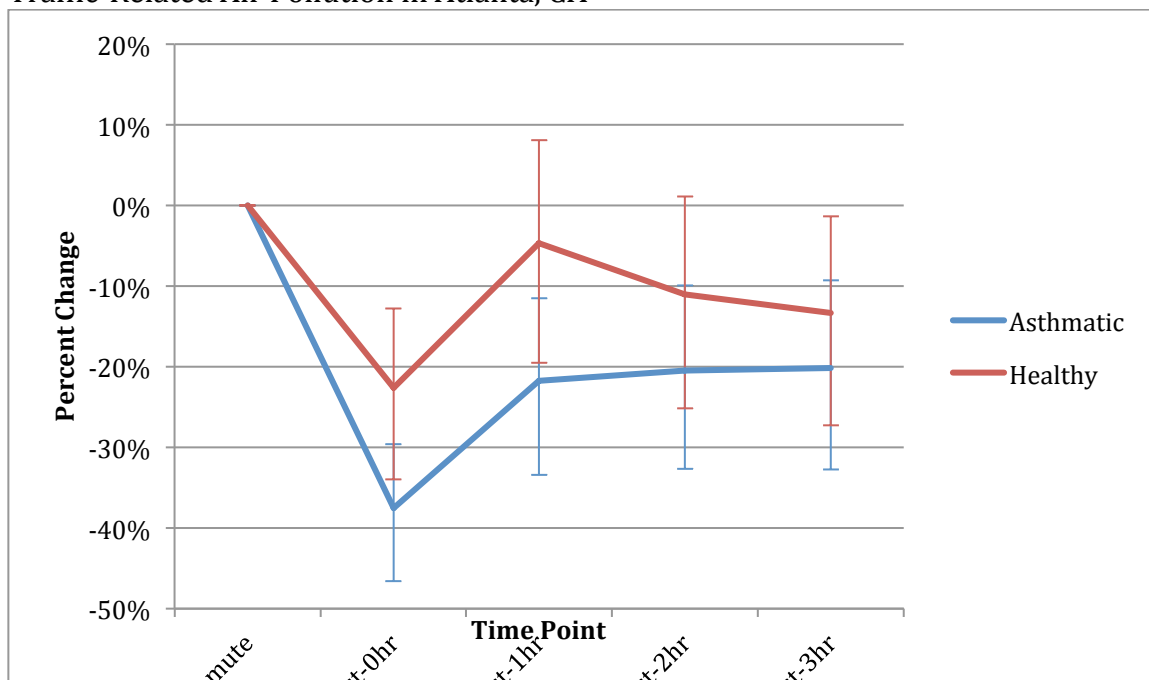
Figure 1b. Percent Change in r-MSSD (mm^2) from baseline and time relative to commute by asthma status from a stratified model in participants in a Panel Study of Traffic-Related Air Pollution in Atlanta, GA
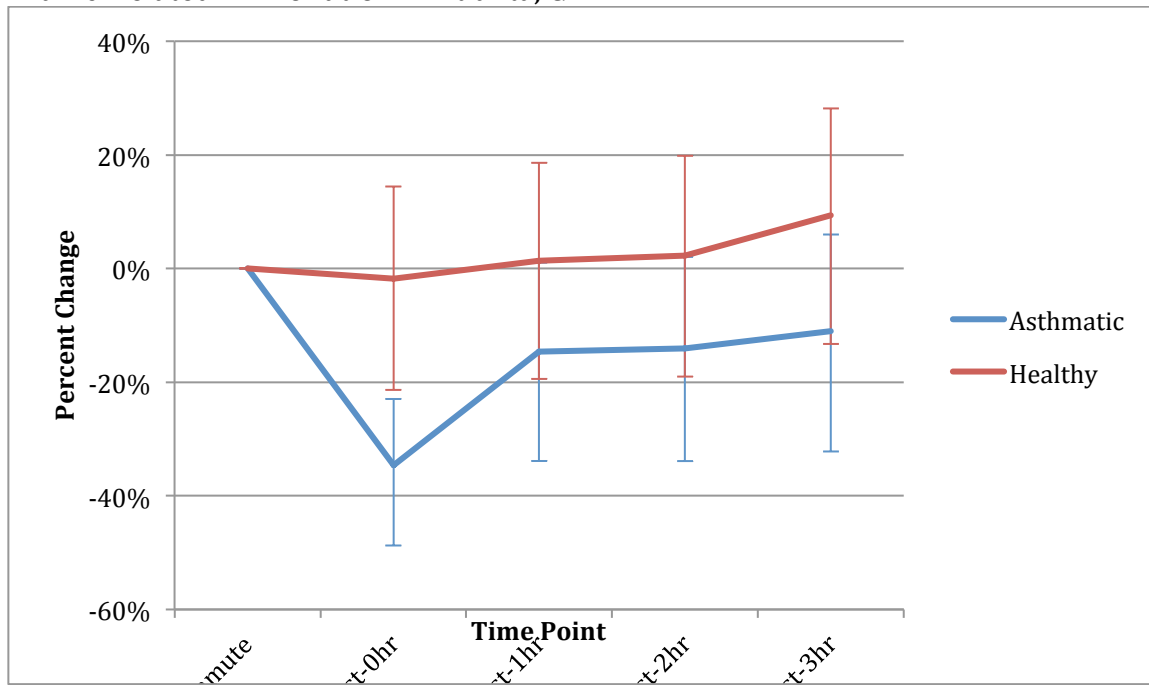
Figure 1c. Percent Change in LF/HF from baseline and time relative to commute by asthma status from a stratified model in participants in a Panel Study of Traffic-Related Air Pollution in Atlanta, GA
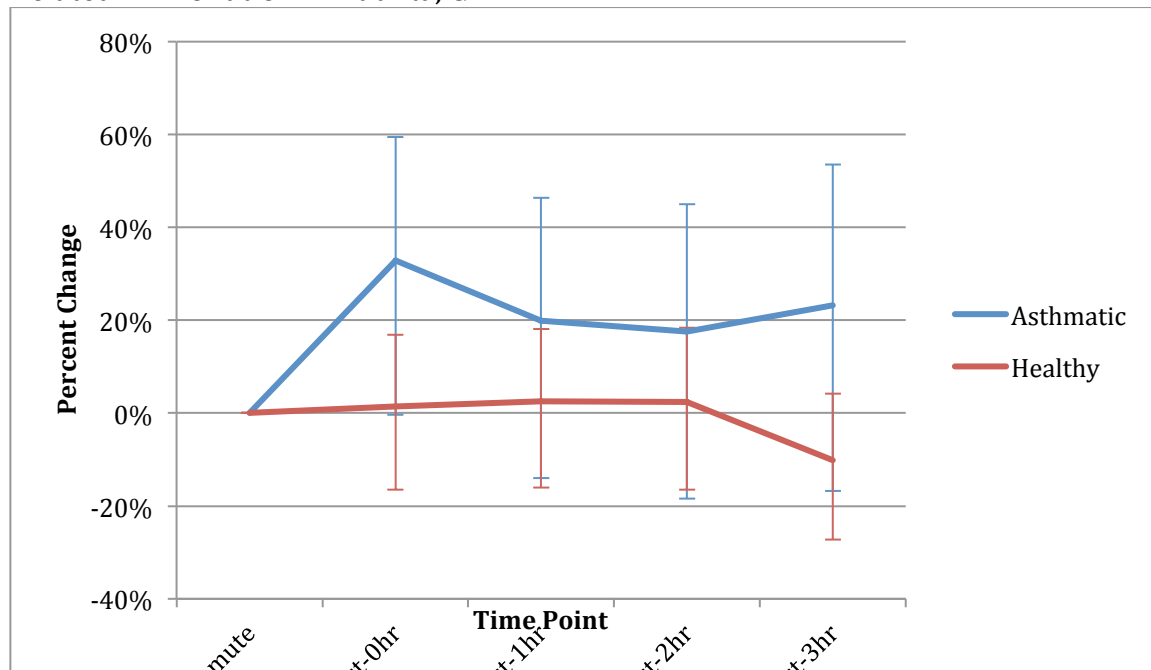
Figure 2a. Percent Change in SDNN (mm^2) from baseline and time relative to commute by asthma status and change in salivary cortisol from a stratified model in participants in a Panel Study of Traffic-Related Air Pollution in Atlanta, GA
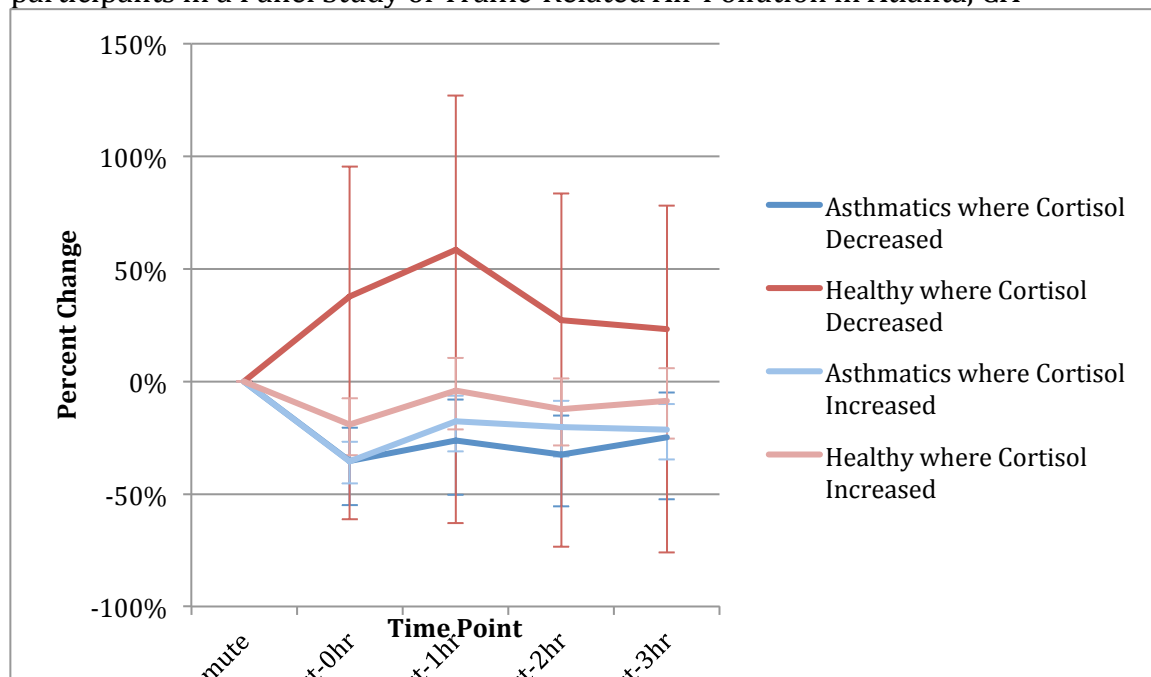
Figure 2b. Percent Change in SDNN (mm²) from baseline and time relative to commute by asthma status and change in salivary cortisol from an interaction model in participants in a Panel Study of Traffic-Related Air Pollution in Atlanta, GA
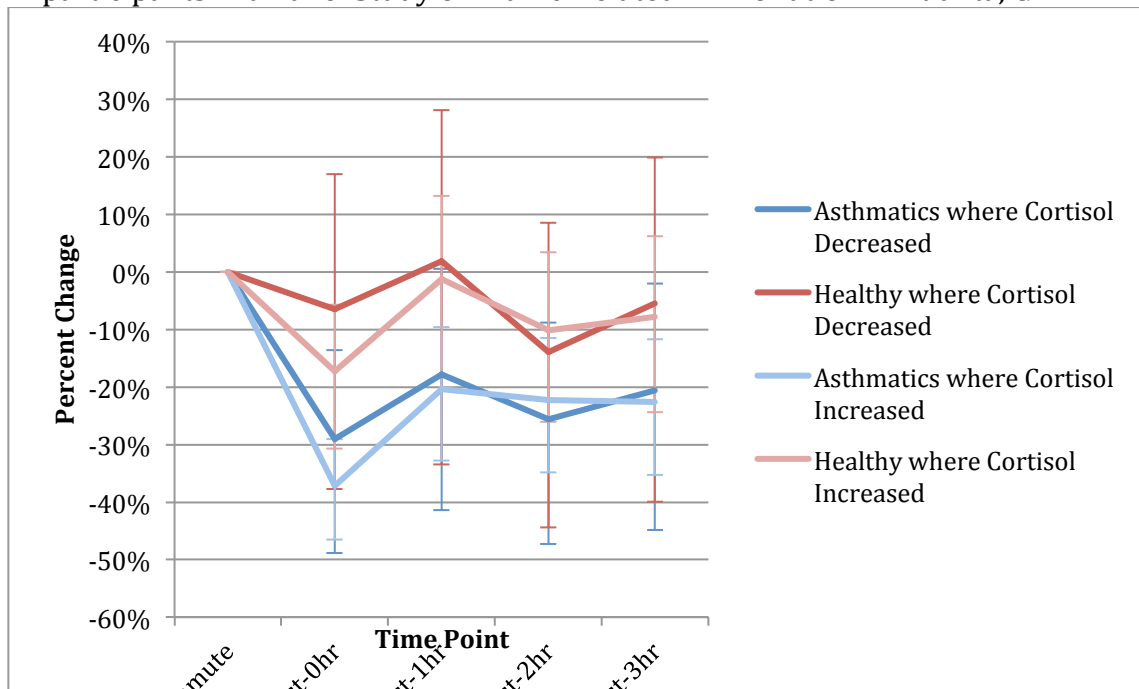
Figure 3a. Percent Change in SDNN (mm²) from baseline at 0 hours from commute by asthma status and covariates of interest from interaction models in a Panel Study of Traffic-Related Air Pollution in Atlanta, GA
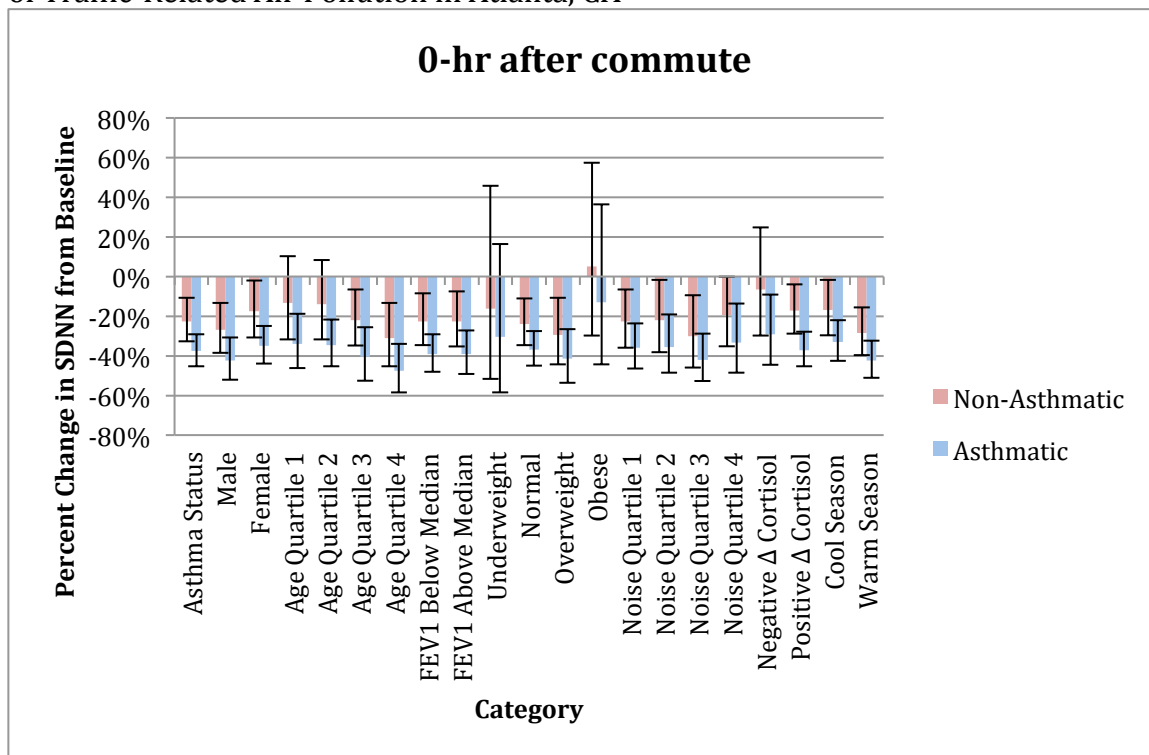
Figure 3b. Percent Change in SDNN (mm^2) from baseline at 1 hour from commute by asthma status and covariates of interest from interaction models in a Panel Study of Traffic-Related Air Pollution in Atlanta, GA
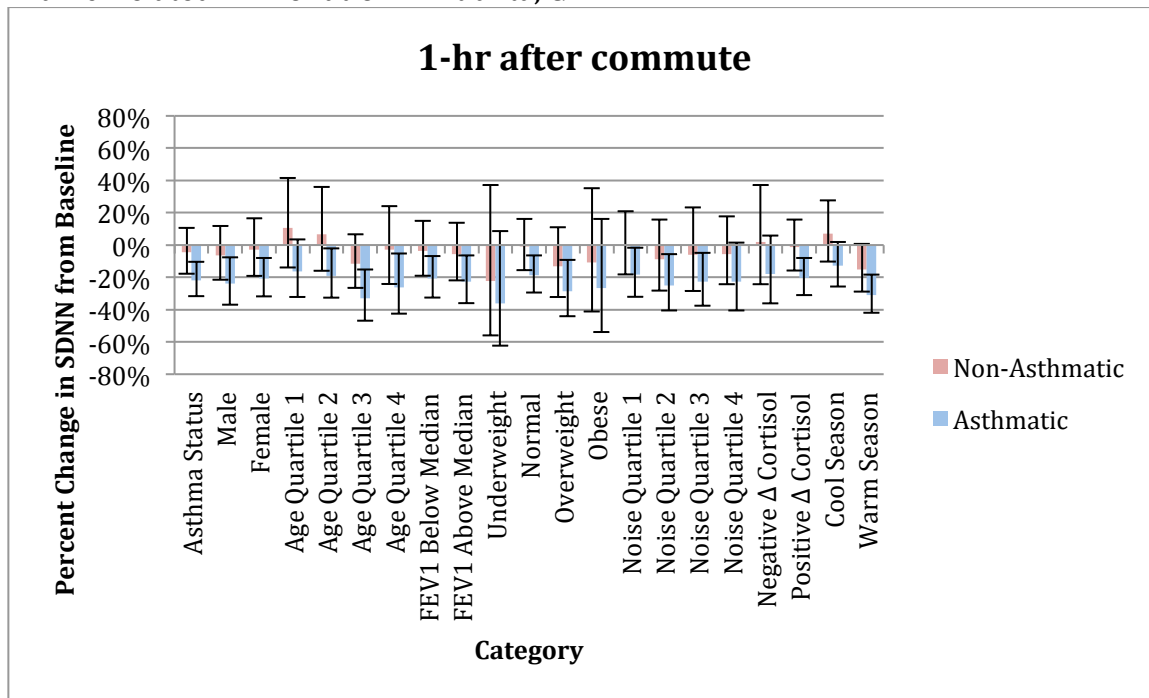
Figure 3c. Percent Change in SDNN (mm^2) from baseline at 2 hours from commute by asthma status and covariates of interest from interaction models in a Panel Study of Traffic-Related Air Pollution in Atlanta, GA
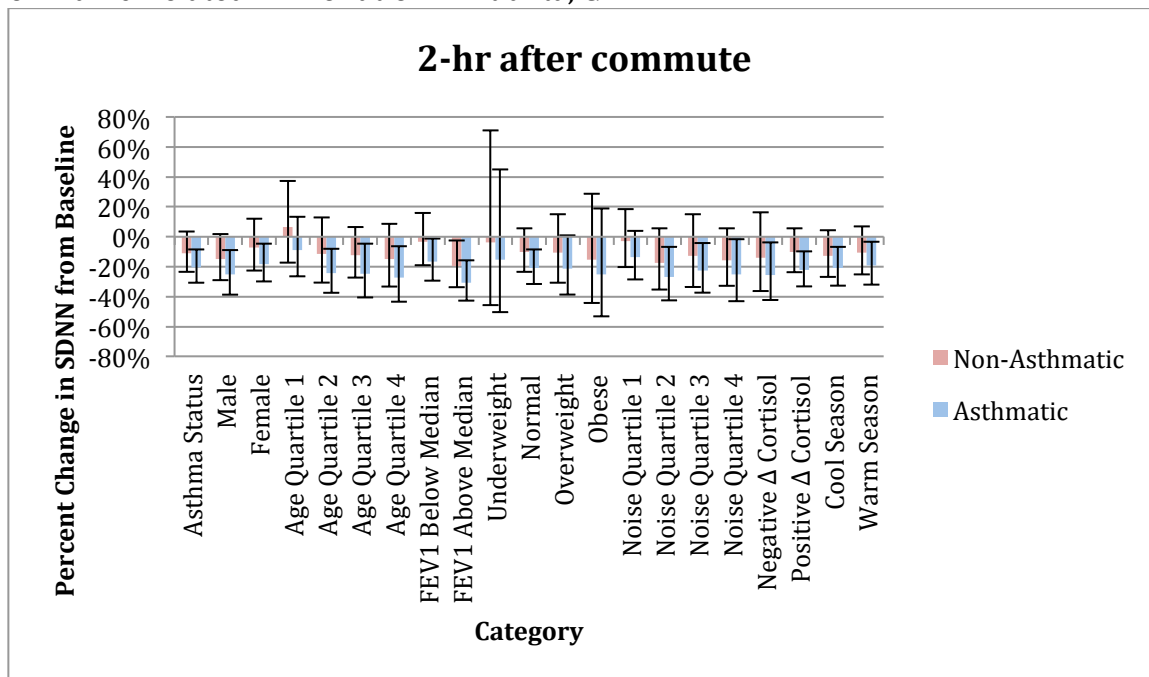
Figure 3d. Percent Change in SDNN (mm²) from baseline at 3 hours from commute by asthma status and covariates of interest from interaction models in a Panel Study of Traffic-Related Air Pollution in Atlanta, GA
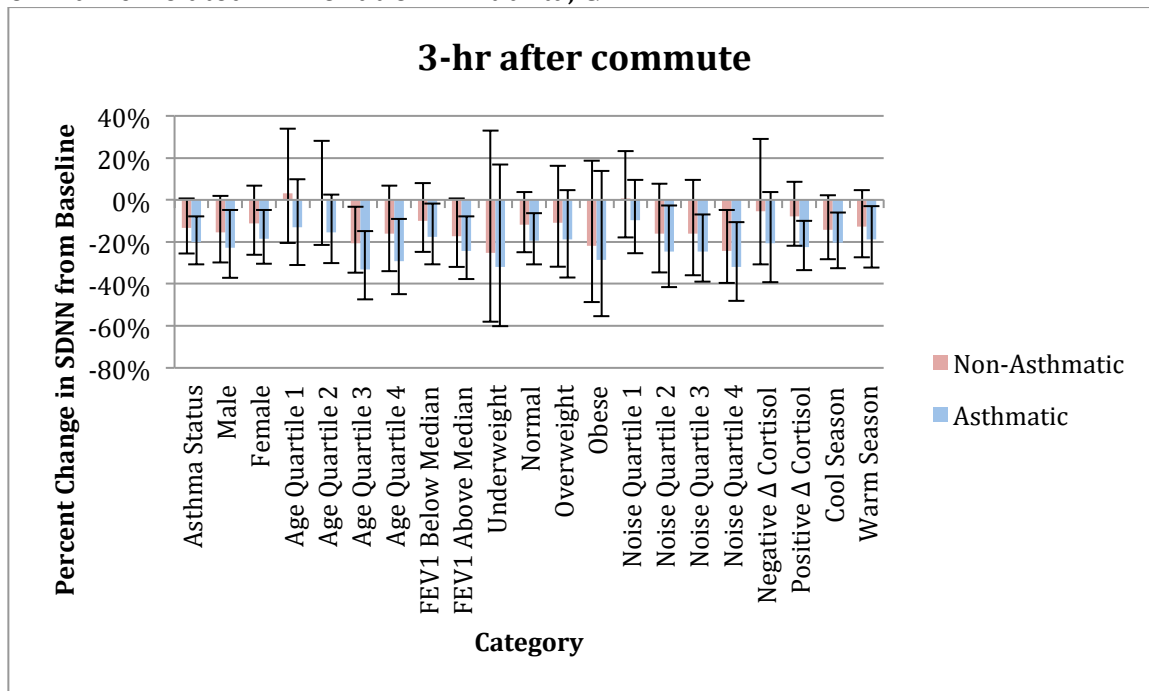
Figure 3e. Percent Change in r-MSSD (mm²) from baseline at 0 hours from commute by asthma status and covariates of interest from interaction models in a Panel Study of Traffic-Related Air Pollution in Atlanta, GA
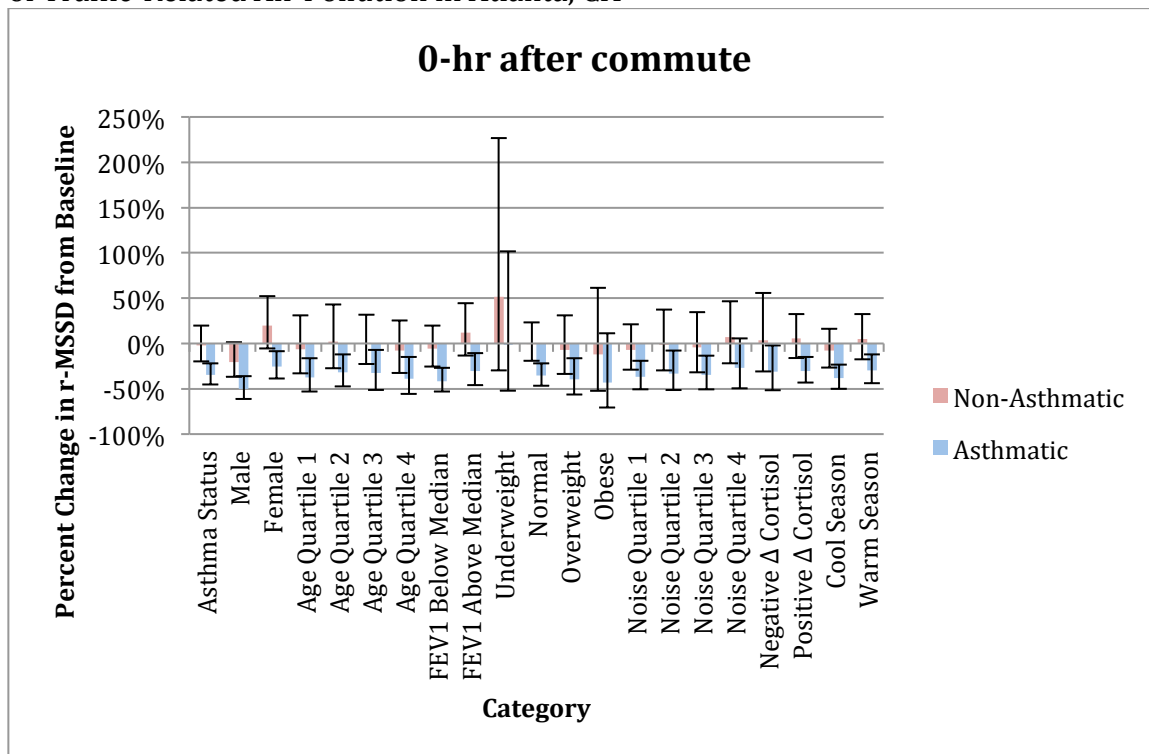
Figure 3f. Percent Change in r-MSSD (mm²) from baseline at 1 hour from commute by asthma status and covariates of interest from interaction models in a Panel Study of Traffic-Related Air Pollution in Atlanta, GA
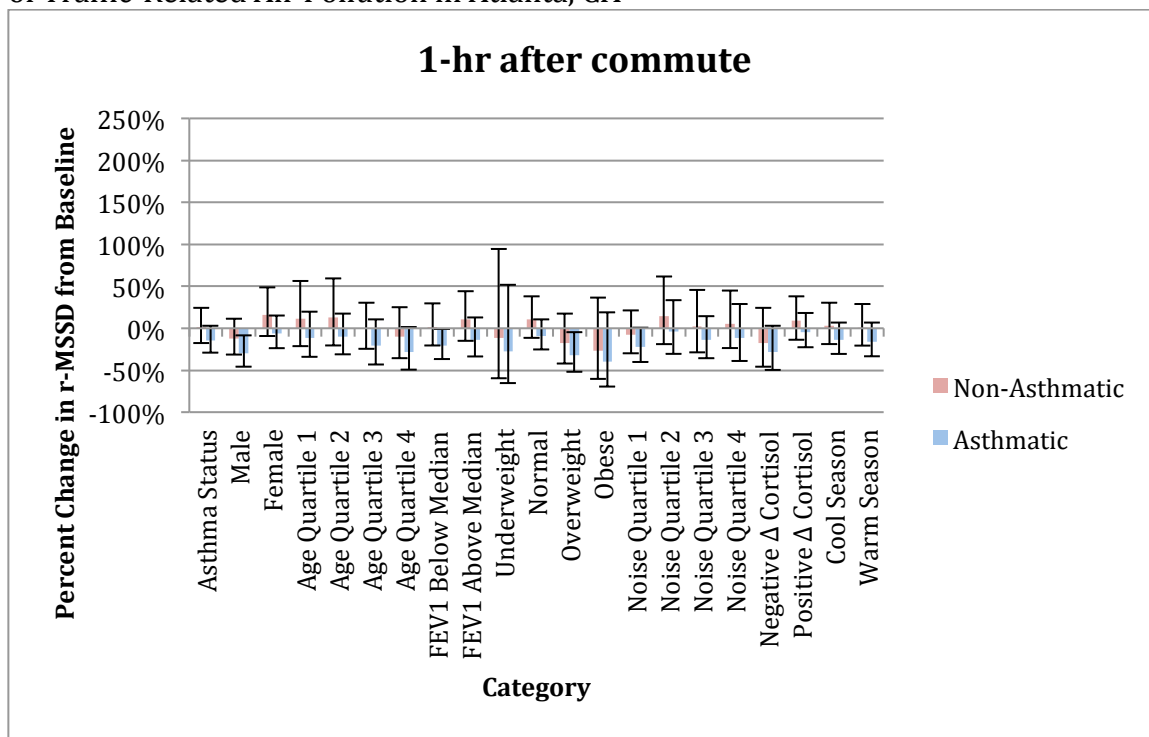
Figure 3g. Percent Change in r-MSSD (mm²) from baseline at 2 hours from commute by asthma status and covariates of interest from interaction models in a Panel Study of Traffic-Related Air Pollution in Atlanta, GA
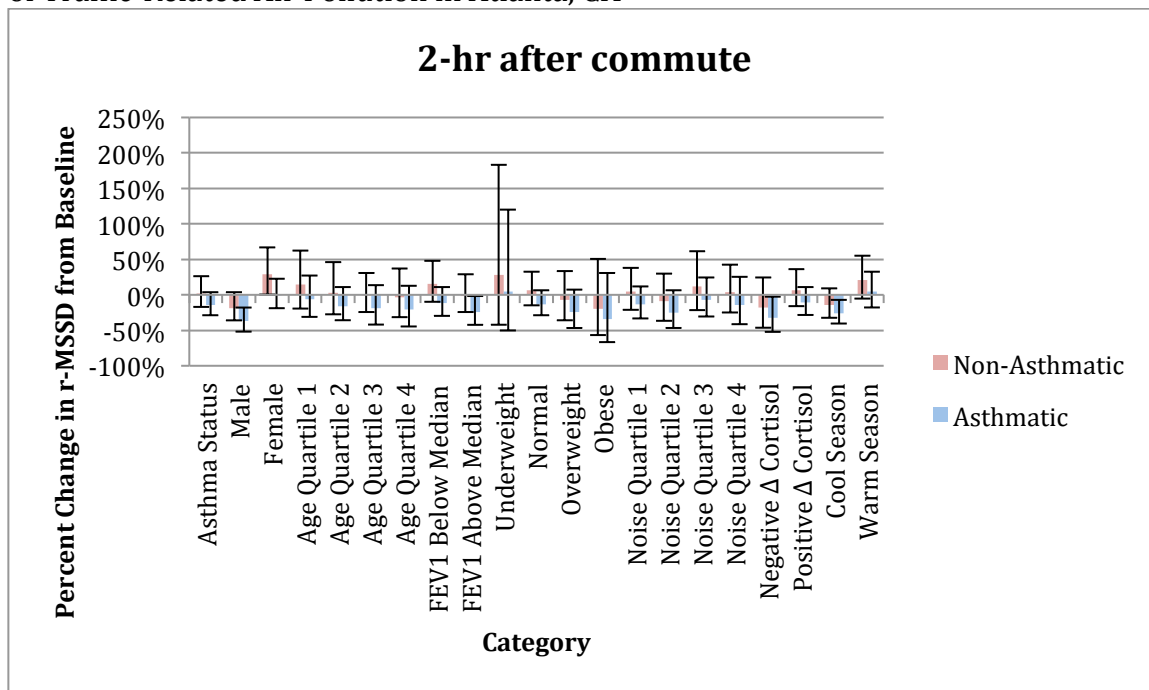
Figure 3h. Percent Change in r-MSSD (mm²) from baseline at 3 hours from commute by asthma status and covariates of interest from interaction models in a Panel Study of Traffic-Related Air Pollution in Atlanta, GA
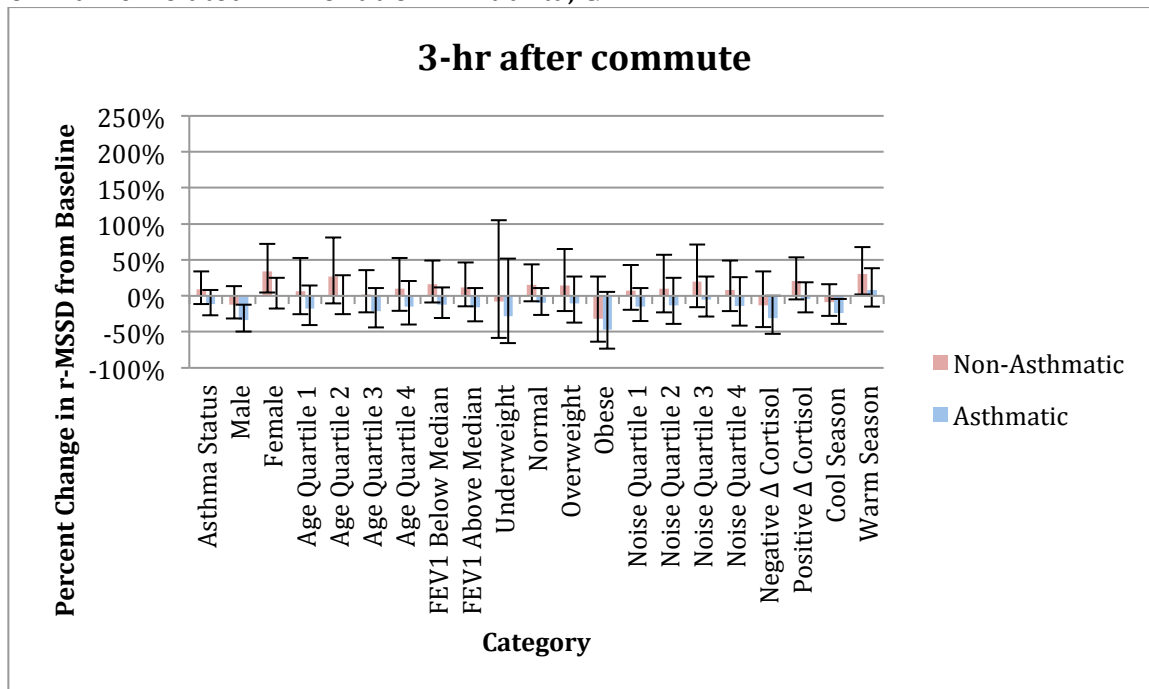
Figure 3i. Percent Change in LF/HF from baseline at 0 hours from commute by asthma status and covariates of interest from interaction models in a Panel Study of Traffic-Related Air Pollution in Atlanta, GA
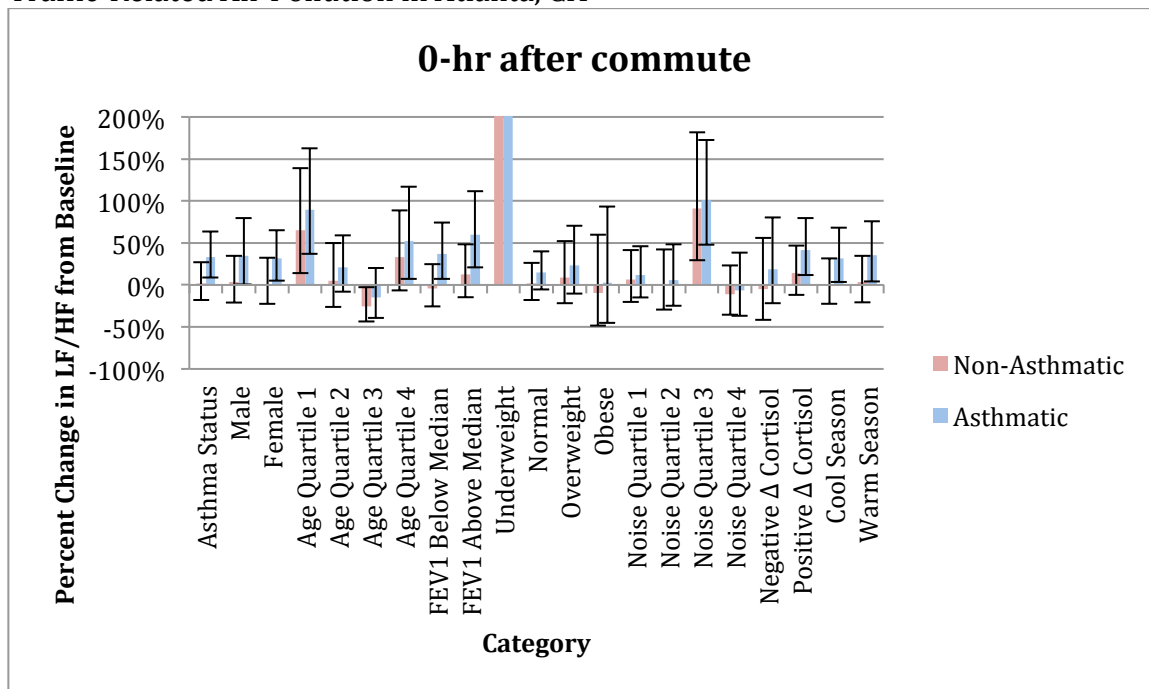
Figure 3j. Percent Change in LF/HF from baseline at 1 hour from commute by asthma status and covariates of interest from interaction models in a Panel Study of Traffic-Related Air Pollution in Atlanta, GA
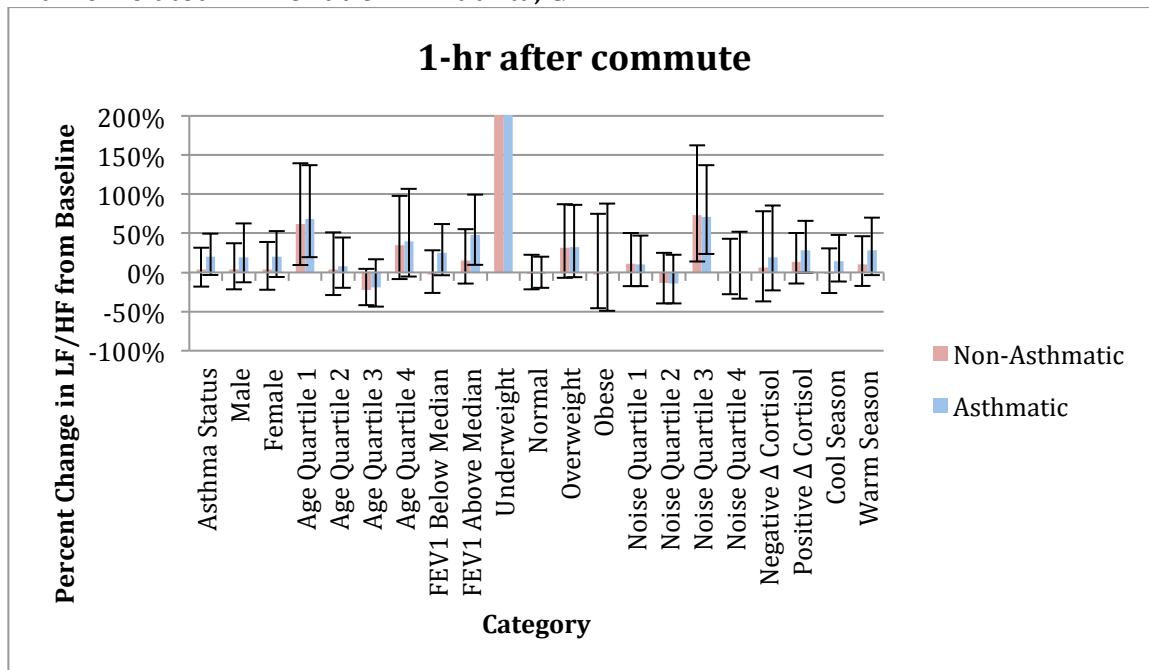
Figure 3k. Percent Change in LF/HF from baseline at 2 hours from commute by asthma status and covariates of interest from interaction models in a Panel Study of Traffic-Related Air Pollution in Atlanta, GA
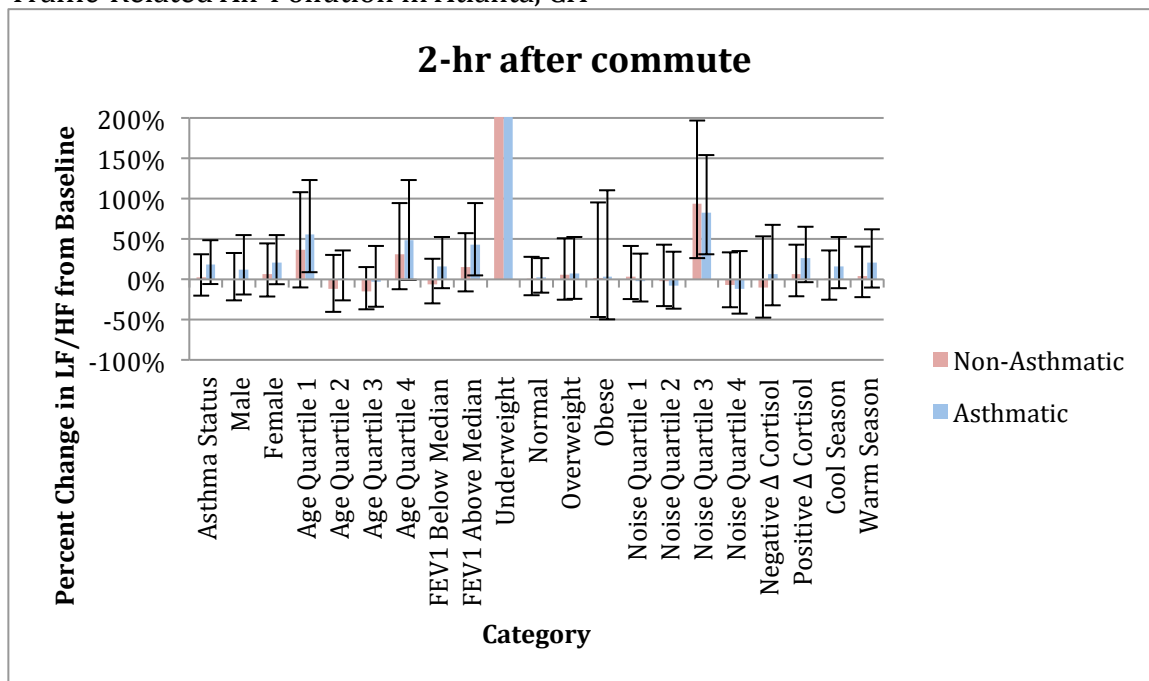
Figure 3k. Percent Change in LF/HF from baseline at 3 hours from commute by asthma status and covariates of interest from interaction models in a Panel Study of Traffic-Related Air Pollution in Atlanta, GA
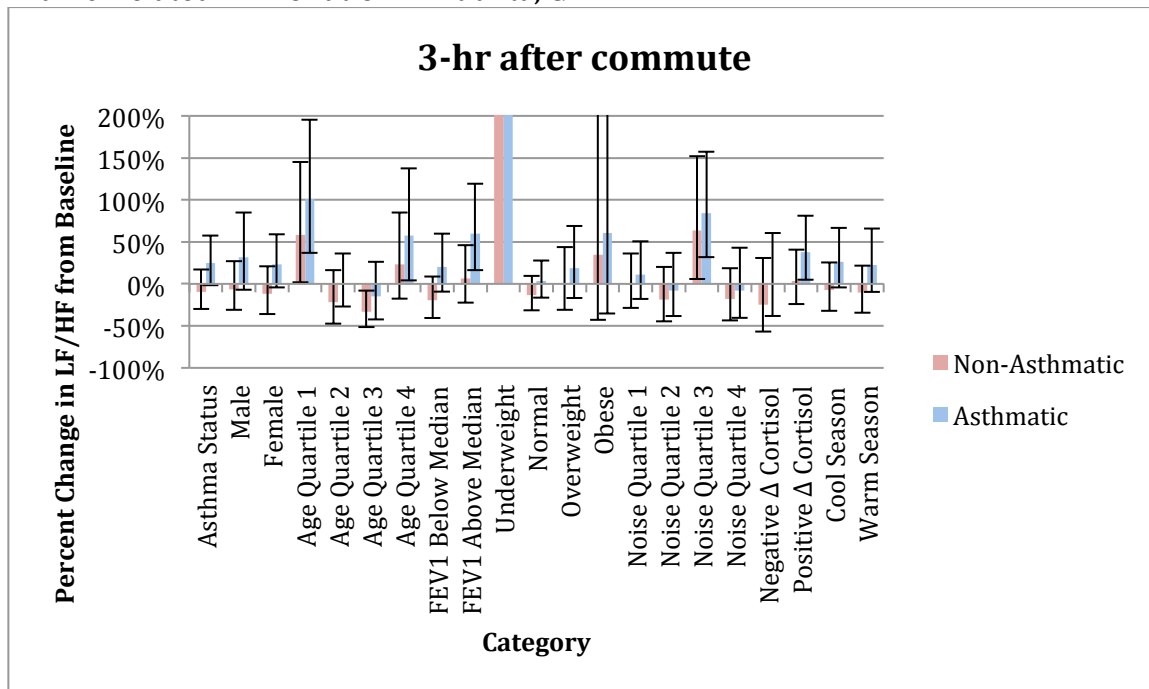
Appendix

Table: Percent Change Estimates for Stratified Models

Covariate	Class	Health Status	Time Point	SDNN Percent Change	SDNN Lower 95%	SDNN Upper 95%	SDNN p-value	r-MSSD Percent Change	r-MSSD Lower 95%	r-MSSD Upper 95%	r-MSSD p-value	LF/HF Percent Change	LF/HF Lower 95%	LF/HF Upper 95%	LF/HF p-value
Asthma Status	Asthmatic	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Asthmatic		Post-0hr	-38%	-45%	-28%	0.0000	-35%	-46%	-20%	0.0000	33%	6%	66%	0.0131
	Asthmatic		Post-1hr	-22%	-32%	-10%	0.0007	-15%	-30%	5%	0.1246	20%	-6%	54%	0.1510
	Asthmatic		Post-2hr	-20%	-31%	-8%	0.0018	-14%	-30%	6%	0.1524	18%	-10%	53%	0.2337
	Asthmatic		Post-3hr	-20%	-31%	-8%	0.0028	-11%	-28%	10%	0.2799	23%	-7%	63%	0.1436
	Healthy	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Healthy		Post-0hr	-23%	-33%	-11%	0.0003	-2%	-18%	18%	0.8409	2%	-14%	20%	0.8565
	Healthy		Post-1hr	-5%	-18%	10%	0.5106	1%	-16%	22%	0.8837	2%	-13%	21%	0.7705
	Healthy		Post-2hr	-11%	-23%	3%	0.1183	2%	-15%	24%	0.8149	2%	-14%	21%	0.7807
	Healthy		Post-3hr	-13%	-25%	1%	0.0596	9%	-9%	32%	0.3476	-10%	-25%	7%	0.2276
Gender	F	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	F		Post-0hr	-29%	-38%	-18%	0.0000	-14%	-28%	1%	0.0713	33%	1%	77%	0.0436
	F		Post-1hr	-13%	-24%	1%	0.0624	4%	-13%	24%	0.6817	23%	-9%	66%	0.1787
	F		Post-2hr	-13%	-24%	1%	0.0712	8%	-10%	29%	0.4179	18%	-13%	62%	0.2865
	F		Post-3hr	-13%	-25%	0%	0.0534	13%	-6%	35%	0.1971	24%	-10%	70%	0.1866
	F	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	F		Post-0hr	-29%	-41%	-16%	0.0002	-3%	-22%	20%	0.7565	-1%	-30%	41%	0.9680
	F		Post-1hr	-18%	-32%	-1%	0.0416	-2%	-22%	24%	0.8848	1%	-32%	48%	0.9789
	F		Post-2hr	-17%	-31%	0%	0.0530	16%	-8%	47%	0.2153	11%	-26%	67%	0.6165
	F		Post-3hr	-20%	-33%	-4%	0.0192	14%	-9%	44%	0.2462	-12%	-42%	34%	0.5518
	M	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	M		Post-0hr	-51%	-62%	-38%	0.0000	-61%	-73%	-44%	0.0000	32%	2%	70%	0.0360
	M		Post-1hr	-37%	-51%	-17%	0.0009	-43%	-61%	-18%	0.0031	15%	-11%	50%	0.2795
	M		Post-2hr	-35%	-51%	-14%	0.0025	-47%	-64%	-22%	0.0015	19%	-9%	56%	0.1944

	M		Post-3hr	-33%	-50%	-10%	0.0091	-49%	-66%	-23%	0.0018	36%	2%	82%	0.0346
	M	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	M		Post-0hr	-15%	-32%	7%	0.1577	0%	-27%	39%	0.9792	4%	-17%	29%	0.7315
	M		Post-1hr	9%	-13%	38%	0.4507	5%	-24%	46%	0.7656	6%	-15%	32%	0.5953
	M		Post-2hr	-6%	-25%	20%	0.6334	-7%	-33%	30%	0.6853	-5%	-24%	19%	0.6339
	M		Post-3hr	-7%	-27%	19%	0.5843	6%	-24%	49%	0.7297	-8%	-27%	16%	0.4963
Age (above and below median)	Group 1	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 1		Post-0hr	-34%	-43%	-23%	0.0000	-32%	-46%	-15%	0.0011	55%	18%	102%	0.0017
	Group 1		Post-1hr	-18%	-30%	-4%	0.0149	-11%	-30%	12%	0.3162	38%	3%	85%	0.0327
	Group 1		Post-2hr	-17%	-30%	-3%	0.0214	-9%	-29%	15%	0.4199	27%	-7%	73%	0.1355
	Group 1		Post-3hr	-18%	-30%	-3%	0.0232	-8%	-29%	18%	0.4939	39%	0%	93%	0.0483
	Group 1	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 1		Post-0hr	-16%	-35%	7%	0.1599	-11%	-39%	29%	0.5360	13%	-26%	74%	0.5617
	Group 1		Post-1hr	6%	-18%	36%	0.6608	11%	-24%	63%	0.5852	13%	-29%	81%	0.6010
	Group 1		Post-2hr	-7%	-28%	19%	0.5508	-2%	-33%	44%	0.9121	-2%	-41%	62%	0.9376
	Group 1		Post-3hr	9%	-16%	40%	0.5251	15%	-22%	69%	0.4788	-6%	-44%	58%	0.8229
	Group 2	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 2		Post-0hr	-45%	-56%	-31%	0.0000	-40%	-55%	-19%	0.0011	1%	-24%	34%	0.9384
	Group 2		Post-1hr	-30%	-45%	-10%	0.0052	-22%	-44%	7%	0.1190	-4%	-28%	28%	0.7709
	Group 2		Post-2hr	-27%	-43%	-6%	0.0161	-24%	-45%	5%	0.0969	9%	-18%	46%	0.5434
	Group 2		Post-3hr	-25%	-42%	-3%	0.0259	-17%	-40%	15%	0.2570	3%	-22%	38%	0.8205
	Group 2	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 2		Post-0hr	-25%	-37%	-12%	0.0009	2%	-18%	29%	0.8329	-3%	-22%	19%	0.7431
	Group 2		Post-1hr	-9%	-24%	9%	0.2926	-3%	-24%	23%	0.7779	-2%	-21%	21%	0.8564
	Group 2		Post-2hr	-13%	-27%	5%	0.1559	5%	-18%	33%	0.7203	4%	-16%	29%	0.7398
	Group 2		Post-3hr	-22%	-35%	-6%	0.0104	6%	-16%	36%	0.6130	-12%	-30%	10%	0.2511
Age (tertiles)	Group 1	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 1		Post-0hr	-31%	-44%	-15%	0.0008	-32%	-52%	-4%	0.0278	81%	19%	173%	0.0059
	Group 1		Post-1hr	-13%	-30%	8%	0.1955	-8%	-35%	32%	0.6578	65%	5%	159%	0.0305
	Group 1		Post-2hr	-13%	-31%	9%	0.2218	-9%	-37%	31%	0.5958	52%	-6%	146%	0.0899

	Group 1		Post-3hr	-21%	-38%	1%	0.0621	-15%	-43%	27%	0.4249	76%	4%	198%	0.0357
	Group 1	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 1		Post-0hr	-24%	-45%	3%	0.0788	-23%	-54%	28%	0.3041	21%	-33%	119%	0.5138
	Group 1		Post-1hr	-1%	-28%	37%	0.9566	-1%	-41%	67%	0.9840	22%	-36%	133%	0.5446
	Group 1		Post-2hr	-5%	-31%	32%	0.7671	-1%	-41%	67%	0.9703	20%	-41%	144%	0.6170
	Group 1		Post-3hr	8%	-22%	50%	0.6200	9%	-36%	83%	0.7504	21%	-42%	154%	0.6094
	Group 2	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 2		Post-0hr	-42%	-52%	-29%	0.0000	-34%	-47%	-17%	0.0005	15%	-8%	42%	0.2140
	Group 2		Post-1hr	-30%	-42%	-14%	0.0006	-21%	-37%	0%	0.0478	4%	-17%	29%	0.7500
	Group 2		Post-2hr	-29%	-42%	-13%	0.0011	-14%	-32%	8%	0.1921	-2%	-21%	22%	0.8547
	Group 2		Post-3hr	-24%	-38%	-7%	0.0083	-7%	-26%	17%	0.5131	-1%	-21%	23%	0.8970
	Group 2	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 2		Post-0hr	-19%	-33%	-3%	0.0259	10%	-13%	40%	0.4301	-19%	-35%	-1%	0.0425
	Group 2		Post-1hr	-8%	-24%	11%	0.3744	9%	-14%	38%	0.4814	-15%	-31%	5%	0.1282
	Group 2		Post-2hr	-13%	-28%	6%	0.1687	2%	-20%	29%	0.8877	-13%	-30%	8%	0.1945
	Group 2		Post-3hr	-19%	-34%	-1%	0.0436	7%	-16%	37%	0.5871	-33%	-46%	-16%	0.0008
	Group 3	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 3		Post-0hr	-41%	-55%	-23%	0.0002	-40%	-58%	-14%	0.0067	9%	-23%	54%	0.6159
	Group 3		Post-1hr	-23%	-43%	3%	0.0802	-18%	-46%	23%	0.3200	-1%	-32%	44%	0.9495
	Group 3		Post-2hr	-19%	-40%	9%	0.1594	-24%	-50%	16%	0.1970	16%	-20%	70%	0.4280
	Group 3		Post-3hr	-16%	-38%	13%	0.2426	-17%	-46%	29%	0.4050	12%	-23%	64%	0.5521
	Group 3	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 3		Post-0hr	-27%	-44%	-5%	0.0184	-1%	-29%	37%	0.9408	29%	-8%	79%	0.1366
	Group 3		Post-1hr	-2%	-26%	30%	0.8814	-8%	-36%	32%	0.6407	24%	-13%	78%	0.2256
	Group 3		Post-2hr	-14%	-35%	14%	0.3012	9%	-25%	61%	0.6398	19%	-17%	71%	0.3336
	Group 3		Post-3hr	-19%	-38%	7%	0.1368	13%	-22%	63%	0.5137	12%	-22%	61%	0.5324
Age (quartiles)	Group 1	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 1		Post-0hr	-31%	-47%	-10%	0.0072	-32%	-57%	6%	0.0869	120%	26%	286%	0.0068
	Group 1		Post-1hr	-13%	-34%	14%	0.2980	-12%	-44%	40%	0.5915	106%	12%	279%	0.0217
	Group 1		Post-2hr	-5%	-28%	25%	0.6889	-2%	-39%	57%	0.9213	85%	-4%	254%	0.0642

Group	Category	Timepoint											
Group 1		Post-3hr	-18%	-39%	11%	0.1990	-14%	-49%	44%	0.5501	129%	12%	368%	0.0243
Group 1	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
Group 1		Post-0hr	-15%	-43%	27%	0.4223	-20%	-59%	54%	0.4901	37%	-38%	206%	0.4317
Group 1		Post-1hr	5%	-30%	58%	0.8037	13%	-42%	121%	0.7158	21%	-50%	196%	0.6650
Group 1		Post-2hr	2%	-32%	52%	0.9357	2%	-48%	99%	0.9646	13%	-59%	214%	0.8117
Group 1		Post-3hr	13%	-25%	69%	0.5545	-5%	-52%	86%	0.8756	40%	-53%	317%	0.5362
Group 2	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
Group 2		Post-0hr	-35%	-45%	-23%	0.0000	-32%	-45%	-17%	0.0004	25%	3%	53%	0.0267
Group 2		Post-1hr	-21%	-33%	-6%	0.0074	-11%	-28%	10%	0.2688	8%	-12%	32%	0.4546
Group 2		Post-2hr	-25%	-37%	-11%	0.0015	-15%	-31%	6%	0.1469	1%	-18%	24%	0.9204
Group 2		Post-3hr	-19%	-31%	-4%	0.0185	-5%	-24%	17%	0.6018	3%	-16%	27%	0.7412
Group 2	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
Group 2		Post-0hr	-10%	-33%	21%	0.4961	-6%	-37%	40%	0.7537	-5%	-33%	35%	0.7929
Group 2		Post-1hr	17%	-13%	57%	0.3032	6%	-29%	59%	0.7719	5%	-26%	49%	0.7862
Group 2		Post-2hr	-6%	-30%	27%	0.6893	-8%	-39%	38%	0.6773	-13%	-39%	23%	0.4301
Group 2		Post-3hr	16%	-14%	55%	0.3326	29%	-14%	94%	0.2085	-28%	-49%	2%	0.0639
Group 3	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
Group 3		Post-0hr	-47%	-61%	-29%	0.0001	-26%	-50%	10%	0.1353	-36%	-54%	-10%	0.0096
Group 3		Post-1hr	-40%	-56%	-17%	0.0021	-15%	-43%	27%	0.4174	-35%	-54%	-9%	0.0138
Group 3		Post-2hr	-39%	-56%	-15%	0.0035	-15%	-43%	27%	0.4189	-20%	-43%	12%	0.1945
Group 3		Post-3hr	-38%	-55%	-15%	0.0041	-7%	-38%	38%	0.7149	-35%	-54%	-9%	0.0132
Group 3	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
Group 3		Post-0hr	-19%	-33%	-3%	0.0254	-2%	-24%	26%	0.8673	-17%	-32%	1%	0.0664
Group 3		Post-1hr	-8%	-24%	11%	0.3707	-3%	-25%	26%	0.8350	-15%	-31%	5%	0.1309
Group 3		Post-2hr	-5%	-22%	16%	0.6114	-1%	-24%	28%	0.9099	-7%	-25%	15%	0.5019
Group 3		Post-3hr	-18%	-34%	1%	0.0584	-3%	-26%	26%	0.7956	-26%	-41%	-7%	0.0115
Group 4	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
Group 4		Post-0hr	-44%	-60%	-22%	0.0011	-49%	-67%	-21%	0.0037	47%	-1%	119%	0.0551
Group 4		Post-1hr	-21%	-45%	13%	0.1950	-28%	-57%	18%	0.1837	36%	-11%	108%	0.1542
Group 4		Post-2hr	-16%	-42%	21%	0.3351	-33%	-60%	14%	0.1351	44%	-7%	122%	0.0961

	Group	Asthmatic	Time												
	Group 4		Post-3hr	-13%	-41%	26%	0.4397	-27%	-57%	24%	0.2311	60%	4%	146%	0.0348
	Group 4	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 4		Post-0hr	-37%	-54%	-12%	0.0069	9%	-27%	62%	0.6792	38%	-6%	103%	0.0975
	Group 4		Post-1hr	-10%	-36%	27%	0.5447	-9%	-42%	41%	0.6575	41%	-7%	112%	0.1011
	Group 4		Post-2hr	-25%	-47%	5%	0.0945	14%	-29%	84%	0.5689	38%	-8%	109%	0.1200
	Group 4		Post-3hr	-29%	-49%	-1%	0.0432	23%	-21%	92%	0.3568	26%	-17%	91%	0.2623
FEV (above and below median)	Group 1	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 1		Post-0hr	-34%	-45%	-22%	0.0000	-39%	-52%	-22%	0.0000	35%	12%	64%	0.0000
	Group 1		Post-1hr	-12%	-26%	6%	0.0100	-10%	-30%	15%	0.0035	16%	-4%	41%	0.0336
	Group 1		Post-2hr	-8%	-23%	11%	0.0112	-5%	-26%	23%	0.0097	6%	-13%	29%	0.2340
	Group 1		Post-3hr	-14%	-29%	4%	0.0584	-5%	-27%	24%	0.0112	12%	-9%	37%	0.4871
	Group 1	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 1		Post-0hr	-30%	-42%	-15%	0.1470	-7%	-29%	22%	0.0092	-5%	-23%	17%	0.0042
	Group 1		Post-1hr	-16%	-31%	3%	0.5492	-10%	-32%	20%	0.5760	3%	-17%	27%	0.3117
	Group 1		Post-2hr	-14%	-30%	5%	0.6367	10%	-18%	46%	0.2254	6%	-15%	32%	0.6262
	Group 1		Post-3hr	-16%	-31%	3%	0.9720	10%	-17%	45%	0.1241	-14%	-31%	8%	0.4354
	Group 2	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 2		Post-0hr	-45%	-55%	-33%	0.0000	-34%	-50%	-12%	0.0000	58%	6%	136%	0.0000
	Group 2		Post-1hr	-34%	-46%	-19%	0.0005	-27%	-45%	-3%	0.0061	60%	2%	150%	0.0292
	Group 2		Post-2hr	-39%	-51%	-25%	0.0042	-31%	-48%	-8%	0.0093	62%	1%	161%	0.0134
	Group 2		Post-3hr	-29%	-42%	-13%	0.0004	-23%	-42%	2%	0.0161	77%	8%	191%	0.0060
	Group 2	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 2		Post-0hr	-14%	-29%	5%	0.0001	18%	-11%	56%	0.0014	10%	-26%	63%	0.0006
	Group 2		Post-1hr	11%	-10%	36%	0.2382	31%	-2%	75%	0.6437	6%	-32%	64%	0.2672
	Group 2		Post-2hr	-8%	-25%	13%	0.0791	7%	-20%	43%	0.1875	2%	-36%	62%	0.0909
	Group 2		Post-3hr	-11%	-28%	10%	0.0122	23%	-8%	64%	0.1272	-5%	-42%	56%	0.0068
FEV (tertiles)	Group 1	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 1		Post-0hr	-38%	-49%	-25%	0.0000	-51%	-63%	-35%	0.0002	41%	14%	75%	0.0000
	Group 1		Post-1hr	-18%	-33%	0%	0.0660	-20%	-40%	7%	0.1247	8%	-13%	34%	0.0209
	Group 1		Post-2hr	-11%	-28%	10%	0.1100	-9%	-32%	22%	0.1115	8%	-14%	35%	0.0993

	Group	Status	Timepoint												
	Group 1		Post-3hr	-18%	-34%	2%	0.1483	-16%	-38%	15%	0.2127	16%	-7%	46%	0.1618
	Group 1	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 1		Post-0hr	-27%	-45%	-4%	0.0859	-16%	-44%	27%	0.1237	-14%	-36%	15%	0.0049
	Group 1		Post-1hr	-25%	-44%	0%	0.6581	-23%	-49%	16%	0.7142	8%	-19%	46%	0.6177
	Group 1		Post-2hr	-18%	-38%	10%	0.8432	-1%	-34%	49%	0.6026	12%	-18%	52%	0.6839
	Group 1		Post-3hr	-18%	-38%	9%	0.6748	-3%	-36%	46%	0.6352	-21%	-43%	11%	0.7028
	Group 2	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 2		Post-0hr	-30%	-46%	-9%	0.0000	2%	-31%	51%	0.0000	12%	-17%	52%	0.0000
	Group 2		Post-1hr	-6%	-30%	26%	0.0006	16%	-24%	76%	0.0009	22%	-11%	65%	0.0008
	Group 2		Post-2hr	-27%	-46%	-1%	0.0017	-24%	-50%	18%	0.0029	9%	-20%	48%	0.0039
	Group 2		Post-3hr	-29%	-48%	-2%	0.0029	-11%	-43%	38%	0.0019	8%	-21%	48%	0.0067
	Group 2	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 2		Post-0hr	-25%	-40%	-7%	0.0038	3%	-26%	43%	0.0007	3%	-21%	33%	0.0078
	Group 2		Post-1hr	0%	-22%	28%	0.2478	26%	-12%	80%	0.3612	-14%	-34%	12%	0.1670
	Group 2		Post-2hr	-10%	-31%	16%	0.0746	19%	-18%	73%	0.1242	0%	-24%	31%	0.1379
	Group 2		Post-3hr	-13%	-34%	13%	0.0514	17%	-19%	69%	0.0441	-7%	-29%	22%	0.1233
	Group 3	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 3		Post-0hr	-48%	-58%	-34%	0.0000	-36%	-52%	-15%	0.0000	81%	13%	192%	0.0001
	Group 3		Post-1hr	-37%	-50%	-20%	0.0330	-34%	-50%	-12%	0.0146	91%	12%	228%	0.1829
	Group 3		Post-2hr	-32%	-46%	-14%	0.0357	-17%	-38%	10%	0.0356	74%	-2%	211%	0.0139
	Group 3		Post-3hr	-18%	-35%	3%	0.0353	-11%	-33%	18%	0.0430	101%	9%	267%	0.0062
	Group 3	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 3		Post-0hr	-17%	-33%	3%	0.0046	17%	-10%	54%	0.0071	13%	-27%	76%	0.0189
	Group 3		Post-1hr	7%	-14%	33%	0.8570	14%	-14%	50%	0.3585	22%	-26%	101%	0.9596
	Group 3		Post-2hr	-8%	-26%	16%	0.3301	5%	-21%	38%	0.1594	4%	-39%	78%	0.0832
	Group 3		Post-3hr	-10%	-28%	13%	0.1940	27%	-4%	68%	0.1086	-4%	-45%	70%	0.0246
FEV (quartiles)	Group 1	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 1		Post-0hr	-39%	-52%	-24%	0.0001	-52%	-66%	-32%	0.0007	37%	8%	73%	0.0000
	Group 1		Post-1hr	-18%	-34%	2%	0.1015	-20%	-43%	11%	0.0927	4%	-17%	32%	0.0337
	Group 1		Post-2hr	-11%	-30%	12%	0.4112	-11%	-37%	27%	0.0857	11%	-13%	41%	0.1215

Group	Category	Time												
Group 1		Post-3hr	-24%	-41%	-3%	0.2380	-22%	-46%	14%	0.1655	15%	-11%	48%	0.2959
Group 1	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
Group 1		Post-0hr	-35%	-54%	-9%	0.2448	-29%	-57%	16%	0.0789	-8%	-35%	30%	0.0080
Group 1		Post-1hr	-27%	-48%	2%	0.4327	-30%	-57%	16%	0.9790	20%	-15%	69%	0.9610
Group 1		Post-2hr	-14%	-39%	21%	0.6204	-6%	-43%	54%	0.3614	11%	-22%	56%	0.7795
Group 1	Asthmatic	Post-3hr	-11%	-37%	25%	0.8154	-1%	-40%	63%	0.3748	-19%	-42%	14%	0.9571
Group 2		Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
Group 2		Post-0hr	-23%	-41%	0%	0.0000	-3%	-31%	36%	0.0000	33%	-2%	82%	0.0002
Group 2		Post-1hr	3%	-23%	36%	0.0282	18%	-18%	70%	0.0052	39%	2%	90%	0.0143
Group 2		Post-2hr	1%	-25%	35%	0.0048	17%	-20%	70%	0.0283	1%	-26%	38%	0.0124
Group 2	Non-Asthmatic	Post-3hr	0%	-26%	35%	0.0879	26%	-15%	86%	0.0150	10%	-20%	51%	0.0301
Group 2		Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
Group 2		Post-0hr	-27%	-41%	-10%	0.1974	2%	-23%	35%	0.0148	-3%	-25%	25%	0.0352
Group 2		Post-1hr	-10%	-29%	13%	0.5881	-2%	-28%	33%	0.4695	-4%	-26%	24%	0.4437
Group 2		Post-2hr	-15%	-33%	8%	0.3253	15%	-17%	59%	0.3015	4%	-21%	36%	0.1257
Group 2	Asthmatic	Post-3hr	-18%	-36%	4%	0.9794	10%	-20%	52%	0.1143	-9%	-32%	21%	0.1681
Group 3		Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
Group 3		Post-0hr	-36%	-49%	-21%	0.0000	-15%	-43%	27%	0.0000	128%	2%	407%	0.0000
Group 3		Post-1hr	-35%	-49%	-18%	0.0009	-15%	-46%	34%	0.1390	116%	-12%	430%	0.0164
Group 3		Post-2hr	-42%	-54%	-27%	0.0196	-35%	-58%	1%	0.0478	144%	-6%	537%	0.0195
Group 3	Non-Asthmatic	Post-3hr	-42%	-54%	-27%	0.0012	-37%	-59%	-1%	0.0749	166%	-2%	620%	0.0086
Group 3		Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
Group 3		Post-0hr	21%	-11%	65%	0.0069	72%	-1%	199%	0.0084	-20%	-74%	147%	0.0068
Group 3		Post-1hr	19%	-14%	65%	0.1959	76%	-4%	223%	0.6992	-28%	-80%	158%	0.6463
Group 3		Post-2hr	12%	-18%	52%	0.1844	22%	-32%	119%	0.3648	-14%	-78%	232%	0.3344
Group 3	Asthmatic	Post-3hr	-8%	-34%	30%	0.0216	-12%	-55%	72%	0.2719	-11%	-81%	305%	0.1965
Group 4		Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
Group 4		Post-0hr	-55%	-65%	-40%	0.0000	-49%	-62%	-30%	0.0000	10%	-22%	57%	0.0024
Group 4		Post-1hr	-35%	-51%	-13%	0.0167	-41%	-58%	-18%	0.0040	18%	-18%	71%	0.0625
Group 4		Post-2hr	-37%	-53%	-15%	0.0141	-26%	-47%	3%	0.0399	8%	-26%	57%	0.0365

Category	Group	Asthmatic	Time												
	Group 4		Post-3hr	-14%	-36%	16%	0.0073	-8%	-34%	29%	0.0526	18%	-19%	73%	0.0059
	Group 4	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 4		Post-0hr	-22%	-37%	-3%	0.0016	3%	-21%	36%	0.0095	23%	-7%	63%	0.0486
	Group 4		Post-1hr	9%	-14%	37%	0.8110	17%	-12%	57%	0.1842	20%	-11%	61%	0.6043
	Group 4		Post-2hr	-13%	-31%	11%	0.1958	2%	-24%	37%	0.1966	8%	-20%	46%	0.1382
	Group 4		Post-3hr	-13%	-32%	11%	0.1552	22%	-9%	64%	0.1408	-2%	-28%	34%	0.0168
BMI (above and below median)	Group 1	Asthmatic	Pre-Commute		0%	0%		0%	0%	0%		0%	0%	0%	
	Group 1		Post-0hr		-43%	-20%	0.0000	-16%	-32%	3%	0.0935	45%	6%	99%	0.0223
	Group 1		Post-1hr		-34%	-7%	0.0059	-4%	-23%	20%	0.6972	34%	-6%	89%	0.1006
	Group 1		Post-2hr		-34%	-7%	0.0069	-13%	-31%	10%	0.2413	37%	-5%	98%	0.0899
	Group 1		Post-3hr		-36%	-8%	0.0041	-8%	-27%	17%	0.4873	46%	0%	113%	0.0521
	Group 1	Non-Asthmatic	Pre-Commute		0%	0%		0%	0%	0%		0%	0%	0%	
	Group 1		Post-0hr		-40%	-12%	0.0013	-14%	-32%	9%	0.2002	-6%	-35%	35%	0.7296
	Group 1		Post-1hr		-23%	14%	0.5341	0%	-22%	29%	0.9880	-16%	-43%	25%	0.3843
	Group 1		Post-2hr		-25%	11%	0.3611	1%	-22%	31%	0.9293	-4%	-36%	46%	0.8580
	Group 1		Post-3hr		-26%	10%	0.3268	4%	-19%	35%	0.7461	-20%	-47%	23%	0.3065
	Group 2	Asthmatic	Pre-Commute		0%	0%		0%	0%	0%		0%	0%	0%	
	Group 2		Post-0hr		-53%	-30%	0.0000	-50%	-63%	-34%	0.0000	22%	-3%	52%	0.0827
	Group 2		Post-1hr		-36%	-3%	0.0227	-25%	-44%	0%	0.0525	7%	-14%	35%	0.5373
	Group 2		Post-2hr		-35%	0%	0.0546	-15%	-37%	14%	0.2676	1%	-20%	27%	0.9307
	Group 2		Post-3hr		-33%	5%	0.1197	-16%	-38%	13%	0.2439	5%	-17%	33%	0.6629
	Group 2	Non-Asthmatic	Pre-Commute		0%	0%		0%	0%	0%		0%	0%	0%	
	Group 2		Post-0hr		-33%	2%	0.0700	15%	-16%	57%	0.3751	8%	-14%	35%	0.5145
	Group 2		Post-1hr		-22%	21%	0.8100	6%	-23%	46%	0.7032	24%	-2%	56%	0.0740
	Group 2		Post-2hr		-31%	8%	0.2105	7%	-23%	48%	0.6829	6%	-17%	35%	0.6646
	Group 2		Post-3hr		-34%	4%	0.1020	19%	-14%	63%	0.2861	0%	-23%	30%	0.9868
BMI (tertiles)	Group 1	Asthmatic	Pre-Commute		0%	0%		0%	0%	0%		0%	0%	0%	
	Group 1		Post-0hr		-41%	-12%	0.0017	-8%	-25%	12%	0.3938	51%	-4%	139%	0.0732
	Group 1		Post-1hr		-33%	1%	0.0583	-9%	-26%	11%	0.3498	52%	-9%	152%	0.1063
	Group 1		Post-2hr		-30%	6%	0.1606	-2%	-20%	20%	0.8501	47%	-14%	151%	0.1568

		Group 1	Post-3hr	-31%	5%	0.1407	-3%	-21%	19%	0.7829	59%	-9%	177%	0.1004
	Non-Asthmatic	Group 1	Pre-Commute	0%	0%		0%	0%	0%		0%	0%	0%	
		Group 1	Post-0hr	-38%	0%	0.0495	-18%	-35%	4%	0.0985	-4%	-44%	63%	0.8659
		Group 1	Post-1hr	-14%	40%	0.4317	-4%	-24%	21%	0.7189	-13%	-52%	58%	0.6421
		Group 1	Post-2hr	-27%	18%	0.5335	-4%	-24%	22%	0.7583	8%	-43%	102%	0.8183
		Group 1	Post-3hr	-23%	26%	0.9243	-2%	-23%	24%	0.8668	-7%	-52%	78%	0.8172
	Asthmatic	Group 2	Pre-Commute	0%	0%		0%	0%	0%		0%	0%	0%	
		Group 2	Post-0hr	-50%	-27%	0.0000	-41%	-55%	-22%	0.0003	20%	-3%	48%	0.0924
		Group 2	Post-1hr	-35%	-5%	0.0159	-11%	-33%	19%	0.4337	2%	-18%	25%	0.8866
		Group 2	Post-2hr	-36%	-5%	0.0161	-16%	-37%	13%	0.2504	2%	-18%	26%	0.8863
		Group 2	Post-3hr	-41%	-9%	0.0046	-11%	-35%	21%	0.4357	1%	-19%	27%	0.9088
	Non-Asthmatic	Group 2	Pre-Commute	0%	0%		0%	0%	0%		0%	0%	0%	
		Group 2	Post-0hr	-50%	-15%	0.0016	-3%	-32%	40%	0.8867	12%	-16%	48%	0.4426
		Group 2	Post-1hr	-36%	10%	0.1994	16%	-20%	69%	0.4315	-5%	-28%	26%	0.7432
		Group 2	Post-2hr	-37%	9%	0.1711	13%	-23%	66%	0.5168	2%	-24%	36%	0.9044
		Group 2	Post-3hr	-38%	8%	0.1555	15%	-21%	69%	0.4619	-7%	-31%	24%	0.6022
	Asthmatic	Group 3	Pre-Commute	0%	0%		0%	0%	0%		0%	0%	0%	
		Group 3	Post-0hr	-62%	-29%	0.0001	-55%	-72%	-28%	0.0011	37%	-3%	93%	0.0743
		Group 3	Post-1hr	-48%	-1%	0.0433	-35%	-61%	6%	0.0838	25%	-13%	80%	0.2188
		Group 3	Post-2hr	-48%	1%	0.0586	-31%	-58%	14%	0.1403	23%	-15%	77%	0.2667
		Group 3	Post-3hr	-38%	19%	0.3493	-27%	-56%	21%	0.2209	40%	-3%	101%	0.0714
	Non-Asthmatic	Group 3	Pre-Commute	0%	0%		0%	0%	0%		0%	0%	0%	
		Group 3	Post-0hr	-30%	10%	0.2554	18%	-19%	74%	0.3785	-2%	-24%	26%	0.8517
		Group 3	Post-1hr	-26%	20%	0.6447	-2%	-35%	45%	0.9016	27%	-3%	66%	0.0752
		Group 3	Post-2hr	-29%	15%	0.4007	2%	-32%	54%	0.9205	-3%	-26%	28%	0.8472
		Group 3	Post-3hr	-37%	2%	0.0719	20%	-20%	79%	0.3713	-17%	-39%	12%	0.2226
BMI (quartiles)	Asthmatic	Group 1	Pre-Commute	0%	0%		0%	0%	0%		0%	0%	0%	
		Group 1	Post-0hr	-46%	-13%	0.0025	-13%	-34%	15%	0.3207	154%	33%	383%	0.0055
		Group 1	Post-1hr	-45%	-10%	0.0059	-19%	-39%	7%	0.1345	181%	37%	477%	0.0058
		Group 1	Post-2hr	-39%	0%	0.0461	-9%	-31%	21%	0.5161	135%	9%	404%	0.0295

Group	Category	Time											
Group 1		Post-3hr	-41%	-4%	0.0221	-13%	-35%	15%	0.3177	190%	32%	539%	0.0093
Group 1	Non-Asthmatic	Pre-Commute	0%	0%		0%	0%	0%		0%	0%	0%	
Group 1		Post-0hr	-36%	-3%	0.0286	-18%	-35%	4%	0.1062	-4%	-45%	67%	0.8711
Group 1		Post-1hr	-11%	36%	0.3657	-4%	-24%	22%	0.7304	-13%	-53%	62%	0.6560
Group 1		Post-2hr	-25%	14%	0.4703	-3%	-24%	23%	0.7693	8%	-45%	108%	0.8261
Group 1		Post-3hr	-20%	22%	0.9120	-2%	-23%	25%	0.8772	-7%	-53%	84%	0.8253
Group 2	Asthmatic	Pre-Commute	0%	0%		0%	0%	0%		0%	0%	0%	
Group 2		Post-0hr	-46%	-18%	0.0003	-19%	-38%	7%	0.1360	5%	-17%	34%	0.6670
Group 2		Post-1hr	-34%	4%	0.0967	4%	-22%	39%	0.7894	-11%	-31%	13%	0.3354
Group 2		Post-2hr	-37%	0%	0.0465	-15%	-37%	16%	0.2956	2%	-21%	31%	0.8627
Group 2		Post-3hr	-39%	-1%	0.0390	-5%	-31%	31%	0.7593	1%	-22%	31%	0.9250
Group 2	Non-Asthmatic	Pre-Commute	0%	0%		0%	0%	0%		0%	0%	0%	
Group 2		Post-0hr	-53%	-13%	0.0054	-7%	-38%	39%	0.7015	-8%	-36%	30%	0.6188
Group 2		Post-1hr	-46%	3%	0.0761	8%	-30%	66%	0.7185	-20%	-44%	14%	0.2172
Group 2		Post-2hr	-37%	22%	0.4263	9%	-29%	69%	0.6858	-17%	-42%	19%	0.3031
Group 2		Post-3hr	-43%	10%	0.1627	15%	-26%	78%	0.5364	-34%	-54%	-5%	0.0244
Group 3	Asthmatic	Pre-Commute	0%	0%		0%	0%	0%		0%	0%	0%	
Group 3		Post-0hr	-52%	-21%	0.0003	-47%	-62%	-25%	0.0005	13%	-15%	51%	0.3917
Group 3		Post-1hr	-35%	9%	0.1787	-17%	-40%	16%	0.2792	-2%	-26%	31%	0.9117
Group 3		Post-2hr	-33%	15%	0.3326	-2%	-31%	38%	0.8999	-10%	-33%	21%	0.4742
Group 3		Post-3hr	-38%	9%	0.1686	-10%	-38%	29%	0.5547	-14%	-36%	17%	0.3317
Group 3	Non-Asthmatic	Pre-Commute	0%	0%		0%	0%	0%		0%	0%	0%	
Group 3		Post-0hr	-46%	2%	0.0685	7%	-30%	65%	0.7398	30%	-8%	85%	0.1336
Group 3		Post-1hr	-19%	59%	0.4699	41%	-11%	122%	0.1360	25%	-14%	80%	0.2346
Group 3		Post-2hr	-42%	14%	0.2294	15%	-27%	82%	0.5322	23%	-17%	80%	0.2969
Group 3		Post-3hr	-37%	22%	0.4315	27%	-17%	96%	0.2718	17%	-20%	73%	0.4079
Group 4	Asthmatic	Pre-Commute	0%	0%		0%	0%	0%		0%	0%	0%	
Group 4		Post-0hr	-62%	-30%	0.0001	-55%	-72%	-27%	0.0015	37%	-2%	91%	0.0660
Group 4		Post-1hr	-48%	0%	0.0526	-34%	-61%	11%	0.1155	25%	-12%	77%	0.2083
Group 4		Post-2hr	-48%	3%	0.0712	-30%	-59%	19%	0.1858	22%	-14%	74%	0.2566

Category	Group	Status	Time												
	Group 4		Post-3hr		-39%	21%	0.3747	-26%	-57%	27%	0.2735	39%	-2%	98%	0.0646
	Group 4	Non-Asthmatic	Pre-Commute		0%	0%		0%	0%	0%		0%	0%	0%	
	Group 4		Post-0hr		-31%	16%	0.3785	29%	-17%	100%	0.2461	-6%	-30%	25%	0.6453
	Group 4		Post-1hr		-35%	13%	0.2799	-10%	-43%	43%	0.6573	24%	-7%	67%	0.1372
	Group 4		Post-2hr		-31%	21%	0.5271	7%	-34%	72%	0.7878	-4%	-29%	29%	0.7738
	Group 4		Post-3hr		-42%	6%	0.1128	17%	-28%	90%	0.5202	-11%	-37%	25%	0.4826
BMI (CDC categories)	Group 1	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 1		Post-0hr	-30%	-38%	-22%	0.0009	-2%	-18%	18%	0.8088	858%	-35%	#####	0.0796
	Group 1		Post-1hr	-36%	-55%	-10%	0.0215	-27%	-47%	0%	0.0514	1022%	-41%	#####	0.0854
	Group 1		Post-2hr	-15%	-27%	-1%	0.0418	5%	-17%	31%	0.6086	849%	-57%	#####	0.1139
	Group 1		Post-3hr	-32%	-51%	-6%	0.0311	-28%	-47%	-2%	0.0399	1394%	-38%	#####	0.0774
	Group 1	Non-Asthmatic	Pre-Commute												
	Group 1		Post-0hr												
	Group 1		Post-1hr												
	Group 1		Post-2hr												
	Group 1		Post-3hr												
	Group 2	Asthmatic	Pre-Commute												
	Group 2		Post-0hr	-35%	-44%	-25%	0.0000	-30%	-43%	-15%	0.0004	12%	-5%	33%	0.1815
	Group 2		Post-1hr	-19%	-30%	-5%	0.0079	-8%	-25%	13%	0.4142	0%	-16%	18%	0.9679
	Group 2		Post-2hr	-19%	-31%	-6%	0.0077	-11%	-28%	9%	0.2655	0%	-16%	19%	0.9732
	Group 2		Post-3hr	-21%	-32%	-7%	0.0056	-5%	-24%	18%	0.6246	0%	-17%	19%	0.9578
	Group 2	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 2		Post-0hr	-27%	-38%	-13%	0.0003	-10%	-28%	12%	0.3560	4%	-14%	26%	0.6533
	Group 2		Post-1hr	-1%	-17%	18%	0.9138	8%	-14%	36%	0.4897	-5%	-22%	15%	0.5960
	Group 2		Post-2hr	-12%	-27%	5%	0.1494	3%	-18%	30%	0.7856	4%	-15%	27%	0.6894
	Group 2		Post-3hr	-11%	-25%	7%	0.2145	8%	-14%	36%	0.4832	-10%	-26%	10%	0.2927
	Group 3	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 3		Post-0hr	-48%	-62%	-30%	0.0001	-55%	-73%	-26%	0.0022	36%	0%	86%	0.0512
	Group 3		Post-1hr	-29%	-48%	-3%	0.0321	-35%	-62%	11%	0.1090	24%	-11%	73%	0.1926
	Group 3		Post-2hr	-28%	-47%	-1%	0.0454	-31%	-60%	18%	0.1718	22%	-13%	70%	0.2385

Category	Group	Status	Timepoint												
	Group 3		Post-3hr	-15%	-38%	17%	0.3118	-26%	-57%	26%	0.2555	39%	-1%	94%	0.0539
	Group 3	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 3		Post-0hr	-18%	-41%	13%	0.2161	49%	-16%	165%	0.1666	-5%	-33%	33%	0.7473
	Group 3		Post-1hr	-15%	-39%	19%	0.3430	-6%	-48%	70%	0.8351	43%	1%	103%	0.0467
	Group 3		Post-2hr	-3%	-31%	37%	0.8613	12%	-41%	111%	0.7209	-8%	-35%	31%	0.6517
	Group 3		Post-3hr	-20%	-45%	17%	0.2386	59%	-16%	202%	0.1465	-19%	-45%	18%	0.2576
	Group 4	Asthmatic	Pre-Commute												
	Group 4		Post-0hr												
	Group 4		Post-1hr												
	Group 4		Post-2hr												
	Group 4		Post-3hr												
	Group 4	Non-Asthmatic	Pre-Commute												
	Group 4		Post-0hr	4%	-15%	26%	0.6785	-12%	-28%	9%	0.2176	-13%	-51%	55%	0.5884
	Group 4		Post-1hr	-12%	-30%	10%	0.2274	-31%	-51%	-2%	0.0404	-7%	-49%	70%	0.7898
	Group 4		Post-2hr	-16%	-34%	7%	0.1299	-20%	-38%	3%	0.0756	16%	-40%	125%	0.5983
	Group 4		Post-3hr	-23%	-40%	-1%	0.0452	-35%	-54%	-10%	0.0166	28%	-47%	211%	0.5242
Day of the Week	Tuesday	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Tuesday		Post-0hr	-32%	-43%	-19%	0.0001	-15%	-33%	8%	0.1789	-1%	-23%	26%	0.9239
	Tuesday		Post-1hr	-22%	-36%	-6%	0.0119	-6%	-28%	23%	0.6593	-6%	-27%	21%	0.6153
	Tuesday		Post-2hr	-26%	-39%	-9%	0.0049	-8%	-31%	21%	0.5256	-4%	-26%	24%	0.7443
	Tuesday		Post-3hr	-26%	-40%	-8%	0.0067	8%	-19%	43%	0.6118	-8%	-29%	19%	0.4977
	Tuesday	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Tuesday		Post-0hr	6%	-30%	59%	0.7776	3%	-38%	74%	0.8947	-14%	-51%	49%	0.5807
	Tuesday		Post-1hr	4%	-32%	60%	0.8551	-14%	-50%	49%	0.5774	-36%	-63%	12%	0.1130
	Tuesday		Post-2hr	-7%	-41%	45%	0.7330	1%	-43%	78%	0.9733	-41%	-68%	12%	0.1042
	Tuesday		Post-3hr	-10%	-43%	41%	0.6397	-9%	-49%	62%	0.7508	-51%	-74%	-7%	0.0293
	Wednesday	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Wednesday		Post-0hr	-36%	-55%	-9%	0.0141	-42%	-62%	-11%	0.0129	18%	-17%	68%	0.3532
	Wednesday		Post-1hr	-22%	-45%	11%	0.1709	-16%	-45%	26%	0.3892	4%	-27%	47%	0.8297
	Wednesday		Post-2hr	5%	-27%	49%	0.8030	12%	-26%	69%	0.5952	8%	-24%	53%	0.6576

			Est	Low	High	p	Est	Low	High	p	Est	Low	High	p
Wednesday		Post-3hr	-12%	-40%	28%	0.4869	-8%	-41%	44%	0.7189	5%	-27%	52%	0.7725
Wednesday	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
Wednesday		Post-0hr	-33%	-52%	-7%	0.0167	31%	-15%	102%	0.2105	-26%	-46%	2%	0.0631
Wednesday		Post-1hr	-19%	-42%	13%	0.2076	-8%	-40%	41%	0.6933	23%	-10%	69%	0.1915
Wednesday		Post-2hr	-20%	-44%	14%	0.2140	-2%	-36%	51%	0.9206	19%	-14%	63%	0.2864
Wednesday		Post-3hr	-23%	-47%	11%	0.1545	12%	-28%	76%	0.6077	-9%	-36%	28%	0.5666
Thursday	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
Thursday		Post-0hr	-36%	-50%	-18%	0.0009	-40%	-57%	-15%	0.0054	185%	45%	462%	0.0034
Thursday		Post-1hr	-22%	-39%	1%	0.0579	-37%	-56%	-10%	0.0131	183%	33%	505%	0.0085
Thursday		Post-2hr	-20%	-39%	4%	0.0989	-36%	-56%	-7%	0.0209	149%	8%	474%	0.0331
Thursday		Post-3hr	-17%	-37%	8%	0.1576	-42%	-60%	-15%	0.0059	166%	11%	539%	0.0298
Thursday	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
Thursday		Post-0hr	-14%	-34%	11%	0.2363	-20%	-43%	14%	0.2095	30%	-36%	161%	0.4591
Thursday		Post-1hr	-2%	-26%	29%	0.8654	-14%	-41%	26%	0.4371	27%	-43%	183%	0.5481
Thursday		Post-2hr	-6%	-28%	24%	0.6573	-11%	-39%	30%	0.5351	21%	-48%	185%	0.6464
Thursday		Post-3hr	-4%	-26%	24%	0.7322	2%	-29%	44%	0.9279	7%	-56%	159%	0.8705
Friday	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
Friday		Post-0hr	-47%	-58%	-33%	0.0000	-45%	-61%	-24%	0.0006	24%	-4%	61%	0.0980
Friday		Post-1hr	-22%	-39%	0%	0.0470	-8%	-36%	33%	0.6664	1%	-22%	32%	0.9185
Friday		Post-2hr	-31%	-47%	-12%	0.0042	-22%	-47%	14%	0.1976	-5%	-28%	24%	0.6883
Friday		Post-3hr	-23%	-41%	0%	0.0507	-16%	-43%	24%	0.3788	19%	-9%	57%	0.1995
Friday	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
Friday		Post-0hr	-23%	-37%	-6%	0.0112	-8%	-32%	25%	0.5908	14%	-9%	43%	0.2393
Friday		Post-1hr	6%	-15%	31%	0.6023	27%	-8%	77%	0.1468	-6%	-25%	18%	0.5818
Friday		Post-2hr	-5%	-24%	18%	0.6317	16%	-17%	64%	0.3843	-4%	-24%	21%	0.7151
Friday		Post-3hr	-8%	-26%	15%	0.4791	20%	-15%	69%	0.2988	-7%	-27%	18%	0.5565
Mean Noise (above and below median)	Asthmatic	Group 1 Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
		Group 1 Post-0hr	-31%	-45%	-14%	0.0011	-30%	-49%	-2%	0.0361	3%	-18%	30%	0.7650
		Group 1 Post-1hr	-18%	-35%	3%	0.0815	-10%	-36%	27%	0.5451	-4%	-24%	20%	0.6955
		Group 1 Post-2hr	-10%	-29%	15%	0.3883	-8%	-36%	31%	0.6320	-6%	-26%	19%	0.6084

		Group 1	Post-3hr	-4%	-26%	24%	0.7362	0%	-32%	46%	0.9857	2%	-20%	32%	0.8513
	Non-Asthmatic	Group 1	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
		Group 1	Post-0hr	-25%	-41%	-3%	0.0302	-2%	-33%	43%	0.9112	-15%	-34%	10%	0.2159
		Group 1	Post-1hr	-7%	-29%	21%	0.5715	1%	-32%	49%	0.9684	-16%	-34%	9%	0.1866
		Group 1	Post-2hr	-5%	-27%	24%	0.7193	9%	-27%	64%	0.6670	-10%	-31%	16%	0.4003
		Group 1	Post-3hr	-10%	-31%	18%	0.4580	7%	-29%	60%	0.7569	-19%	-38%	7%	0.1342
	Asthmatic	Group 2	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
		Group 2	Post-0hr	-37%	-46%	-25%	0.0000	-28%	-41%	-12%	0.0016	62%	13%	134%	0.0100
		Group 2	Post-1hr	-17%	-30%	-1%	0.0342	-5%	-23%	16%	0.6107	44%	-4%	116%	0.0804
		Group 2	Post-2hr	-21%	-34%	-6%	0.0083	-4%	-22%	18%	0.7010	49%	-4%	130%	0.0726
		Group 2	Post-3hr	-25%	-37%	-10%	0.0018	-5%	-22%	17%	0.6427	56%	0%	145%	0.0514
	Non-Asthmatic	Group 2	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
		Group 2	Post-0hr	-29%	-41%	-15%	0.0002	-3%	-23%	22%	0.8004	6%	-29%	58%	0.7721
		Group 2	Post-1hr	-15%	-30%	3%	0.1004	-4%	-24%	21%	0.6973	17%	-25%	82%	0.4954
		Group 2	Post-2hr	-18%	-32%	0%	0.0530	1%	-20%	28%	0.9078	11%	-31%	79%	0.6655
		Group 2	Post-3hr	-24%	-38%	-8%	0.0055	11%	-12%	39%	0.3765	-7%	-44%	54%	0.7720
Mean Noise (tertiles)	Asthmatic	Group 1	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
		Group 1	Post-0hr	-31%	-48%	-9%	0.0089	-26%	-49%	8%	0.1207	-7%	-30%	24%	0.6037
		Group 1	Post-1hr	-19%	-39%	8%	0.1507	-8%	-38%	37%	0.6795	-9%	-32%	22%	0.5129
		Group 1	Post-2hr	7%	-20%	43%	0.6577	30%	-12%	94%	0.1879	-16%	-38%	13%	0.2377
		Group 1	Post-3hr	8%	-20%	46%	0.6137	28%	-15%	93%	0.2361	-11%	-34%	21%	0.4471
	Non-Asthmatic	Group 1	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
		Group 1	Post-0hr	-29%	-48%	-1%	0.0416	14%	-27%	79%	0.5615	-20%	-42%	11%	0.1715
		Group 1	Post-1hr	-6%	-33%	30%	0.6926	-8%	-42%	45%	0.7112	-2%	-29%	36%	0.9246
		Group 1	Post-2hr	0%	-28%	38%	0.9812	10%	-32%	78%	0.6881	1%	-28%	42%	0.9585
		Group 1	Post-3hr	-15%	-39%	20%	0.3624	13%	-30%	83%	0.5966	-20%	-44%	15%	0.2262
	Asthmatic	Group 2	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
		Group 2	Post-0hr	-38%	-49%	-26%	0.0000	-38%	-54%	-17%	0.0020	103%	34%	206%	0.0010
		Group 2	Post-1hr	-26%	-39%	-10%	0.0036	-20%	-42%	11%	0.1796	70%	8%	167%	0.0224
		Group 2	Post-2hr	-26%	-40%	-9%	0.0046	-25%	-47%	6%	0.0961	76%	8%	188%	0.0244

	Group	Asthmatic	Time	%	Low	High	p	%	Low	High	p	%	Low	High	p
	Group 2		Post-3hr	-26%	-41%	-9%	0.0054	-21%	-45%	14%	0.2046	108%	23%	253%	0.0069
	Group 2	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 2		Post-0hr	-31%	-49%	-6%	0.0188	-25%	-53%	21%	0.2376	-9%	-53%	75%	0.7724
	Group 2		Post-1hr	-22%	-43%	7%	0.1239	8%	-35%	81%	0.7615	-26%	-65%	53%	0.4086
	Group 2		Post-2hr	-14%	-37%	19%	0.3642	5%	-38%	79%	0.8524	-10%	-59%	97%	0.7934
	Group 2		Post-3hr	-11%	-36%	22%	0.4569	-4%	-44%	65%	0.8790	-22%	-65%	75%	0.5389
	Group 3	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 3		Post-0hr	-31%	-46%	-13%	0.0022	-17%	-36%	8%	0.1683	-8%	-33%	25%	0.5798
	Group 3		Post-1hr	0%	-24%	31%	0.9868	22%	-6%	60%	0.1385	-10%	-34%	22%	0.4862
	Group 3		Post-2hr	-25%	-44%	2%	0.0629	-5%	-27%	25%	0.7153	-9%	-33%	25%	0.5583
	Group 3		Post-3hr	-26%	-47%	2%	0.0617	-5%	-28%	24%	0.6922	-20%	-42%	9%	0.1477
	Group 3	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 3		Post-0hr	-25%	-37%	-10%	0.0019	-3%	-21%	19%	0.7825	10%	-13%	38%	0.4279
	Group 3		Post-1hr	-10%	-26%	11%	0.3215	-4%	-22%	19%	0.7249	13%	-11%	43%	0.2975
	Group 3		Post-2hr	-17%	-34%	3%	0.0908	-2%	-21%	21%	0.8311	6%	-17%	35%	0.6358
	Group 3		Post-3hr	-22%	-38%	-2%	0.0352	10%	-11%	34%	0.3805	-6%	-27%	21%	0.6500
Mean Noise (quartiles)	Group 1	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 1		Post-0hr	-32%	-52%	-5%	0.0244	-30%	-54%	7%	0.0989	-9%	-35%	26%	0.5463
	Group 1		Post-1hr	-16%	-41%	19%	0.3180	-15%	-45%	33%	0.4749	-2%	-31%	38%	0.8930
	Group 1		Post-2hr	17%	-18%	68%	0.3722	42%	-9%	122%	0.1184	-17%	-41%	18%	0.2918
	Group 1		Post-3hr	15%	-21%	68%	0.4447	29%	-19%	107%	0.2716	-2%	-31%	40%	0.9125
	Group 1	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 1		Post-0hr	-25%	-50%	13%	0.1629	2%	-38%	71%	0.9248	-17%	-43%	23%	0.3511
	Group 1		Post-1hr	-3%	-36%	47%	0.8662	-19%	-52%	35%	0.4115	-4%	-35%	42%	0.8383
	Group 1		Post-2hr	-3%	-36%	48%	0.8914	-7%	-44%	56%	0.7798	-2%	-36%	49%	0.9147
	Group 1		Post-3hr	-6%	-40%	46%	0.7662	-20%	-54%	39%	0.4165	2%	-35%	62%	0.9154
	Group 2	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 2		Post-0hr	-34%	-48%	-15%	0.0016	-32%	-56%	6%	0.0873	21%	-12%	64%	0.2322
	Group 2		Post-1hr	-25%	-41%	-3%	0.0279	-8%	-42%	46%	0.7090	-3%	-29%	33%	0.8692
	Group 2		Post-2hr	-34%	-50%	-14%	0.0028	-42%	-65%	-4%	0.0334	8%	-22%	51%	0.6254

	Group		Time												
	Group 2		Post-3hr	-27%	-45%	-2%	0.0358	-30%	-59%	21%	0.1989	8%	-25%	55%	0.6723
	Group 2	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 2		Post-0hr	-25%	-42%	-3%	0.0310	-3%	-41%	60%	0.8969	-14%	-38%	20%	0.3701
	Group 2		Post-1hr	-12%	-32%	16%	0.3586	25%	-27%	111%	0.4053	-25%	-46%	5%	0.0924
	Group 2		Post-2hr	-8%	-29%	21%	0.5569	31%	-25%	128%	0.3410	-17%	-41%	16%	0.2641
	Group 2		Post-3hr	-13%	-34%	13%	0.2912	36%	-21%	135%	0.2609	-30%	-50%	-2%	0.0387
	Group 3	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 3		Post-0hr	-40%	-50%	-27%	0.0000	-36%	-50%	-18%	0.0006	99%	25%	219%	0.0048
	Group 3		Post-1hr	-19%	-33%	-2%	0.0343	-13%	-33%	12%	0.2793	66%	-2%	180%	0.0595
	Group 3		Post-2hr	-20%	-34%	-3%	0.0217	-9%	-30%	18%	0.4740	82%	4%	218%	0.0368
	Group 3		Post-3hr	-21%	-35%	-5%	0.0147	-7%	-28%	21%	0.6056	102%	13%	260%	0.0190
	Group 3	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 3		Post-0hr	-37%	-57%	-6%	0.0236	-3%	-36%	49%	0.9014	68%	-39%	365%	0.3097
	Group 3		Post-1hr	-21%	-49%	21%	0.2702	-8%	-43%	47%	0.7188	78%	-43%	454%	0.3144
	Group 3		Post-2hr	-20%	-48%	23%	0.2957	14%	-29%	85%	0.5738	82%	-45%	502%	0.3216
	Group 3		Post-3hr	-26%	-50%	11%	0.1418	22%	-22%	91%	0.3855	8%	-68%	271%	0.8983
	Group 4	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 4		Post-0hr	-23%	-44%	5%	0.1002	7%	-26%	55%	0.7156	-24%	-50%	16%	0.1925
	Group 4		Post-1hr	-11%	-39%	29%	0.5181	30%	-11%	90%	0.1713	-14%	-44%	31%	0.4686
	Group 4		Post-2hr	-25%	-51%	14%	0.1663	17%	-20%	71%	0.4097	-29%	-54%	9%	0.1164
	Group 4		Post-3hr	-37%	-60%	-1%	0.0473	2%	-30%	49%	0.9037	-38%	-60%	-6%	0.0274
	Group 4	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 4		Post-0hr	-27%	-39%	-12%	0.0012	-5%	-24%	20%	0.6767	-5%	-25%	21%	0.6750
	Group 4		Post-1hr	-14%	-31%	7%	0.1674	-6%	-26%	19%	0.5983	7%	-16%	36%	0.5927
	Group 4		Post-2hr	-18%	-35%	5%	0.1133	-5%	-25%	20%	0.6552	3%	-20%	32%	0.8316
	Group 4		Post-3hr	-24%	-41%	-1%	0.0438	4%	-18%	31%	0.7371	-8%	-30%	19%	0.5097
Mean Noise (above and below 65 decibels)	Group 1	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 1		Post-0hr	-47%	-60%	-30%	0.0000	-50%	-67%	-24%	0.0020	42%	-3%	107%	0.0676
	Group 1		Post-1hr	-28%	-46%	-5%	0.0222	-34%	-57%	0%	0.0526	28%	-13%	89%	0.2061
	Group 1		Post-2hr	-35%	-51%	-13%	0.0042	-38%	-60%	-6%	0.0261	6%	-28%	57%	0.7512

		Group 1	Post-3hr	-30%	-47%	-7%	0.0140	-32%	-55%	5%	0.0779	13%	-24%	68%	0.5255
	Non-Asthmatic	Group 1	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
		Group 1	Post-0hr	-1%	-27%	36%	0.9677	10%	-33%	79%	0.7089	38%	-8%	109%	0.1194
		Group 1	Post-1hr	30%	-5%	77%	0.0951	29%	-22%	112%	0.3105	28%	-17%	95%	0.2541
		Group 1	Post-2hr	-9%	-33%	24%	0.5393	-4%	-42%	58%	0.8743	15%	-25%	77%	0.5046
		Group 1	Post-3hr	9%	-20%	49%	0.5656	15%	-30%	88%	0.5842	12%	-27%	72%	0.6003
	Asthmatic	Group 2	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
		Group 2	Post-0hr	-35%	-44%	-26%	0.0000	-31%	-44%	-16%	0.0003	32%	4%	66%	0.0210
		Group 2	Post-1hr	-20%	-31%	-7%	0.0035	-10%	-27%	11%	0.3262	19%	-8%	53%	0.1823
		Group 2	Post-2hr	-17%	-29%	-3%	0.0205	-7%	-25%	15%	0.4828	21%	-7%	57%	0.1623
		Group 2	Post-3hr	-17%	-29%	-3%	0.0212	-5%	-24%	18%	0.6288	27%	-4%	67%	0.0927
	Non-Asthmatic	Group 2	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
		Group 2	Post-0hr	-26%	-37%	-13%	0.0002	-5%	-23%	19%	0.6709	-5%	-26%	23%	0.7136
		Group 2	Post-1hr	-10%	-24%	6%	0.2128	-4%	-24%	20%	0.6986	-1%	-24%	30%	0.9597
		Group 2	Post-2hr	-10%	-24%	6%	0.1938	3%	-18%	30%	0.7846	0%	-25%	33%	0.9852
		Group 2	Post-3hr	-17%	-30%	-2%	0.0327	7%	-15%	35%	0.5521	-14%	-36%	17%	0.3370
Change in Cortisol (above and below median)	Asthmatic	Group 1	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
		Group 1	Post-0hr	-38%	-47%	-27%	0.0000	-35%	-49%	-16%	0.0014	56%	15%	112%	0.0048
		Group 1	Post-1hr	-18%	-31%	-3%	0.0244	-16%	-35%	9%	0.1906	48%	5%	108%	0.0260
		Group 1	Post-2hr	-23%	-36%	-9%	0.0032	-25%	-42%	-1%	0.0397	45%	1%	110%	0.0467
		Group 1	Post-3hr	-23%	-36%	-8%	0.0044	-20%	-39%	5%	0.1035	51%	2%	123%	0.0387
	Non-Asthmatic	Group 1	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
		Group 1	Post-0hr	2%	-30%	49%	0.9180	12%	-36%	97%	0.6894	68%	-18%	243%	0.1527
		Group 1	Post-1hr	33%	-10%	97%	0.1519	16%	-35%	106%	0.6163	67%	-24%	266%	0.1946
		Group 1	Post-2hr	-14%	-42%	28%	0.4673	-8%	-49%	64%	0.7727	32%	-42%	201%	0.5086
		Group 1	Post-3hr	0%	-33%	49%	0.9922	7%	-40%	91%	0.8244	50%	-36%	252%	0.3510
	Asthmatic	Group 2	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
		Group 2	Post-0hr	-32%	-44%	-17%	0.0002	-23%	-42%	2%	0.0643	6%	-18%	37%	0.6486
		Group 2	Post-1hr	-23%	-38%	-5%	0.0144	0%	-25%	34%	0.9863	-5%	-26%	24%	0.7211
		Group 2	Post-2hr	-24%	-39%	-5%	0.0169	1%	-25%	36%	0.9429	-12%	-33%	15%	0.3419

	Group 2		Post-3hr	-22%	-38%	-2%	0.0353	9%	-20%	47%	0.5836	-5%	-27%	24%	0.7214
	Group 2	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 2		Post-0hr	-19%	-31%	-6%	0.0069	6%	-16%	33%	0.6093	4%	-15%	27%	0.7071
	Group 2		Post-1hr	-7%	-21%	10%	0.4067	7%	-16%	36%	0.5790	3%	-16%	26%	0.7724
	Group 2		Post-2hr	-9%	-23%	9%	0.3046	10%	-14%	40%	0.4334	2%	-17%	26%	0.8439
	Group 2		Post-3hr	-8%	-23%	10%	0.3476	22%	-4%	55%	0.1037	-10%	-27%	13%	0.3680
Change in Cortisol (tertiles)	Group 1	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 1		Post-0hr	-42%	-52%	-29%	0.0000	-41%	-57%	-20%	0.0011	23%	0%	52%	0.0523
	Group 1		Post-1hr	-22%	-36%	-6%	0.0106	-24%	-44%	4%	0.0866	19%	-3%	47%	0.0932
	Group 1		Post-2hr	-35%	-46%	-21%	0.0000	-39%	-55%	-17%	0.0026	7%	-13%	32%	0.4957
	Group 1		Post-3hr	-33%	-45%	-18%	0.0002	-36%	-54%	-12%	0.0069	8%	-13%	34%	0.4724
	Group 1	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 1		Post-0hr	36%	-22%	137%	0.2705	-8%	-55%	91%	0.8264	57%	-10%	175%	0.1099
	Group 1		Post-1hr	55%	-11%	172%	0.1203	-13%	-59%	82%	0.6992	44%	-18%	152%	0.2007
	Group 1		Post-2hr	24%	-29%	118%	0.4393	-14%	-59%	81%	0.6879	40%	-20%	146%	0.2323
	Group 1		Post-3hr	20%	-31%	111%	0.5142	-17%	-61%	74%	0.6081	28%	-27%	125%	0.3832
	Group 2	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 2		Post-0hr	-32%	-44%	-17%	0.0002	-22%	-38%	-2%	0.0359	62%	2%	156%	0.0403
	Group 2		Post-1hr	-21%	-36%	-3%	0.0226	3%	-19%	31%	0.8016	44%	-14%	142%	0.1605
	Group 2		Post-2hr	-1%	-20%	24%	0.9563	28%	0%	66%	0.0538	48%	-16%	163%	0.1732
	Group 2		Post-3hr	-4%	-23%	20%	0.7194	34%	3%	73%	0.0288	64%	-11%	201%	0.1072
	Group 2	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 2		Post-0hr	-26%	-43%	-3%	0.0275	10%	-25%	61%	0.6294	38%	-26%	158%	0.3102
	Group 2		Post-1hr	3%	-24%	38%	0.8612	31%	-13%	97%	0.1908	71%	-18%	259%	0.1512
	Group 2		Post-2hr	-24%	-45%	5%	0.0931	5%	-30%	58%	0.8134	26%	-46%	193%	0.5914
	Group 2		Post-3hr	0%	-27%	37%	0.9988	33%	-10%	98%	0.1468	58%	-41%	318%	0.3536
	Group 3	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 3		Post-0hr	-28%	-44%	-6%	0.0146	-19%	-46%	21%	0.2980	20%	-17%	73%	0.3213
	Group 3		Post-1hr	-9%	-30%	19%	0.4971	1%	-33%	52%	0.9737	6%	-27%	54%	0.7493
	Group 3		Post-2hr	-26%	-43%	-3%	0.0269	-13%	-42%	31%	0.5101	7%	-26%	55%	0.7150

	Group		Time												
	Group 3		Post-3hr	-23%	-41%	1%	0.0591	-2%	-35%	48%	0.9280	15%	-21%	67%	0.4583
	Group 3	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 3		Post-0hr	-16%	-28%	-1%	0.0330	11%	-14%	43%	0.4131	-2%	-21%	22%	0.8752
	Group 3		Post-1hr	-6%	-20%	11%	0.4664	7%	-17%	38%	0.5991	-6%	-25%	18%	0.5845
	Group 3		Post-2hr	-8%	-22%	8%	0.2837	11%	-15%	43%	0.4424	-5%	-24%	20%	0.6669
	Group 3		Post-3hr	-12%	-25%	4%	0.1449	23%	-5%	59%	0.1199	-15%	-33%	7%	0.1596
Change in Cortisol (quartiles)	Group 1	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 1		Post-0hr	-40%	-52%	-24%	0.0001	-33%	-53%	-5%	0.0248	13%	-12%	45%	0.3288
	Group 1		Post-1hr	-27%	-42%	-7%	0.0108	-27%	-49%	5%	0.0894	19%	-7%	52%	0.1705
	Group 1		Post-2hr	-32%	-46%	-13%	0.0026	-34%	-55%	-5%	0.0277	6%	-17%	36%	0.6222
	Group 1		Post-3hr	-31%	-46%	-12%	0.0040	-35%	-56%	-4%	0.0322	-3%	-25%	26%	0.8377
	Group 1	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 1		Post-0hr	39%	-21%	143%	0.2425	-11%	-55%	76%	0.7370	56%	-10%	168%	0.1096
	Group 1		Post-1hr	59%	-10%	180%	0.1079	-18%	-59%	67%	0.5838	42%	-18%	146%	0.2041
	Group 1		Post-2hr	27%	-28%	125%	0.4001	-19%	-60%	67%	0.5622	39%	-20%	140%	0.2374
	Group 1		Post-3hr	23%	-31%	118%	0.4702	-22%	-62%	60%	0.4831	26%	-27%	119%	0.3948
	Group 2	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 2		Post-0hr	-35%	-49%	-19%	0.0005	-35%	-56%	-6%	0.0249	107%	25%	243%	0.0060
	Group 2		Post-1hr	-8%	-28%	19%	0.5332	-2%	-35%	47%	0.9135	74%	-2%	210%	0.0601
	Group 2		Post-2hr	-13%	-33%	14%	0.3131	-9%	-41%	40%	0.6501	89%	0%	258%	0.0504
	Group 2		Post-3hr	-13%	-34%	15%	0.3201	0%	-36%	55%	0.9977	123%	13%	338%	0.0216
	Group 2	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 2		Post-0hr	-18%	-51%	37%	0.4386	41%	-52%	315%	0.5199	71%	-45%	429%	0.3427
	Group 2		Post-1hr	21%	-31%	112%	0.4920	60%	-48%	394%	0.4068	89%	-48%	588%	0.3264
	Group 2		Post-2hr	-36%	-64%	15%	0.1300	1%	-68%	221%	0.9835	21%	-70%	392%	0.7835
	Group 2		Post-3hr	-11%	-51%	61%	0.6890	42%	-56%	356%	0.5433	72%	-61%	654%	0.4591
	Group 3	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 3		Post-0hr	-32%	-45%	-16%	0.0006	-23%	-40%	0%	0.0461	4%	-24%	43%	0.8035
	Group 3		Post-1hr	-30%	-44%	-13%	0.0020	-4%	-27%	27%	0.7893	3%	-25%	41%	0.8671
	Group 3		Post-2hr	-23%	-39%	-3%	0.0249	2%	-23%	36%	0.8799	-12%	-36%	23%	0.4560

		Group 3	Post-3hr	-23%	-39%	-3%	0.0255	8%	-20%	45%	0.6200	1%	-27%	41%	0.9285
	Non-Asthmatic	Group 3	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
		Group 3	Post-0hr	-31%	-44%	-15%	0.0009	-16%	-37%	12%	0.2347	8%	-22%	50%	0.6491
		Group 3	Post-1hr	-17%	-34%	5%	0.1203	-11%	-35%	22%	0.4658	32%	-6%	87%	0.1075
		Group 3	Post-2hr	-16%	-34%	7%	0.1606	-10%	-35%	24%	0.5045	24%	-14%	79%	0.2334
		Group 3	Post-3hr	-7%	-27%	18%	0.5320	7%	-22%	46%	0.6699	15%	-23%	70%	0.4909
	Asthmatic	Group 4	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
		Group 4	Post-0hr	-35%	-54%	-9%	0.0133	-26%	-57%	25%	0.2521	14%	-27%	76%	0.5584
		Group 4	Post-1hr	-4%	-32%	36%	0.8256	10%	-37%	93%	0.7274	-20%	-50%	26%	0.3262
		Group 4	Post-2hr	-23%	-46%	9%	0.1426	3%	-41%	79%	0.9227	-14%	-45%	36%	0.5207
		Group 4	Post-3hr	-14%	-39%	22%	0.3915	16%	-34%	102%	0.5996	-18%	-48%	30%	0.3913
	Non-Asthmatic	Group 4	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
		Group 4	Post-0hr	-10%	-25%	9%	0.2772	22%	-10%	64%	0.1907	0%	-20%	26%	0.9702
		Group 4	Post-1hr	1%	-16%	22%	0.9186	18%	-13%	60%	0.2852	-12%	-31%	12%	0.3004
		Group 4	Post-2hr	-3%	-20%	16%	0.7109	19%	-13%	63%	0.2595	-9%	-29%	16%	0.4246
		Group 4	Post-3hr	-8%	-24%	11%	0.3673	31%	-4%	79%	0.0880	-21%	-38%	2%	0.0686
Change in Cortisol (positive or negative)	Asthmatic	Group 1	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
		Group 1	Post-0hr	-35%	-50%	-16%	0.0021	-23%	-44%	6%	0.1031	4%	-18%	32%	0.7224
		Group 1	Post-1hr	-26%	-44%	-2%	0.0356	-24%	-46%	8%	0.1213	9%	-14%	38%	0.4768
		Group 1	Post-2hr	-32%	-50%	-9%	0.0107	-28%	-49%	4%	0.0773	-7%	-26%	18%	0.5509
		Group 1	Post-3hr	-25%	-45%	3%	0.0696	-27%	-50%	7%	0.1058	-18%	-36%	5%	0.1104
	Non-Asthmatic	Group 1	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
		Group 1	Post-0hr	38%	-20%	137%	0.2349	-8%	-47%	58%	0.7423	56%	2%	140%	0.0426
		Group 1	Post-1hr	58%	-10%	180%	0.1087	-17%	-54%	52%	0.5366	42%	-8%	120%	0.1122
		Group 1	Post-2hr	27%	-29%	128%	0.4034	-19%	-57%	52%	0.4977	39%	-10%	114%	0.1345
		Group 1	Post-3hr	23%	-32%	122%	0.4734	-23%	-60%	46%	0.4051	26%	-18%	95%	0.2787
	Asthmatic	Group 2	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
		Group 2	Post-0hr	-36%	-44%	-26%	0.0000	-32%	-45%	-16%	0.0004	47%	14%	90%	0.0037
		Group 2	Post-1hr	-18%	-29%	-5%	0.0101	-6%	-25%	17%	0.5727	31%	-1%	74%	0.0571
		Group 2	Post-2hr	-20%	-32%	-7%	0.0045	-12%	-30%	10%	0.2471	31%	-3%	76%	0.0758

	Group 2		Post-3hr	-21%	-33%	-8%	0.0026	-7%	-26%	17%	0.5369	44%	6%	95%	0.0202
	Group 2	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 2		Post-0hr	-19%	-31%	-6%	0.0078	11%	-13%	41%	0.4132	9%	-18%	44%	0.5549
	Group 2		Post-1hr	-4%	-19%	13%	0.6131	13%	-12%	45%	0.3354	11%	-19%	51%	0.5167
	Group 2		Post-2hr	-12%	-26%	4%	0.1289	10%	-14%	42%	0.4480	2%	-27%	41%	0.9212
	Group 2		Post-3hr	-8%	-23%	9%	0.3062	26%	-2%	61%	0.0735	-2%	-31%	38%	0.8966
Season	Group 1	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 1		Post-0hr	-37%	-46%	-25%	0.0000	-35%	-49%	-18%	0.0005	15%	-6%	41%	0.1721
	Group 1		Post-1hr	-15%	-29%	1%	0.0628	-15%	-33%	8%	0.1824	12%	-9%	37%	0.2885
	Group 1		Post-2hr	-26%	-38%	-12%	0.0009	-29%	-44%	-9%	0.0064	12%	-9%	37%	0.2864
	Group 1		Post-3hr	-24%	-37%	-9%	0.0031	-23%	-40%	-2%	0.0355	15%	-7%	42%	0.1851
	Group 1	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 1		Post-0hr	-11%	-27%	8%	0.2298	-12%	-33%	15%	0.3483	21%	-4%	52%	0.1112
	Group 1		Post-1hr	9%	-11%	34%	0.3756	8%	-18%	43%	0.5621	-2%	-22%	25%	0.8980
	Group 1		Post-2hr	-5%	-22%	17%	0.6474	-7%	-30%	23%	0.6016	7%	-16%	36%	0.5980
	Group 1		Post-3hr	-10%	-26%	10%	0.3064	-8%	-30%	21%	0.5585	4%	-18%	33%	0.7364
	Group 2	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 2		Post-0hr	-38%	-49%	-25%	0.0000	-33%	-48%	-14%	0.0019	59%	12%	126%	0.0100
	Group 2		Post-1hr	-29%	-42%	-12%	0.0018	-12%	-33%	16%	0.3547	31%	-12%	94%	0.1837
	Group 2		Post-2hr	-11%	-28%	11%	0.2940	12%	-16%	49%	0.4437	26%	-18%	94%	0.2864
	Group 2		Post-3hr	-14%	-31%	8%	0.2000	10%	-18%	49%	0.5155	35%	-14%	113%	0.1894
	Group 2	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 2		Post-0hr	-33%	-45%	-17%	0.0002	13%	-15%	50%	0.4027	-14%	-40%	23%	0.4033
	Group 2		Post-1hr	-17%	-33%	3%	0.0896	0%	-26%	35%	0.9904	5%	-29%	57%	0.7967
	Group 2		Post-2hr	-18%	-34%	3%	0.0894	16%	-15%	58%	0.3369	-3%	-37%	50%	0.8940
	Group 2		Post-3hr	-16%	-33%	6%	0.1407	32%	-3%	81%	0.0786	-22%	-51%	24%	0.2860

Table: Percent Change Estimates for Interaction Models

Covariate	Class	Health Status	Time Point	SDNN				r-MSSD				LF/HF			
				Percent Change	Lower 95%	Upper 95%	p-value	Percent Change	Lower 95%	Upper 95%	p-value	Percent Change	Lower 95%	Upper 95%	p-value
Asthma Status	Asthmatic	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Asthmatic		Post-0hr	-38%	-45%	-29%	0.0000	-35%	-46%	-22%	0.0000	33%	9%	64%	0.0057
	Asthmatic		Post-1hr	-22%	-32%	-10%	0.0004	-15%	-29%	3%	0.0934	20%	-3%	50%	0.0956
	Asthmatic		Post-2hr	-21%	-31%	-9%	0.0013	-14%	-29%	4%	0.1187	18%	-6%	48%	0.1473
	Asthmatic		Post-3hr	-20%	-31%	-8%	0.0023	-11%	-27%	8%	0.2409	24%	-2%	57%	0.0675
	Healthy	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Healthy		Post-0hr	-23%	-33%	-11%	0.0005	-2%	-20%	20%	0.8420	2%	-18%	27%	0.8692
	Healthy		Post-1hr	-5%	-18%	11%	0.5321	1%	-18%	24%	0.9117	4%	-18%	31%	0.7627
	Healthy		Post-2hr	-11%	-24%	3%	0.1251	2%	-17%	26%	0.8476	2%	-20%	31%	0.8596
	Healthy		Post-3hr	-13%	-26%	1%	0.0625	9%	-11%	34%	0.4135	-9%	-30%	17%	0.4501
Gender	Male	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Male		Post-0hr	-42%	-52%	-31%	0.0000	-50%	-61%	-36%	0.0000	34%	1%	80%	0.0457
	Male		Post-1hr	-24%	-37%	-7%	0.0061	-30%	-46%	-9%	0.0083	19%	-13%	62%	0.2674
	Male		Post-2hr	-25%	-39%	-9%	0.0042	-37%	-52%	-18%	0.0007	12%	-19%	55%	0.4802
	Male		Post-3hr	-23%	-37%	-5%	0.0161	-33%	-50%	-12%	0.0047	31%	-7%	85%	0.1210
	Male	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Male		Post-0hr	-27%	-38%	-13%	0.0004	-20%	-37%	1%	0.0612	3%	-21%	34%	0.8233
	Male		Post-1hr	-6%	-22%	12%	0.4600	-13%	-31%	11%	0.2756	3%	-22%	37%	0.8144
	Male		Post-2hr	-15%	-29%	2%	0.0796	-19%	-36%	4%	0.1000	-1%	-26%	33%	0.9528
	Male		Post-3hr	-16%	-30%	2%	0.0757	-12%	-31%	13%	0.3226	-6%	-31%	27%	0.6657
	Female	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Female		Post-0hr	-35%	-44%	-25%	0.0000	-25%	-39%	-9%	0.0046	32%	5%	65%	0.0169
	Female		Post-1hr	-21%	-32%	-8%	0.0027	-6%	-24%	15%	0.5224	20%	-6%	53%	0.1396
	Female		Post-2hr	-18%	-30%	-4%	0.0113	0%	-19%	23%	0.9916	21%	-6%	55%	0.1393
	Female		Post-3hr	-19%	-30%	-5%	0.0100	1%	-18%	25%	0.8910	23%	-4%	59%	0.1056

	Female	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Female		Post-0hr	-18%	-31%	-2%	0.0283	20%	-5%	52%	0.1335	1%	-23%	32%	0.9428
	Female		Post-1hr	-3%	-19%	16%	0.7444	16%	-9%	49%	0.2327	4%	-22%	39%	0.7857
	Female		Post-2hr	-7%	-23%	12%	0.4424	29%	0%	67%	0.0465	7%	-21%	44%	0.6815
	Female		Post-3hr	-11%	-26%	7%	0.2083	34%	5%	73%	0.0206	-12%	-36%	21%	0.4232
Age (above and below median)	Group 1	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 1		Post-0hr	-35%	-43%	-24%	0.0000	-35%	-47%	-20%	0.0000	48%	18%	86%	0.0008
	Group 1		Post-1hr	-18%	-29%	-5%	0.0100	-11%	-28%	9%	0.2572	32%	3%	68%	0.0256
	Group 1		Post-2hr	-18%	-30%	-4%	0.0112	-12%	-29%	8%	0.2236	22%	-5%	57%	0.1254
	Group 1		Post-3hr	-14%	-27%	1%	0.0584	-8%	-27%	14%	0.4338	34%	3%	74%	0.0299
	Group 1	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 1		Post-0hr	-14%	-29%	5%	0.1470	-2%	-26%	30%	0.8904	25%	-8%	71%	0.1492
	Group 1		Post-1hr	7%	-13%	31%	0.5492	11%	-17%	49%	0.4701	24%	-11%	73%	0.1993
	Group 1		Post-2hr	-5%	-23%	17%	0.6367	7%	-20%	43%	0.6555	7%	-25%	51%	0.7200
	Group 1		Post-3hr	0%	-19%	24%	0.9720	16%	-13%	56%	0.3147	4%	-27%	48%	0.8343
	Group 2	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 2		Post-0hr	-44%	-54%	-32%	0.0000	-35%	-50%	-15%	0.0016	10%	-18%	47%	0.5368
	Group 2		Post-1hr	-30%	-43%	-15%	0.0005	-23%	-42%	2%	0.0662	2%	-26%	40%	0.9178
	Group 2		Post-2hr	-26%	-39%	-9%	0.0042	-18%	-38%	8%	0.1617	15%	-18%	60%	0.4140
	Group 2		Post-3hr	-31%	-43%	-15%	0.0004	-17%	-37%	11%	0.2081	10%	-22%	53%	0.5940
	Group 2	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 2		Post-0hr	-26%	-37%	-14%	0.0001	-2%	-21%	22%	0.8511	-7%	-27%	18%	0.5418
	Group 2		Post-1hr	-9%	-23%	7%	0.2382	-3%	-23%	21%	0.7706	-4%	-26%	24%	0.7425
	Group 2		Post-2hr	-14%	-27%	2%	0.0791	0%	-21%	26%	0.9911	0%	-23%	31%	0.9823
	Group 2		Post-3hr	-19%	-31%	-5%	0.0122	6%	-16%	33%	0.6238	-15%	-36%	12%	0.2538
Age (tertiles)	Group 1	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 1		Post-0hr	-34%	-45%	-22%	0.0000	-38%	-52%	-20%	0.0003	68%	27%	122%	0.0003
	Group 1		Post-1hr	-16%	-30%	1%	0.0660	-10%	-31%	16%	0.4030	52%	13%	104%	0.0060
	Group 1		Post-2hr	-14%	-29%	4%	0.1100	-11%	-32%	16%	0.3813	43%	5%	96%	0.0235
	Group 1		Post-3hr	-14%	-30%	5%	0.1483	-12%	-33%	17%	0.3820	69%	22%	135%	0.0019

Category	Group	Asthma	Time											
	Group 1	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 1		Post-0hr	-17%	-33%	3%	0.0859	-8%	-32%	25%	0.5923	34%	-3%	86%	0.0782
	Group 1		Post-1hr	5%	-16%	31%	0.6581	8%	-21%	48%	0.6183	37%	-4%	94%	0.0786
	Group 1		Post-2hr	-2%	-22%	22%	0.8432	6%	-23%	46%	0.7090	28%	-12%	85%	0.1904
	Group 1		Post-3hr	-5%	-24%	20%	0.6748	8%	-22%	49%	0.6459	29%	-12%	89%	0.1871
	Group 2	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 2		Post-0hr	-39%	-49%	-27%	0.0000	-30%	-46%	-10%	0.0059	7%	-19%	41%	0.6283
	Group 2		Post-1hr	-28%	-40%	-13%	0.0006	-16%	-35%	10%	0.2031	-2%	-26%	32%	0.9122
	Group 2		Post-2hr	-26%	-39%	-11%	0.0017	-15%	-35%	11%	0.2293	-3%	-28%	31%	0.8270
	Group 2		Post-3hr	-25%	-38%	-9%	0.0029	-10%	-31%	17%	0.4410	-6%	-31%	27%	0.6832
	Group 2	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 2		Post-0hr	-23%	-35%	-8%	0.0038	3%	-20%	34%	0.7975	-14%	-34%	12%	0.2523
	Group 2		Post-1hr	-10%	-25%	8%	0.2478	2%	-22%	33%	0.8888	-11%	-33%	18%	0.4119
	Group 2		Post-2hr	-16%	-30%	2%	0.0746	2%	-22%	33%	0.8975	-14%	-36%	16%	0.3267
	Group 2		Post-3hr	-17%	-31%	0%	0.0514	10%	-16%	45%	0.4888	-28%	-47%	-2%	0.0356
	Group 3	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 3		Post-0hr	-41%	-52%	-28%	0.0000	-37%	-53%	-16%	0.0020	34%	-3%	84%	0.0754
	Group 3		Post-1hr	-22%	-37%	-2%	0.0330	-22%	-43%	6%	0.1155	17%	-17%	66%	0.3700
	Group 3		Post-2hr	-21%	-37%	-2%	0.0357	-18%	-40%	13%	0.2255	24%	-13%	78%	0.2376
	Group 3		Post-3hr	-21%	-37%	-2%	0.0353	-12%	-36%	20%	0.4194	28%	-11%	85%	0.1860
	Group 3	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 3		Post-0hr	-26%	-40%	-9%	0.0046	-7%	-29%	23%	0.6147	7%	-22%	46%	0.6748
	Group 3		Post-1hr	-2%	-21%	22%	0.8570	-6%	-30%	26%	0.6900	6%	-25%	49%	0.7437
	Group 3		Post-2hr	-10%	-28%	12%	0.3301	-1%	-27%	33%	0.9229	11%	-22%	58%	0.5672
	Group 3		Post-3hr	-13%	-30%	8%	0.1940	7%	-20%	44%	0.6238	-2%	-32%	40%	0.9047
Age (quartiles)	Group 1	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 1		Post-0hr	-34%	-46%	-19%	0.0001	-38%	-53%	-17%	0.0015	90%	37%	163%	0.0001
	Group 1		Post-1hr	-16%	-32%	4%	0.1015	-11%	-34%	19%	0.4293	68%	20%	137%	0.0030
	Group 1		Post-2hr	-9%	-27%	14%	0.4112	-6%	-31%	27%	0.6654	56%	9%	123%	0.0159
	Group 1		Post-3hr	-13%	-31%	10%	0.2380	-18%	-41%	14%	0.2433	101%	37%	196%	0.0004

Group 1	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
Group 1		Post-0hr	-13%	-32%	10%	0.2448	-6%	-33%	31%	0.6985	65%	14%	139%	0.0081
Group 1		Post-1hr	10%	-14%	42%	0.4327	11%	-21%	57%	0.5500	62%	9%	140%	0.0169
Group 1		Post-2hr	7%	-17%	37%	0.6204	14%	-19%	62%	0.4493	37%	-10%	108%	0.1411
Group 1		Post-3hr	3%	-21%	34%	0.8154	7%	-25%	53%	0.7203	58%	2%	145%	0.0410
Group 2	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
Group 2		Post-0hr	-35%	-45%	-22%	0.0000	-32%	-48%	-12%	0.0037	21%	-8%	59%	0.1798
Group 2		Post-1hr	-19%	-33%	-2%	0.0282	-10%	-31%	17%	0.4371	8%	-20%	45%	0.6144
Group 2		Post-2hr	-24%	-37%	-8%	0.0048	-16%	-36%	11%	0.2177	0%	-26%	36%	0.9980
Group 2		Post-3hr	-15%	-30%	3%	0.0879	-2%	-25%	29%	0.8885	0%	-27%	36%	0.9805
Group 2	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
Group 2		Post-0hr	-14%	-32%	8%	0.1974	2%	-27%	43%	0.9111	5%	-26%	50%	0.7804
Group 2		Post-1hr	7%	-16%	36%	0.5881	13%	-20%	59%	0.5025	4%	-29%	51%	0.8503
Group 2		Post-2hr	-11%	-31%	13%	0.3253	3%	-27%	47%	0.8632	-12%	-40%	30%	0.5193
Group 2		Post-3hr	0%	-21%	28%	0.9794	27%	-11%	81%	0.1819	-22%	-47%	16%	0.2250
Group 3	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
Group 3		Post-0hr	-41%	-53%	-25%	0.0000	-33%	-51%	-7%	0.0169	-15%	-40%	20%	0.3617
Group 3		Post-1hr	-33%	-47%	-15%	0.0009	-21%	-43%	11%	0.1743	-19%	-44%	17%	0.2599
Group 3		Post-2hr	-25%	-41%	-4%	0.0196	-19%	-42%	14%	0.2297	-3%	-34%	42%	0.8668
Group 3		Post-3hr	-33%	-47%	-15%	0.0012	-21%	-44%	11%	0.1715	-15%	-42%	26%	0.4189
Group 3	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
Group 3		Post-0hr	-22%	-35%	-7%	0.0069	1%	-23%	32%	0.9426	-26%	-43%	-2%	0.0329
Group 3		Post-1hr	-12%	-27%	7%	0.1959	-1%	-24%	31%	0.9579	-22%	-42%	4%	0.0926
Group 3		Post-2hr	-12%	-27%	6%	0.1844	0%	-24%	31%	0.9735	-15%	-37%	15%	0.2990
Group 3		Post-3hr	-21%	-35%	-3%	0.0216	2%	-23%	36%	0.8756	-33%	-51%	-8%	0.0142
Group 4	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
Group 4		Post-0hr	-48%	-58%	-34%	0.0000	-39%	-56%	-15%	0.0033	52%	7%	117%	0.0199
Group 4		Post-1hr	-26%	-43%	-5%	0.0167	-28%	-49%	2%	0.0619	40%	-5%	107%	0.0921
Group 4		Post-2hr	-27%	-43%	-6%	0.0141	-21%	-45%	13%	0.1963	49%	-1%	123%	0.0551
Group 4		Post-3hr	-29%	-45%	-9%	0.0073	-15%	-40%	20%	0.3546	57%	4%	137%	0.0316

	Group		Time												
	Group 4	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 4		Post-0hr	-31%	-45%	-13%	0.0016	-8%	-33%	26%	0.5974	33%	-7%	89%	0.1126
	Group 4		Post-1hr	-3%	-24%	24%	0.8110	-10%	-36%	25%	0.5248	35%	-8%	98%	0.1307
	Group 4		Post-2hr	-15%	-33%	9%	0.1958	-3%	-32%	37%	0.8524	31%	-12%	95%	0.1857
	Group 4		Post-3hr	-16%	-34%	7%	0.1552	10%	-21%	52%	0.5700	24%	-18%	85%	0.3049
FEV1 (above and below median)	Group 1	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 1		Post-0hr	-39%	-48%	-29%	0.0000	-42%	-53%	-27%	0.0000	37%	7%	74%	0.0000
	Group 1		Post-1hr	-21%	-33%	-7%	0.0100	-21%	-37%	-1%	0.0035	25%	-4%	62%	0.0336
	Group 1		Post-2hr	-16%	-29%	-1%	0.0112	-12%	-30%	11%	0.0097	16%	-11%	52%	0.2340
	Group 1		Post-3hr	-18%	-31%	-2%	0.0584	-12%	-31%	12%	0.0112	20%	-9%	60%	0.4871
	Group 1	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 1		Post-0hr	-23%	-35%	-9%	0.1470	-6%	-26%	20%	0.0092	-4%	-26%	24%	0.0042
	Group 1		Post-1hr	-3%	-19%	15%	0.5492	2%	-20%	30%	0.5760	-3%	-26%	28%	0.3117
	Group 1		Post-2hr	-3%	-19%	16%	0.6367	15%	-10%	48%	0.2254	-6%	-30%	26%	0.6262
	Group 1		Post-3hr	-10%	-25%	8%	0.9720	16%	-9%	49%	0.1241	-20%	-41%	9%	0.4354
	Group 2	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 2		Post-0hr	-39%	-49%	-27%	0.0000	-31%	-46%	-11%	0.0000	60%	21%	111%	0.0000
	Group 2		Post-1hr	-23%	-36%	-6%	0.0005	-13%	-34%	13%	0.0061	48%	10%	100%	0.0292
	Group 2		Post-2hr	-31%	-43%	-16%	0.0042	-25%	-42%	-2%	0.0093	43%	5%	95%	0.0134
	Group 2		Post-3hr	-24%	-38%	-8%	0.0004	-15%	-35%	10%	0.0161	60%	16%	119%	0.0060
	Group 2	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 2		Post-0hr	-23%	-35%	-8%	0.0001	12%	-13%	44%	0.0014	12%	-15%	48%	0.0006
	Group 2		Post-1hr	-6%	-22%	14%	0.2382	11%	-15%	44%	0.6437	15%	-14%	55%	0.2672
	Group 2		Post-2hr	-20%	-34%	-3%	0.0791	-2%	-25%	29%	0.1875	16%	-15%	57%	0.0909
	Group 2		Post-3hr	-17%	-32%	1%	0.0122	12%	-15%	46%	0.1272	7%	-22%	46%	0.0068
FEV1 (tertiles)	Group 1	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 1		Post-0hr	-37%	-47%	-27%	0.0000	-45%	-56%	-32%	0.0002	20%	-7%	54%	0.0000
	Group 1		Post-1hr	-25%	-36%	-11%	0.0660	-22%	-38%	-2%	0.1247	3%	-21%	34%	0.0209
	Group 1		Post-2hr	-15%	-29%	1%	0.1100	-12%	-30%	12%	0.1115	7%	-19%	41%	0.0993
	Group 1		Post-3hr	-20%	-33%	-4%	0.1483	-16%	-34%	7%	0.2127	7%	-20%	43%	0.1618

	Group	Status	Time												
	Group 1	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 1		Post-0hr	-23%	-37%	-6%	0.0859	-25%	-44%	-2%	0.1237	-11%	-35%	21%	0.0049
	Group 1		Post-1hr	-12%	-28%	9%	0.6581	-12%	-34%	17%	0.7142	-16%	-39%	17%	0.6177
	Group 1		Post-2hr	-4%	-22%	19%	0.8432	5%	-22%	40%	0.6026	-10%	-36%	28%	0.6839
	Group 1		Post-3hr	-14%	-30%	7%	0.6748	0%	-26%	33%	0.6352	-25%	-48%	7%	0.7028
	Group 2	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 2		Post-0hr	-35%	-47%	-20%	0.0000	-14%	-36%	15%	0.0000	27%	-8%	76%	0.0000
	Group 2		Post-1hr	-11%	-29%	10%	0.0006	12%	-17%	52%	0.0009	13%	-20%	60%	0.0008
	Group 2		Post-2hr	-24%	-39%	-5%	0.0017	-13%	-36%	18%	0.0029	15%	-19%	65%	0.0039
	Group 2		Post-3hr	-23%	-39%	-4%	0.0029	-6%	-31%	28%	0.0019	21%	-16%	75%	0.0067
	Group 2	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 2		Post-0hr	-20%	-34%	-3%	0.0038	17%	-10%	53%	0.0007	-5%	-30%	28%	0.0078
	Group 2		Post-1hr	4%	-15%	28%	0.2478	27%	-4%	67%	0.3612	-7%	-33%	28%	0.1670
	Group 2		Post-2hr	-14%	-30%	6%	0.0746	3%	-22%	37%	0.1242	-2%	-30%	37%	0.1379
	Group 2		Post-3hr	-17%	-33%	2%	0.0514	12%	-15%	49%	0.0441	-15%	-40%	19%	0.1233
	Group 3	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 3		Post-0hr	-40%	-51%	-27%	0.0000	-26%	-44%	-3%	0.0000	69%	25%	129%	0.0001
	Group 3		Post-1hr	-24%	-38%	-6%	0.0330	-18%	-38%	9%	0.0146	69%	22%	134%	0.1829
	Group 3		Post-2hr	-26%	-40%	-8%	0.0357	-16%	-37%	12%	0.0356	46%	4%	104%	0.0139
	Group 3		Post-3hr	-18%	-34%	2%	0.0353	-4%	-28%	29%	0.0430	66%	18%	133%	0.0062
	Group 3	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 3		Post-0hr	-26%	-39%	-11%	0.0046	1%	-23%	32%	0.0071	26%	-6%	68%	0.0189
	Group 3		Post-1hr	-10%	-26%	10%	0.8570	-8%	-30%	22%	0.3585	39%	1%	90%	0.9596
	Group 3		Post-2hr	-16%	-31%	4%	0.3301	0%	-25%	33%	0.1594	23%	-11%	70%	0.0832
	Group 3		Post-3hr	-11%	-28%	9%	0.1940	15%	-14%	52%	0.1086	16%	-17%	61%	0.0246
FEV1 (quartiles)	Group 1	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 1		Post-0hr	-40%	-49%	-28%	0.0001	-48%	-59%	-35%	0.0007	17%	-10%	53%	0.0000
	Group 1		Post-1hr	-25%	-37%	-11%	0.1015	-24%	-40%	-4%	0.0927	0%	-25%	33%	0.0337
	Group 1		Post-2hr	-14%	-28%	4%	0.4112	-13%	-33%	11%	0.0857	7%	-21%	44%	0.1215
	Group 1		Post-3hr	-20%	-34%	-3%	0.2380	-16%	-36%	8%	0.1655	2%	-25%	40%	0.2959

Group	Status	Phase												
Group 1	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
Group 1		Post-0hr	-24%	-38%	-5%	0.2448	-24%	-43%	2%	0.0789	-12%	-37%	23%	0.0080
Group 1		Post-1hr	-12%	-30%	10%	0.4327	-9%	-33%	22%	0.9790	-18%	-42%	18%	0.9610
Group 1		Post-2hr	-2%	-22%	23%	0.6204	3%	-24%	40%	0.3614	-7%	-35%	35%	0.7795
Group 1		Post-3hr	-16%	-34%	6%	0.8154	-5%	-30%	30%	0.3748	-25%	-49%	9%	0.9571
Group 2	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
Group 2		Post-0hr	-37%	-49%	-22%	0.0000	-22%	-42%	5%	0.0000	33%	-5%	86%	0.0002
Group 2		Post-1hr	-16%	-33%	5%	0.0282	-6%	-31%	27%	0.0052	28%	-10%	82%	0.0143
Group 2		Post-2hr	-17%	-34%	4%	0.0048	1%	-26%	37%	0.0283	10%	-24%	58%	0.0124
Group 2		Post-3hr	-15%	-32%	7%	0.0879	9%	-21%	48%	0.0150	19%	-19%	73%	0.0301
Group 2	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
Group 2		Post-0hr	-20%	-34%	-2%	0.1974	15%	-13%	51%	0.0148	0%	-26%	36%	0.0352
Group 2		Post-1hr	-1%	-19%	21%	0.5881	12%	-16%	49%	0.4695	6%	-24%	46%	0.4437
Group 2		Post-2hr	-6%	-23%	15%	0.3253	20%	-10%	61%	0.3015	-4%	-32%	35%	0.1257
Group 2		Post-3hr	-11%	-27%	10%	0.9794	24%	-7%	65%	0.1143	-14%	-40%	23%	0.1681
Group 3	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
Group 3		Post-0hr	-27%	-43%	-6%	0.0000	-1%	-29%	39%	0.0000	76%	19%	161%	0.0000
Group 3		Post-1hr	-24%	-41%	-1%	0.0009	12%	-21%	59%	0.1390	60%	5%	142%	0.0164
Group 3		Post-2hr	-31%	-47%	-10%	0.0196	-20%	-44%	14%	0.0478	80%	18%	176%	0.0195
Group 3		Post-3hr	-33%	-48%	-12%	0.0012	-24%	-47%	10%	0.0749	108%	34%	222%	0.0086
Group 3	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
Group 3		Post-0hr	-7%	-30%	22%	0.0069	46%	1%	110%	0.0084	33%	-14%	104%	0.0068
Group 3		Post-1hr	-11%	-33%	19%	0.1959	34%	-8%	96%	0.6992	32%	-17%	108%	0.6463
Group 3		Post-2hr	-22%	-41%	4%	0.1844	-5%	-35%	39%	0.3648	57%	-1%	151%	0.3344
Group 3		Post-3hr	-30%	-48%	-5%	0.0216	-13%	-42%	30%	0.2719	51%	-7%	147%	0.1965
Group 4	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
Group 4		Post-0hr	-45%	-56%	-32%	0.0000	-39%	-55%	-17%	0.0000	41%	0%	99%	0.0024
Group 4		Post-1hr	-20%	-36%	1%	0.0167	-21%	-43%	9%	0.0040	34%	-7%	93%	0.0625
Group 4		Post-2hr	-29%	-44%	-10%	0.0141	-22%	-43%	8%	0.0399	16%	-20%	69%	0.0365
Group 4		Post-3hr	-16%	-34%	6%	0.0073	-1%	-29%	36%	0.0526	28%	-13%	87%	0.0059

	Group	Asthmatic	Timepoint												
	Group 4	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 4		Post-0hr	-30%	-43%	-15%	0.0016	-10%	-33%	20%	0.0095	6%	-22%	44%	0.0486
	Group 4		Post-1hr	-5%	-23%	17%	0.8110	-6%	-30%	28%	0.1842	10%	-21%	54%	0.6043
	Group 4		Post-2hr	-20%	-35%	0%	0.1958	-6%	-31%	27%	0.1966	2%	-28%	43%	0.1382
	Group 4		Post-3hr	-12%	-29%	8%	0.1552	12%	-17%	52%	0.1408	-7%	-34%	31%	0.0168
BMI (above and below median)	Group 1	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 1		Post-0hr	-36%	-46%	-25%	0.0000	-29%	-43%	-12%	0.0025	35%	5%	72%	0.0183
	Group 1		Post-1hr	-22%	-34%	-8%	0.0035	-10%	-28%	14%	0.3811	16%	-11%	51%	0.2636
	Group 1		Post-2hr	-20%	-33%	-5%	0.0097	-14%	-32%	8%	0.1999	25%	-5%	65%	0.1073
	Group 1		Post-3hr	-20%	-33%	-5%	0.0112	-11%	-30%	13%	0.3343	29%	-3%	71%	0.0800
	Group 1	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 1		Post-0hr	-21%	-34%	-6%	0.0092	7%	-16%	37%	0.5594	3%	-21%	35%	0.8041
	Group 1		Post-1hr	-5%	-21%	14%	0.5760	8%	-16%	38%	0.5489	1%	-24%	34%	0.9596
	Group 1		Post-2hr	-11%	-26%	7%	0.2254	2%	-20%	32%	0.8472	9%	-19%	47%	0.5732
	Group 1		Post-3hr	-14%	-28%	4%	0.1241	9%	-15%	41%	0.4819	-5%	-30%	28%	0.7233
	Group 2	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 2		Post-0hr	-39%	-48%	-28%	0.0000	-40%	-52%	-25%	0.0000	31%	2%	70%	0.0360
	Group 2		Post-1hr	-21%	-34%	-7%	0.0061	-20%	-36%	2%	0.0682	24%	-5%	64%	0.1176
	Group 2		Post-2hr	-21%	-34%	-6%	0.0093	-14%	-32%	10%	0.2259	11%	-17%	48%	0.4813
	Group 2		Post-3hr	-20%	-33%	-4%	0.0161	-11%	-30%	14%	0.3634	20%	-11%	61%	0.2349
	Group 2	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 2		Post-0hr	-24%	-36%	-10%	0.0014	-9%	-29%	15%	0.4191	1%	-22%	31%	0.9386
	Group 2		Post-1hr	-4%	-20%	14%	0.6437	-4%	-25%	23%	0.7467	8%	-18%	43%	0.5951
	Group 2		Post-2hr	-11%	-26%	6%	0.1875	3%	-20%	33%	0.8217	-4%	-28%	30%	0.7996
	Group 2		Post-3hr	-13%	-28%	4%	0.1272	10%	-15%	41%	0.4740	-12%	-36%	20%	0.4196
BMI (tertiles)	Group 1	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 1		Post-0hr	-31%	-43%	-16%	0.0002	-26%	-43%	-4%	0.0249	40%	4%	87%	0.0258
	Group 1		Post-1hr	-14%	-30%	4%	0.1247	-15%	-35%	11%	0.2262	30%	-5%	78%	0.1019
	Group 1		Post-2hr	-15%	-30%	4%	0.1115	-11%	-32%	17%	0.4029	37%	-1%	90%	0.0573
	Group 1		Post-3hr	-12%	-28%	8%	0.2127	-12%	-33%	16%	0.3736	45%	4%	102%	0.0283

	Group 1	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 1		Post-0hr	-15%	-31%	5%	0.1237	11%	-16%	47%	0.4494	7%	-22%	47%	0.6847
	Group 1		Post-1hr	4%	-16%	29%	0.7142	4%	-22%	39%	0.7863	7%	-24%	51%	0.6807
	Group 1		Post-2hr	-6%	-24%	17%	0.6026	8%	-19%	44%	0.6138	18%	-17%	68%	0.3474
	Group 1		Post-3hr	-5%	-24%	18%	0.6352	9%	-18%	46%	0.5575	5%	-26%	51%	0.7788
	Group 2	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 2		Post-0hr	-42%	-51%	-32%	0.0000	-39%	-51%	-23%	0.0000	28%	-1%	66%	0.0591
	Group 2		Post-1hr	-25%	-37%	-11%	0.0009	-9%	-28%	14%	0.4173	6%	-19%	40%	0.6540
	Group 2		Post-2hr	-23%	-36%	-9%	0.0029	-13%	-31%	11%	0.2657	7%	-20%	43%	0.6387
	Group 2		Post-3hr	-25%	-38%	-10%	0.0019	-10%	-30%	15%	0.4091	10%	-19%	49%	0.5296
	Group 2	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 2		Post-0hr	-29%	-42%	-14%	0.0007	-8%	-30%	20%	0.5318	-2%	-28%	33%	0.8929
	Group 2		Post-1hr	-9%	-26%	12%	0.3612	12%	-15%	47%	0.4276	-12%	-37%	22%	0.4366
	Group 2		Post-2hr	-15%	-31%	5%	0.1242	6%	-20%	39%	0.6951	-8%	-34%	30%	0.6504
	Group 2		Post-3hr	-19%	-35%	-1%	0.0441	11%	-16%	47%	0.4547	-20%	-44%	13%	0.2092
	Group 3	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 3		Post-0hr	-37%	-49%	-22%	0.0000	-39%	-55%	-17%	0.0016	33%	-5%	86%	0.0959
	Group 3		Post-1hr	-25%	-41%	-6%	0.0146	-29%	-49%	-3%	0.0339	45%	0%	109%	0.0491
	Group 3		Post-2hr	-22%	-39%	-2%	0.0356	-25%	-46%	4%	0.0849	17%	-20%	71%	0.4236
	Group 3		Post-3hr	-22%	-38%	-1%	0.0430	-16%	-39%	17%	0.3044	28%	-14%	90%	0.2218
	Group 3	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 3		Post-0hr	-23%	-36%	-7%	0.0071	-9%	-31%	21%	0.5304	2%	-24%	36%	0.9135
	Group 3		Post-1hr	-9%	-26%	11%	0.3585	-13%	-35%	16%	0.3382	19%	-13%	64%	0.2766
	Group 3		Post-2hr	-14%	-30%	6%	0.1594	-9%	-33%	23%	0.5248	1%	-28%	41%	0.9607
	Group 3		Post-3hr	-16%	-31%	4%	0.1086	4%	-23%	40%	0.7918	-7%	-35%	33%	0.6844
BMI (quartiles)	Group 1	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 1		Post-0hr	-33%	-46%	-15%	0.0007	-33%	-51%	-9%	0.0102	75%	23%	147%	0.0018
	Group 1		Post-1hr	-18%	-36%	3%	0.0927	-23%	-44%	6%	0.1117	64%	13%	139%	0.0090
	Group 1		Post-2hr	-19%	-36%	3%	0.0857	-17%	-40%	14%	0.2524	70%	16%	149%	0.0069
	Group 1		Post-3hr	-16%	-34%	7%	0.1655	-20%	-42%	10%	0.1727	90%	29%	181%	0.0013

Group	Status	Time												
Group 1	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
Group 1		Post-0hr	-18%	-34%	2%	0.0789	2%	-24%	36%	0.8991	27%	-9%	76%	0.1611
Group 1		Post-1hr	0%	-20%	25%	0.9790	-2%	-28%	31%	0.8693	30%	-9%	85%	0.1443
Group 1		Post-2hr	-10%	-28%	13%	0.3614	1%	-25%	36%	0.9529	37%	-5%	97%	0.0887
Group 1		Post-3hr	-10%	-28%	13%	0.3748	1%	-25%	37%	0.9334	27%	-12%	84%	0.1984
Group 2	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
Group 2		Post-0hr	-38%	-49%	-25%	0.0000	-26%	-43%	-4%	0.0250	12%	-17%	50%	0.4631
Group 2		Post-1hr	-25%	-39%	-8%	0.0052	-2%	-25%	28%	0.8708	-8%	-32%	27%	0.6235
Group 2		Post-2hr	-21%	-35%	-2%	0.0283	-13%	-34%	14%	0.3131	2%	-26%	41%	0.9096
Group 2		Post-3hr	-23%	-38%	-5%	0.0150	-5%	-29%	25%	0.6991	-1%	-29%	39%	0.9529
Group 2	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
Group 2		Post-0hr	-25%	-40%	-5%	0.0148	13%	-17%	54%	0.4399	-19%	-43%	14%	0.2273
Group 2		Post-1hr	-8%	-27%	16%	0.4695	24%	-10%	70%	0.1904	-27%	-49%	5%	0.0935
Group 2		Post-2hr	-12%	-30%	12%	0.3015	6%	-23%	46%	0.7400	-18%	-44%	20%	0.3069
Group 2		Post-3hr	-18%	-35%	5%	0.1143	20%	-13%	66%	0.2707	-34%	-55%	-2%	0.0369
Group 3	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
Group 3		Post-0hr	-39%	-50%	-26%	0.0000	-41%	-55%	-22%	0.0002	36%	0%	86%	0.0536
Group 3		Post-1hr	-14%	-30%	5%	0.1390	-8%	-31%	21%	0.5328	20%	-14%	67%	0.2730
Group 3		Post-2hr	-19%	-35%	0%	0.0478	-4%	-28%	27%	0.7630	11%	-21%	57%	0.5501
Group 3		Post-3hr	-18%	-34%	2%	0.0749	-5%	-29%	27%	0.7182	14%	-20%	64%	0.4644
Group 3	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
Group 3		Post-0hr	-26%	-40%	-7%	0.0084	-10%	-33%	22%	0.4997	-2%	-30%	38%	0.9298
Group 3		Post-1hr	5%	-17%	32%	0.6992	16%	-16%	59%	0.3659	-5%	-34%	37%	0.7803
Group 3		Post-2hr	-10%	-29%	14%	0.3648	16%	-15%	60%	0.3493	-11%	-39%	32%	0.5717
Group 3		Post-3hr	-12%	-31%	11%	0.2719	20%	-13%	65%	0.2580	-23%	-49%	14%	0.1871
Group 4	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
Group 4		Post-0hr	-38%	-50%	-23%	0.0000	-40%	-56%	-18%	0.0014	36%	-3%	91%	0.0786
Group 4		Post-1hr	-29%	-44%	-11%	0.0040	-35%	-53%	-10%	0.0100	44%	0%	108%	0.0531
Group 4		Post-2hr	-22%	-39%	-1%	0.0399	-25%	-46%	4%	0.0844	20%	-18%	77%	0.3397
Group 4		Post-3hr	-21%	-38%	0%	0.0526	-19%	-42%	12%	0.1983	40%	-6%	108%	0.0981

Category	Group	Asthmatic	Time												
	Group 4	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 4		Post-0hr	-24%	-39%	-7%	0.0095	-8%	-32%	24%	0.5761	-2%	-29%	35%	0.9193
	Group 4		Post-1hr	-14%	-31%	7%	0.1842	-18%	-39%	12%	0.2170	14%	-19%	60%	0.4603
	Group 4		Post-2hr	-14%	-31%	8%	0.1966	-9%	-34%	25%	0.5617	-3%	-32%	39%	0.8703
	Group 4		Post-3hr	-16%	-33%	6%	0.1408	2%	-26%	40%	0.9018	-7%	-36%	38%	0.7311
BMI (CDC categories)	Group 1	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 1		Post-0hr	-30%	-58%	17%	0.1673	-2%	-52%	102%	0.9630	858%	365%	####	0.0000
	Group 1		Post-1hr	-36%	-62%	9%	0.0975	-27%	-65%	52%	0.3928	1022%	430%	####	0.0000
	Group 1		Post-2hr	-15%	-50%	45%	0.5485	5%	-50%	120%	0.9044	849%	344%	####	0.0000
	Group 1		Post-3hr	-32%	-60%	17%	0.1617	-28%	-66%	52%	0.3885	1394%	598%	####	0.0000
	Group 1	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 1		Post-0hr	-16%	-52%	46%	0.5316	52%	-30%	227%	0.2871	746%	290%	####	0.0000
	Group 1		Post-1hr	-22%	-56%	37%	0.3841	-12%	-60%	94%	0.7556	1019%	401%	####	0.0000
	Group 1		Post-2hr	-4%	-46%	71%	0.8998	28%	-42%	184%	0.5401	836%	315%	####	0.0000
	Group 1		Post-3hr	-25%	-58%	33%	0.3199	-8%	-58%	105%	0.8442	1155%	454%	####	0.0000
	Group 2	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 2		Post-0hr	-37%	-45%	-28%	0.0000	-35%	-47%	-22%	0.0000	15%	-5%	40%	0.1582
	Group 2		Post-1hr	-19%	-29%	-6%	0.0042	-9%	-25%	11%	0.3358	-2%	-20%	20%	0.8679
	Group 2		Post-2hr	-21%	-32%	-8%	0.0018	-13%	-29%	6%	0.1741	3%	-17%	26%	0.8077
	Group 2		Post-3hr	-19%	-31%	-6%	0.0050	-10%	-27%	11%	0.3256	3%	-17%	28%	0.7792
	Group 2	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 2		Post-0hr	-24%	-35%	-11%	0.0006	0%	-19%	23%	0.9795	2%	-18%	26%	0.8868
	Group 2		Post-1hr	-1%	-16%	16%	0.9008	10%	-11%	38%	0.3749	-2%	-22%	23%	0.8604
	Group 2		Post-2hr	-10%	-24%	6%	0.1972	6%	-15%	33%	0.5801	1%	-20%	28%	0.9169
	Group 2		Post-3hr	-12%	-25%	4%	0.1274	15%	-8%	44%	0.2048	-13%	-31%	9%	0.2264
	Group 3	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 3		Post-0hr	-42%	-54%	-26%	0.0000	-40%	-56%	-16%	0.0025	24%	-11%	71%	0.1982
	Group 3		Post-1hr	-29%	-44%	-9%	0.0064	-32%	-52%	-5%	0.0256	32%	-6%	86%	0.1101
	Group 3		Post-2hr	-21%	-39%	1%	0.0582	-24%	-47%	7%	0.1154	7%	-24%	52%	0.6830
	Group 3		Post-3hr	-19%	-37%	5%	0.1080	-11%	-37%	27%	0.5264	19%	-17%	69%	0.3432

	Group 3	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 3		Post-0hr	-30%	-44%	-11%	0.0040	-7%	-34%	31%	0.6824	9%	-22%	52%	0.6079
	Group 3		Post-1hr	-13%	-32%	11%	0.2577	-18%	-42%	17%	0.2795	32%	-7%	87%	0.1204
	Group 3		Post-2hr	-11%	-31%	15%	0.3823	-8%	-36%	33%	0.6745	6%	-26%	51%	0.7433
	Group 3		Post-3hr	-11%	-32%	16%	0.3888	14%	-21%	65%	0.4787	0%	-31%	44%	0.9862
	Group 4	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 4		Post-0hr	-13%	-44%	36%	0.5467	-43%	-71%	11%	0.0980	3%	-45%	93%	0.9277
	Group 4		Post-1hr	-27%	-54%	16%	0.1845	-40%	-69%	19%	0.1447	-2%	-49%	88%	0.9460
	Group 4		Post-2hr	-25%	-53%	19%	0.2195	-34%	-67%	31%	0.2301	3%	-50%	111%	0.9332
	Group 4		Post-3hr	-29%	-55%	14%	0.1561	-47%	-73%	5%	0.0702	61%	-35%	298%	0.3052
	Group 4	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 4		Post-0hr	5%	-30%	57%	0.8083	-12%	-52%	62%	0.6762	-9%	-48%	60%	0.7387
	Group 4		Post-1hr	-11%	-41%	35%	0.5867	-27%	-61%	36%	0.3265	-3%	-46%	75%	0.9314
	Group 4		Post-2hr	-15%	-44%	29%	0.4392	-19%	-57%	50%	0.4951	2%	-47%	95%	0.9589
	Group 4		Post-3hr	-22%	-49%	19%	0.2465	-32%	-64%	27%	0.2219	35%	-43%	218%	0.4925
Day of the Week	Tuesday	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Tuesday		Post-0hr	-30%	-43%	-15%	0.0004	-21%	-40%	4%	0.0980	3%	-24%	40%	0.8280
	Tuesday		Post-1hr	-23%	-37%	-5%	0.0156	-12%	-34%	18%	0.3946	-9%	-35%	26%	0.5645
	Tuesday		Post-2hr	-26%	-40%	-8%	0.0056	-11%	-33%	19%	0.4397	-9%	-36%	28%	0.5821
	Tuesday		Post-3hr	-25%	-40%	-7%	0.0081	0%	-26%	34%	0.9941	-14%	-40%	24%	0.4214
	Tuesday	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Tuesday		Post-0hr	-9%	-30%	17%	0.4381	28%	-9%	81%	0.1530	-27%	-50%	9%	0.1211
	Tuesday		Post-1hr	-6%	-27%	23%	0.6614	5%	-26%	50%	0.7816	-27%	-52%	11%	0.1351
	Tuesday		Post-2hr	-17%	-36%	8%	0.1641	7%	-25%	54%	0.6943	-27%	-53%	14%	0.1649
	Tuesday		Post-3hr	-20%	-39%	5%	0.1114	28%	-11%	84%	0.1889	-44%	-65%	-12%	0.0128
	Wednesday	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Wednesday		Post-0hr	-43%	-54%	-30%	0.0000	-30%	-48%	-5%	0.0207	11%	-21%	55%	0.5495
	Wednesday		Post-1hr	-29%	-43%	-11%	0.0025	-19%	-40%	10%	0.1698	28%	-10%	83%	0.1704
	Wednesday		Post-2hr	-13%	-30%	8%	0.2019	-4%	-30%	30%	0.7824	28%	-11%	85%	0.1868
	Wednesday		Post-3hr	-21%	-38%	-1%	0.0442	-6%	-32%	29%	0.6862	23%	-17%	81%	0.2989

	Day	Group	Timepoint												
	Wednesday	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Wednesday		Post-0hr	-26%	-40%	-9%	0.0047	13%	-16%	53%	0.4209	-21%	-43%	9%	0.1429
	Wednesday		Post-1hr	-13%	-30%	8%	0.2023	-4%	-29%	31%	0.7986	3%	-27%	45%	0.8770
	Wednesday		Post-2hr	-3%	-22%	20%	0.7646	15%	-16%	57%	0.3696	3%	-28%	47%	0.8697
	Wednesday		Post-3hr	-15%	-33%	7%	0.1556	20%	-13%	65%	0.2774	-21%	-46%	16%	0.2251
	Thursday	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Thursday		Post-0hr	-35%	-48%	-19%	0.0002	-45%	-60%	-24%	0.0003	128%	60%	225%	0.0000
	Thursday		Post-1hr	-22%	-38%	0%	0.0465	-32%	-51%	-6%	0.0213	109%	43%	208%	0.0002
	Thursday		Post-2hr	-20%	-38%	2%	0.0744	-30%	-50%	-1%	0.0414	95%	30%	194%	0.0014
	Thursday		Post-3hr	-17%	-35%	7%	0.1483	-32%	-51%	-4%	0.0303	115%	42%	227%	0.0004
	Thursday	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Thursday		Post-0hr	-16%	-33%	6%	0.1482	-11%	-35%	22%	0.4808	62%	13%	132%	0.0089
	Thursday		Post-1hr	-4%	-25%	22%	0.7126	-19%	-42%	12%	0.2033	68%	13%	148%	0.0100
	Thursday		Post-2hr	-11%	-31%	14%	0.3564	-16%	-40%	18%	0.3173	57%	4%	137%	0.0315
	Thursday		Post-3hr	-10%	-30%	14%	0.3694	-13%	-37%	22%	0.4271	38%	-9%	111%	0.1279
	Friday	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Friday		Post-0hr	-43%	-53%	-32%	0.0000	-45%	-58%	-29%	0.0000	45%	8%	94%	0.0142
	Friday		Post-1hr	-17%	-32%	1%	0.0624	-2%	-25%	29%	0.8886	11%	-19%	52%	0.5211
	Friday		Post-2hr	-22%	-37%	-5%	0.0136	-14%	-35%	13%	0.2766	8%	-22%	50%	0.6401
	Friday		Post-3hr	-18%	-33%	1%	0.0586	-13%	-34%	16%	0.3518	34%	-5%	88%	0.0904
	Friday	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Friday		Post-0hr	-26%	-38%	-12%	0.0007	-12%	-31%	13%	0.3298	3%	-22%	35%	0.8525
	Friday		Post-1hr	1%	-16%	21%	0.8952	17%	-10%	51%	0.2387	-11%	-34%	19%	0.4165
	Friday		Post-2hr	-13%	-28%	4%	0.1222	3%	-21%	34%	0.8289	-13%	-36%	18%	0.3680
	Friday		Post-3hr	-12%	-27%	6%	0.1860	12%	-14%	45%	0.4061	-14%	-37%	18%	0.3498
Mean Noise (above and below median)	Asthmatic Group 1		Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 1		Post-0hr	-33%	-43%	-20%	0.0000	-30%	-45%	-11%	0.0039	10%	-17%	45%	0.5065
	Group 1		Post-1hr	-18%	-31%	-2%	0.0336	-8%	-28%	18%	0.5113	-2%	-27%	32%	0.9093
	Group 1		Post-2hr	-11%	-26%	8%	0.2340	-5%	-27%	23%	0.6874	-1%	-28%	35%	0.9380
	Group 1		Post-3hr	-7%	-23%	14%	0.4871	-1%	-25%	30%	0.9378	8%	-23%	50%	0.6665

	Group	Asthma	Time												
	Group 1	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 1		Post-0hr	-24%	-37%	-8%	0.0042	-4%	-27%	25%	0.7390	-19%	-40%	9%	0.1650
	Group 1		Post-1hr	-10%	-26%	10%	0.3117	-4%	-27%	27%	0.7900	-17%	-39%	15%	0.2619
	Group 1		Post-2hr	-5%	-22%	16%	0.6262	5%	-21%	40%	0.7323	-15%	-40%	19%	0.3295
	Group 1		Post-3hr	-8%	-25%	13%	0.4354	9%	-18%	46%	0.5346	-25%	-47%	7%	0.1123
	Group 2	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 2		Post-0hr	-36%	-46%	-24%	0.0000	-29%	-45%	-10%	0.0055	54%	17%	103%	0.0025
	Group 2		Post-1hr	-18%	-32%	-2%	0.0292	-8%	-29%	18%	0.5056	41%	4%	90%	0.0254
	Group 2		Post-2hr	-21%	-34%	-5%	0.0134	-7%	-28%	20%	0.5635	40%	3%	91%	0.0339
	Group 2		Post-3hr	-23%	-36%	-7%	0.0060	-4%	-26%	25%	0.7627	45%	6%	99%	0.0219
	Group 2	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 2		Post-0hr	-28%	-40%	-13%	0.0006	-4%	-26%	24%	0.7619	14%	-15%	52%	0.3934
	Group 2		Post-1hr	-10%	-26%	9%	0.2672	-4%	-27%	26%	0.7696	19%	-13%	64%	0.2748
	Group 2		Post-2hr	-16%	-31%	3%	0.0909	3%	-22%	35%	0.8471	20%	-14%	67%	0.2842
	Group 2		Post-3hr	-24%	-38%	-7%	0.0068	6%	-19%	39%	0.6551	1%	-28%	43%	0.9400
Mean Noise (tertiles)	Group 1	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 1		Post-0hr	-37%	-47%	-25%	0.0000	-32%	-46%	-14%	0.0015	15%	-11%	50%	0.2897
	Group 1		Post-1hr	-19%	-32%	-3%	0.0209	-17%	-35%	6%	0.1351	12%	-16%	48%	0.4348
	Group 1		Post-2hr	-14%	-28%	3%	0.0993	-8%	-28%	19%	0.5210	3%	-23%	38%	0.8502
	Group 1		Post-3hr	-12%	-27%	5%	0.1618	-5%	-26%	23%	0.7181	6%	-22%	42%	0.7223
	Group 1	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 1		Post-0hr	-23%	-35%	-8%	0.0049	0%	-23%	29%	0.9769	-5%	-28%	25%	0.7010
	Group 1		Post-1hr	-5%	-21%	15%	0.6177	-2%	-25%	28%	0.8773	0%	-26%	34%	0.9809
	Group 1		Post-2hr	-4%	-20%	16%	0.6839	9%	-17%	44%	0.5284	-5%	-30%	29%	0.7507
	Group 1		Post-3hr	-4%	-20%	17%	0.7028	16%	-12%	53%	0.2850	-16%	-39%	15%	0.2792
	Group 2	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 2		Post-0hr	-40%	-50%	-28%	0.0000	-40%	-53%	-22%	0.0001	71%	28%	127%	0.0003
	Group 2		Post-1hr	-28%	-40%	-13%	0.0008	-16%	-35%	10%	0.2064	39%	3%	87%	0.0322
	Group 2		Post-2hr	-25%	-39%	-9%	0.0039	-21%	-40%	4%	0.0966	49%	9%	105%	0.0125
	Group 2		Post-3hr	-25%	-38%	-8%	0.0067	-18%	-39%	8%	0.1593	68%	21%	134%	0.0020

	Group 2	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 2		Post-0hr	-27%	-41%	-8%	0.0078	-12%	-35%	21%	0.4422	41%	-1%	99%	0.0549
	Group 2		Post-1hr	-15%	-33%	7%	0.1670	0%	-28%	38%	0.9884	24%	-15%	79%	0.2603
	Group 2		Post-2hr	-16%	-34%	6%	0.1379	-6%	-33%	31%	0.7068	38%	-6%	103%	0.0972
	Group 2		Post-3hr	-17%	-35%	5%	0.1233	-1%	-29%	39%	0.9670	34%	-10%	99%	0.1457
	Group 3	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 3		Post-0hr	-35%	-48%	-19%	0.0001	-30%	-49%	-5%	0.0246	16%	-18%	62%	0.3981
	Group 3		Post-1hr	-14%	-32%	8%	0.1829	-9%	-34%	25%	0.5542	13%	-22%	62%	0.5188
	Group 3		Post-2hr	-25%	-41%	-6%	0.0139	-15%	-39%	18%	0.3320	4%	-28%	52%	0.8291
	Group 3		Post-3hr	-28%	-43%	-9%	0.0062	-11%	-36%	24%	0.4919	3%	-30%	51%	0.8890
	Group 3	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 3		Post-0hr	-21%	-35%	-4%	0.0189	2%	-22%	35%	0.8605	-5%	-29%	28%	0.7455
	Group 3		Post-1hr	1%	-18%	23%	0.9596	7%	-19%	43%	0.6257	0%	-27%	38%	0.9828
	Group 3		Post-2hr	-17%	-32%	2%	0.0832	1%	-24%	34%	0.9543	-4%	-31%	35%	0.8309
	Group 3		Post-3hr	-21%	-35%	-3%	0.0246	9%	-18%	44%	0.5659	-18%	-42%	15%	0.2519
Mean Noise (quartiles)	Group 1	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 1		Post-0hr	-36%	-46%	-24%	0.0000	-37%	-51%	-19%	0.0004	12%	-15%	46%	0.4253
	Group 1		Post-1hr	-18%	-32%	-2%	0.0337	-22%	-40%	0%	0.0545	10%	-18%	47%	0.5214
	Group 1		Post-2hr	-14%	-28%	4%	0.1215	-14%	-34%	12%	0.2709	-2%	-27%	32%	0.8799
	Group 1		Post-3hr	-10%	-25%	9%	0.2959	-15%	-35%	11%	0.2316	11%	-18%	51%	0.4988
	Group 1	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 1		Post-0hr	-23%	-36%	-7%	0.0080	-7%	-29%	21%	0.5887	6%	-20%	41%	0.6829
	Group 1		Post-1hr	0%	-18%	21%	0.9610	-8%	-30%	21%	0.5579	11%	-18%	50%	0.4935
	Group 1		Post-2hr	-3%	-20%	18%	0.7795	4%	-21%	38%	0.7713	4%	-24%	42%	0.8283
	Group 1		Post-3hr	1%	-18%	23%	0.9571	7%	-19%	42%	0.6293	-1%	-29%	36%	0.9280
	Group 2	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 2		Post-0hr	-36%	-49%	-19%	0.0002	-33%	-51%	-8%	0.0149	5%	-25%	49%	0.7600
	Group 2		Post-1hr	-25%	-41%	-6%	0.0143	-4%	-30%	33%	0.8219	-14%	-40%	22%	0.3951
	Group 2		Post-2hr	-27%	-42%	-7%	0.0124	-25%	-47%	6%	0.1075	-8%	-37%	34%	0.6693
	Group 2		Post-3hr	-25%	-42%	-3%	0.0301	-13%	-39%	25%	0.4489	-8%	-38%	37%	0.6739

	Group														
	Group 2	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 2		Post-0hr	-22%	-38%	-2%	0.0352	-2%	-30%	38%	0.9238	0%	-29%	42%	0.9888
	Group 2		Post-1hr	-9%	-28%	16%	0.4437	14%	-19%	61%	0.4410	-13%	-40%	25%	0.4434
	Group 2		Post-2hr	-17%	-35%	6%	0.1257	-9%	-37%	30%	0.6009	-2%	-33%	43%	0.9009
	Group 2		Post-3hr	-16%	-35%	8%	0.1681	10%	-23%	57%	0.6066	-19%	-45%	20%	0.3023
	Group 3	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 3		Post-0hr	-42%	-53%	-29%	0.0000	-35%	-51%	-14%	0.0029	101%	48%	173%	0.0000
	Group 3		Post-1hr	-23%	-38%	-5%	0.0164	-14%	-36%	15%	0.3024	71%	24%	137%	0.0013
	Group 3		Post-2hr	-22%	-37%	-4%	0.0195	-7%	-31%	24%	0.6197	83%	31%	154%	0.0004
	Group 3		Post-3hr	-25%	-39%	-7%	0.0086	-5%	-29%	27%	0.7339	84%	32%	157%	0.0004
	Group 3	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 3		Post-0hr	-30%	-46%	-9%	0.0068	-4%	-32%	34%	0.8002	91%	29%	182%	0.0012
	Group 3		Post-1hr	-6%	-28%	23%	0.6463	2%	-29%	46%	0.9106	73%	14%	162%	0.0102
	Group 3		Post-2hr	-13%	-34%	15%	0.3344	12%	-22%	61%	0.5339	93%	26%	197%	0.0027
	Group 3		Post-3hr	-16%	-36%	10%	0.1965	20%	-16%	71%	0.3097	63%	6%	152%	0.0269
	Group 4	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 4		Post-0hr	-33%	-49%	-14%	0.0024	-27%	-50%	5%	0.0921	-6%	-37%	38%	0.7395
	Group 4		Post-1hr	-22%	-41%	1%	0.0625	-11%	-39%	29%	0.5267	0%	-34%	52%	0.9815
	Group 4		Post-2hr	-25%	-43%	-2%	0.0365	-14%	-41%	26%	0.4307	-12%	-42%	35%	0.5635
	Group 4		Post-3hr	-32%	-48%	-11%	0.0059	-14%	-41%	26%	0.4352	-8%	-40%	43%	0.7188
	Group 4	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 4		Post-0hr	-20%	-35%	0%	0.0486	7%	-22%	46%	0.6751	-11%	-36%	23%	0.4782
	Group 4		Post-1hr	-6%	-24%	18%	0.6043	5%	-24%	45%	0.7558	2%	-28%	43%	0.9291
	Group 4		Post-2hr	-16%	-33%	6%	0.1382	4%	-25%	43%	0.8306	-7%	-35%	33%	0.7073
	Group 4		Post-3hr	-24%	-40%	-5%	0.0168	8%	-21%	50%	0.6203	-18%	-43%	19%	0.2882
Mean Noise (above and below 65 decibels)	Group 1	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 1		Post-0hr	-37%	-50%	-19%	0.0003	-41%	-58%	-17%	0.0025	59%	9%	131%	0.0161
	Group 1		Post-1hr	-14%	-33%	10%	0.2261	-19%	-43%	16%	0.2538	37%	-9%	105%	0.1264
	Group 1		Post-2hr	-28%	-44%	-7%	0.0112	-31%	-52%	-2%	0.0393	18%	-22%	79%	0.4365
	Group 1		Post-3hr	-18%	-36%	6%	0.1333	-22%	-45%	11%	0.1683	30%	-15%	98%	0.2216

	Group	Condition	Timepoint												
	Group 1	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 1		Post-0hr	-21%	-38%	2%	0.0656	-12%	-39%	26%	0.4739	21%	-18%	78%	0.3329
	Group 1		Post-1hr	5%	-19%	36%	0.7219	-4%	-33%	39%	0.8331	18%	-22%	78%	0.4389
	Group 1		Post-2hr	-19%	-38%	5%	0.1080	-19%	-44%	18%	0.2712	2%	-34%	56%	0.9288
	Group 1		Post-3hr	-10%	-31%	16%	0.4057	-5%	-35%	37%	0.7711	-5%	-39%	46%	0.8065
	Group 2	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 2		Post-0hr	-38%	-46%	-29%	0.0000	-33%	-45%	-19%	0.0000	29%	4%	59%	0.0215
	Group 2		Post-1hr	-23%	-33%	-12%	0.0003	-14%	-29%	5%	0.1332	17%	-7%	47%	0.1791
	Group 2		Post-2hr	-19%	-30%	-6%	0.0055	-10%	-26%	10%	0.3203	18%	-7%	50%	0.1701
	Group 2		Post-3hr	-21%	-32%	-8%	0.0026	-8%	-25%	13%	0.4163	23%	-4%	58%	0.1020
	Group 2	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 2		Post-0hr	-23%	-33%	-10%	0.0007	0%	-19%	22%	0.9744	-2%	-22%	23%	0.8599
	Group 2		Post-1hr	-6%	-19%	9%	0.4165	2%	-18%	26%	0.8833	1%	-21%	29%	0.9605
	Group 2		Post-2hr	-9%	-22%	7%	0.2487	7%	-14%	32%	0.5531	2%	-21%	32%	0.8664
	Group 2		Post-3hr	-14%	-26%	1%	0.0657	12%	-10%	38%	0.3133	-10%	-32%	17%	0.4177
Change in Cortisol (above and below median)	Group 1	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 1		Post-0hr	-35%	-44%	-25%	0.0000	-33%	-46%	-17%	0.0004	58%	23%	103%	0.0004
	Group 1		Post-1hr	-15%	-27%	-1%	0.0372	-14%	-31%	8%	0.1939	48%	13%	93%	0.0045
	Group 1		Post-2hr	-24%	-35%	-11%	0.0010	-24%	-39%	-4%	0.0199	41%	7%	87%	0.0152
	Group 1		Post-3hr	-22%	-34%	-8%	0.0031	-19%	-36%	3%	0.0798	52%	13%	103%	0.0052
	Group 1	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 1		Post-0hr	-15%	-33%	8%	0.1747	-2%	-30%	37%	0.8946	57%	6%	134%	0.0263
	Group 1		Post-1hr	14%	-11%	45%	0.3041	-1%	-30%	40%	0.9547	62%	5%	148%	0.0278
	Group 1		Post-2hr	-11%	-31%	15%	0.3718	-15%	-40%	21%	0.3742	48%	-5%	131%	0.0849
	Group 1		Post-3hr	-6%	-27%	22%	0.6450	-4%	-32%	37%	0.8262	46%	-7%	131%	0.1029
	Group 2	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 2		Post-0hr	-37%	-47%	-23%	0.0000	-26%	-44%	-2%	0.0359	5%	-24%	45%	0.7843
	Group 2		Post-1hr	-28%	-41%	-12%	0.0013	-5%	-28%	27%	0.7531	-5%	-33%	35%	0.7894
	Group 2		Post-2hr	-23%	-37%	-5%	0.0141	-1%	-26%	33%	0.9454	-7%	-36%	33%	0.6777
	Group 2		Post-3hr	-23%	-38%	-6%	0.0129	5%	-22%	41%	0.7483	-5%	-35%	38%	0.7748

	Group	Asthmatic	Time												
	Group 2	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 2		Post-0hr	-16%	-28%	-3%	0.0220	8%	-14%	37%	0.5019	4%	-20%	35%	0.7481
	Group 2		Post-1hr	-4%	-18%	13%	0.6291	10%	-14%	40%	0.4593	4%	-21%	39%	0.7675
	Group 2		Post-2hr	-10%	-24%	6%	0.2165	11%	-14%	42%	0.4198	-3%	-28%	31%	0.8262
	Group 2		Post-3hr	-8%	-22%	10%	0.3580	24%	-3%	59%	0.0836	-9%	-33%	25%	0.5725
Change in Cortisol (tertiles)	Group 1	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 1		Post-0hr	-42%	-51%	-32%	0.0000	-45%	-56%	-31%	0.0000	17%	-9%	50%	0.2307
	Group 1		Post-1hr	-24%	-35%	-10%	0.0017	-28%	-43%	-10%	0.0045	6%	-19%	38%	0.6951
	Group 1		Post-2hr	-25%	-37%	-11%	0.0011	-29%	-44%	-11%	0.0033	6%	-20%	40%	0.6899
	Group 1		Post-3hr	-27%	-39%	-13%	0.0004	-32%	-46%	-13%	0.0018	4%	-22%	38%	0.8145
	Group 1	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 1		Post-0hr	-32%	-45%	-17%	0.0001	-22%	-40%	2%	0.0676	-8%	-32%	25%	0.6002
	Group 1		Post-1hr	-8%	-25%	13%	0.4200	-16%	-36%	11%	0.2235	-3%	-30%	34%	0.8434
	Group 1		Post-2hr	-15%	-31%	5%	0.1239	-16%	-37%	10%	0.2007	-3%	-31%	35%	0.8367
	Group 1		Post-3hr	-20%	-35%	-1%	0.0359	-18%	-38%	8%	0.1529	-20%	-44%	13%	0.1957
	Group 2	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 2		Post-0hr	-34%	-46%	-20%	0.0000	-22%	-40%	2%	0.0734	67%	24%	125%	0.0008
	Group 2		Post-1hr	-20%	-35%	-3%	0.0262	6%	-20%	40%	0.6809	56%	13%	114%	0.0067
	Group 2		Post-2hr	-12%	-29%	8%	0.2243	14%	-15%	52%	0.3794	46%	4%	105%	0.0292
	Group 2		Post-3hr	-7%	-25%	15%	0.5176	26%	-6%	68%	0.1194	72%	21%	145%	0.0024
	Group 2	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 2		Post-0hr	-23%	-38%	-3%	0.0252	11%	-20%	53%	0.5304	32%	-7%	86%	0.1158
	Group 2		Post-1hr	-4%	-24%	21%	0.7236	25%	-11%	74%	0.2007	43%	-2%	108%	0.0635
	Group 2		Post-2hr	-1%	-23%	27%	0.9436	34%	-5%	89%	0.0918	33%	-11%	99%	0.1606
	Group 2		Post-3hr	3%	-20%	31%	0.8370	50%	7%	110%	0.0177	33%	-13%	103%	0.1909
	Group 3	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 3		Post-0hr	-28%	-42%	-9%	0.0049	-21%	-42%	8%	0.1371	23%	-14%	75%	0.2489
	Group 3		Post-1hr	-19%	-36%	3%	0.0860	-8%	-33%	28%	0.6345	3%	-29%	50%	0.8749
	Group 3		Post-2hr	-21%	-38%	0%	0.0496	-9%	-34%	27%	0.5860	3%	-30%	52%	0.8872
	Group 3		Post-3hr	-21%	-38%	0%	0.0514	0%	-28%	39%	0.9926	10%	-26%	64%	0.6395

	Group	Asthmatic	Time												
	Group 3	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 3		Post-0hr	-15%	-29%	2%	0.0746	12%	-13%	44%	0.3853	-3%	-27%	28%	0.8354
	Group 3		Post-1hr	-2%	-19%	18%	0.8142	9%	-16%	41%	0.5257	-5%	-30%	27%	0.7078
	Group 3		Post-2hr	-11%	-27%	7%	0.2169	8%	-17%	40%	0.5768	-6%	-31%	28%	0.6850
	Group 3		Post-3hr	-14%	-29%	5%	0.1393	19%	-8%	55%	0.1896	-15%	-38%	16%	0.3008
Change in Cortisol (quartiles)	Group 1	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 1		Post-0hr	-42%	-52%	-31%	0.0000	-43%	-55%	-27%	0.0000	6%	-19%	39%	0.6795
	Group 1		Post-1hr	-27%	-39%	-12%	0.0009	-31%	-46%	-11%	0.0049	-3%	-27%	30%	0.8447
	Group 1		Post-2hr	-21%	-34%	-5%	0.0145	-24%	-41%	-2%	0.0356	-1%	-26%	33%	0.9461
	Group 1		Post-3hr	-26%	-39%	-10%	0.0029	-31%	-47%	-9%	0.0078	-9%	-33%	23%	0.5310
	Group 1	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 1		Post-0hr	-31%	-44%	-16%	0.0003	-20%	-39%	6%	0.1166	-7%	-31%	26%	0.6583
	Group 1		Post-1hr	-10%	-27%	11%	0.3186	-19%	-39%	7%	0.1331	2%	-26%	40%	0.9054
	Group 1		Post-2hr	-12%	-29%	8%	0.2105	-14%	-35%	14%	0.2828	4%	-25%	44%	0.8229
	Group 1		Post-3hr	-19%	-34%	0%	0.0500	-17%	-38%	10%	0.1882	-16%	-40%	17%	0.2954
	Group 2	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 2		Post-0hr	-35%	-47%	-19%	0.0001	-30%	-49%	-5%	0.0219	104%	48%	183%	0.0000
	Group 2		Post-1hr	-7%	-25%	17%	0.5521	4%	-24%	43%	0.7981	75%	24%	147%	0.0016
	Group 2		Post-2hr	-20%	-36%	1%	0.0646	-11%	-36%	23%	0.4892	74%	21%	149%	0.0029
	Group 2		Post-3hr	-15%	-33%	8%	0.1754	2%	-27%	41%	0.9245	117%	51%	213%	0.0000
	Group 2	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 2		Post-0hr	-22%	-41%	2%	0.0672	-2%	-33%	46%	0.9390	81%	20%	172%	0.0050
	Group 2		Post-1hr	15%	-13%	53%	0.3282	21%	-19%	82%	0.3419	84%	19%	184%	0.0067
	Group 2		Post-2hr	-11%	-34%	19%	0.4225	1%	-33%	52%	0.9705	82%	16%	186%	0.0100
	Group 2		Post-3hr	-7%	-31%	25%	0.6158	21%	-20%	83%	0.3641	101%	26%	219%	0.0034
	Group 3	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 3		Post-0hr	-37%	-50%	-22%	0.0000	-29%	-48%	-4%	0.0288	12%	-20%	55%	0.5074
	Group 3		Post-1hr	-32%	-46%	-14%	0.0013	-10%	-35%	24%	0.5074	15%	-19%	63%	0.4451
	Group 3		Post-2hr	-24%	-40%	-3%	0.0265	-6%	-32%	31%	0.7154	1%	-30%	47%	0.9434
	Group 3		Post-3hr	-20%	-37%	2%	0.0714	2%	-26%	42%	0.8904	12%	-23%	64%	0.5579

	Group	Status	Time											
	Group 3	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 3		Post-0hr	-25%	-40%	-7%	0.0093	0%	-28%	38%	0.9797	-1%	-29%	38%	0.9358
	Group 3		Post-1hr	-16%	-33%	7%	0.1575	5%	-25%	47%	0.7927	20%	-16%	72%	0.3157
	Group 3		Post-2hr	-16%	-34%	8%	0.1739	6%	-25%	50%	0.7294	6%	-28%	56%	0.7548
	Group 3		Post-3hr	-12%	-31%	12%	0.2811	22%	-13%	71%	0.2474	3%	-31%	55%	0.8699
	Group 4	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 4		Post-0hr	-26%	-42%	-4%	0.0211	-17%	-42%	19%	0.3082	14%	-23%	67%	0.5163
	Group 4		Post-1hr	-15%	-35%	10%	0.2157	2%	-30%	48%	0.9278	-17%	-45%	25%	0.3658
	Group 4		Post-2hr	-16%	-36%	11%	0.2199	5%	-28%	53%	0.8070	-16%	-45%	28%	0.4081
	Group 4		Post-3hr	-16%	-36%	10%	0.2001	9%	-25%	59%	0.6535	-16%	-46%	29%	0.4202
	Group 4	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 4		Post-0hr	-12%	-28%	8%	0.2216	17%	-12%	57%	0.2848	0%	-26%	36%	0.9880
	Group 4		Post-1hr	4%	-16%	29%	0.6981	19%	-12%	60%	0.2622	-13%	-37%	20%	0.3955
	Group 4		Post-2hr	-7%	-25%	16%	0.5286	18%	-13%	61%	0.2793	-12%	-37%	23%	0.4472
	Group 4		Post-3hr	-9%	-27%	14%	0.4111	30%	-5%	77%	0.0963	-23%	-45%	10%	0.1477
Change in Cortisol (positive or negative)	Group 1	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 1		Post-0hr	-29%	-45%	-9%	0.0066	-31%	-52%	-2%	0.0367	19%	-22%	80%	0.4252
	Group 1		Post-1hr	-18%	-36%	6%	0.1283	-28%	-50%	3%	0.0699	20%	-23%	86%	0.4226
	Group 1		Post-2hr	-26%	-42%	-4%	0.0237	-32%	-53%	-2%	0.0364	7%	-32%	68%	0.7781
	Group 1		Post-3hr	-21%	-39%	4%	0.0892	-31%	-53%	0%	0.0526	0%	-38%	61%	0.9910
	Group 1	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 1		Post-0hr	-6%	-30%	25%	0.6474	4%	-31%	56%	0.8593	-5%	-42%	56%	0.8484
	Group 1		Post-1hr	2%	-24%	37%	0.9002	-18%	-46%	24%	0.3508	6%	-37%	78%	0.8295
	Group 1		Post-2hr	-14%	-36%	17%	0.3295	-18%	-46%	24%	0.3434	-10%	-47%	53%	0.6910
	Group 1		Post-3hr	-5%	-31%	29%	0.7237	-13%	-43%	34%	0.5285	-25%	-57%	31%	0.3091
	Group 2	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 2		Post-0hr	-37%	-45%	-28%	0.0000	-30%	-43%	-15%	0.0006	41%	12%	79%	0.0044
	Group 2		Post-1hr	-20%	-31%	-8%	0.0023	-4%	-23%	18%	0.6691	28%	-1%	66%	0.0562
	Group 2		Post-2hr	-22%	-33%	-10%	0.0011	-11%	-28%	11%	0.2895	26%	-3%	65%	0.0883
	Group 2		Post-3hr	-23%	-34%	-10%	0.0010	-5%	-23%	19%	0.6736	38%	5%	81%	0.0228

	Group	Status	Time												
	Group 2	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 2		Post-0hr	-17%	-29%	-4%	0.0139	5%	-16%	32%	0.6525	14%	-12%	47%	0.3231
	Group 2		Post-1hr	-1%	-16%	16%	0.8741	9%	-14%	38%	0.4601	13%	-14%	50%	0.3721
	Group 2		Post-2hr	-10%	-24%	6%	0.1999	7%	-16%	36%	0.5863	6%	-21%	43%	0.6869
	Group 2		Post-3hr	-8%	-22%	9%	0.3320	21%	-5%	53%	0.1215	3%	-24%	41%	0.8320
Season	Group 1	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 1		Post-0hr	-33%	-43%	-22%	0.0000	-38%	-50%	-24%	0.0000	32%	4%	68%	0.0251
	Group 1		Post-1hr	-13%	-26%	2%	0.0858	-14%	-31%	7%	0.1727	14%	-12%	48%	0.3047
	Group 1		Post-2hr	-21%	-33%	-7%	0.0050	-26%	-40%	-7%	0.0084	16%	-11%	52%	0.2678
	Group 1		Post-3hr	-20%	-33%	-6%	0.0070	-24%	-39%	-5%	0.0184	26%	-4%	67%	0.0991
	Group 1	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 1		Post-0hr	-17%	-30%	-2%	0.0299	-8%	-27%	16%	0.4955	1%	-22%	32%	0.9404
	Group 1		Post-1hr	7%	-10%	28%	0.4490	3%	-19%	31%	0.8042	-2%	-26%	31%	0.8962
	Group 1		Post-2hr	-13%	-27%	4%	0.1358	-14%	-32%	10%	0.2209	1%	-25%	36%	0.9555
	Group 1		Post-3hr	-14%	-28%	2%	0.0848	-8%	-28%	17%	0.4771	-8%	-32%	26%	0.6133
	Group 2	Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 2		Post-0hr	-42%	-51%	-32%	0.0000	-30%	-44%	-12%	0.0020	35%	4%	76%	0.0246
	Group 2		Post-1hr	-31%	-42%	-18%	0.0000	-16%	-33%	7%	0.1541	28%	-3%	70%	0.0854
	Group 2		Post-2hr	-19%	-32%	-3%	0.0194	5%	-18%	33%	0.7152	21%	-10%	62%	0.2144
	Group 2		Post-3hr	-19%	-32%	-3%	0.0225	8%	-15%	38%	0.5173	22%	-10%	66%	0.1948
	Group 2	Non-Asthmatic	Pre-Commute	0%	0%	0%		0%	0%	0%		0%	0%	0%	
	Group 2		Post-0hr	-29%	-40%	-16%	0.0001	5%	-17%	33%	0.7060	3%	-21%	35%	0.8009
	Group 2		Post-1hr	-15%	-29%	1%	0.0621	1%	-21%	29%	0.9377	10%	-17%	46%	0.5118
	Group 2		Post-2hr	-11%	-25%	7%	0.2166	21%	-5%	55%	0.1283	5%	-22%	41%	0.7689
	Group 2		Post-3hr	-13%	-27%	5%	0.1436	30%	2%	67%	0.0367	-11%	-34%	22%	0.4794