(0.4%–1.3%) per 20 $\mu g/m^3$ increase in PM_{10} and 0.9% (0.4%–1.4%) per 12 $\mu g/m^3$ increase in BS. Ten papers provided information on multi-pollutant models, 4 of which provided only qualitative information. In all 4 papers, as well as in 3 of 4 papers that provided quantitative results for PM_{10} adjusted for BS (and vice versa), the effect of BS was suggested to be more robust.

Conclusion: Single pollutant effect estimates for daily mortality or hospital admissions were similar for BS and PM_{10} when expressed per IQR. Limited evidence from multi-pollutant models suggests that the effect of BS/EC may be more robust. As traffic-related policy measures will result in larger reductions in BS, relative to reductions in PM mass, estimated health benefits of such measures will be larger when expressed per achievable reductions in BS.

PP-29-045

Effect of Ozone and Nitrogen Dioxide in Mixture on Lead Availability From Lead-based Paints

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Background/Aims: Much research has focused on sources of household lead exposure, but little has addressed the environmental drivers and mechanisms that promote lead paint deterioration and influence environmental lead availability. We report the effects of nitrogen dioxide (NO_2) and ozone, in combination, on surface lead availability from lead paint.

Methods: We performed chamber experiments exposing alkyd low gloss leaded paint to 3 mixtures of ozone and NO_2. Laboratory results were then combined with photochemical air quality modeling to identify areas in the South Coast Air Basin of California (SoCAB) that may have been historically more susceptible to atmospherically driven paint degradation. In addition, the results of the model can be used to prioritize regions currently posing higher deterioration risk.

Results: Relative to unexposed controls, surfaces exposed to 6 ppm NO_2/10 ppm ozone showed a 21.3 ± 12.0 fold increase in lead loading ($P < 0.001$), while experiments of 9 ppm NO_2/11.5 ppm ozone and 10.5 ppm NO_2/5 ppm ozone reported fold increases of 240.1 ± 77.4.0 ($P < 0.001$) and 506.4 ± 168.4 ($P < 0.001$), respectively. Lead availability was strongly influenced by NO_2 concentration, potentially due to the indoor reaction of NO_2 and ozone to form nitrate radicals and promote production of nitric acid which degrades paint binder, the paint constituent responsible for encapsulating the lead. Surface color was also measured and showed systematic lightening and yellowing as a result of exposure. Photochemical air quality modeling was performed using average and extreme pollutant scenarios from the 1970s, 1980s, and 1990's, and suggest that large regions of SoCAB were susceptible to paint deterioration resulting from photochemical atmospheric pollutants.

Conclusion: This deterioration mechanism may be influential in some rapidly industrializing countries where lead paints are still manufactured and high levels of ozone and NO_2 coexist in areas with a high prevalence of leaded paints.

PP-29-046

Longitudinal Lung Function Effects of Particulate Matter in Children With Cystic Fibrosis

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Background/Aims: Chronic exposure to ambient-source particulate matter (PM) is associated with decreased lung function growth in healthy children. Children with cystic fibrosis (CF) have decreased lung function and decreased lung function growth, compared to normal children, and may be highly susceptible to the adverse chronic effects of air pollution exposure.

Methods: Data were obtained from the Cystic Fibrosis Foundation Patient Registry. Included were Caucasian children 6–18 years of age with at least 1 spirometry measure from 1994 to 2006. Ambient levels of PM less than 2.5 μm in diameter ($PM_{2.5}$) and less than 10 μm in diameter (PM_{10}) were obtained from the US Environmental Protection Agency and estimated using year 2000 annual average concentration at the closest population-based monitor within 30 miles of the patient's home zip code centroid. FVC and FEV1 were regressed on age-adjusted height, age, year of birth (cohort effect), and 2-way interactions, using linear spline models including cross-sectional effects at age 6, stratified by gender.

Results: A total of 5204 (54.0%) patients lived within 30 miles of a $PM_{2.5}$ monitor and 2892 (30.2%) lived within 30 miles of a PM_{10} monitor. Annual average $PM_{2.5}$ ranged from 5.5 to 28.2 $\mu g/m^3$ for males and 3.8–28.2 $\mu g/m^3$ for females. PM_{10} annual average ranged from 12.2–52.0 $\mu g/m^3$ for males and 12.2–83.2 $\mu g/m^3$ for females. A 10 $\mu g/m^3$ increase in $PM_{2.5}$ exposure was associated with a 10.10mL/yr (95% CI: −19.93, −0.32) decrement in FEV1 for males and 10.10 mL/yr (95% CI: −18.29, −1.91) in females. 10-year trend due to cohort effect was associated with a 5.91mL/yr (95% CI: −2.20, 14.02) and a 7.02 mL/yr (95% CI: 0.13, 13.90) increase in FEV1 in males and females, respectively. A 10 $\mu g/m^3$ increase in PM_{10} was not found to be significantly associated with reduced lung function growth.

Conclusion: Chronic exposure to ambient $PM_{2.5}$ is associated with decreased lung function growth in children with cystic fibrosis. This effect is greater than the increase in FEV1 and FVC associated with longitudinal treatment trends.

PP-29-047

Air Quality Impacts of Higher Gas Prices in Atlanta, Georgia During 2006–2008

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Background/Aims: Vehicle miles traveled (VMT), a substantial contributor to air pollution in urban areas, has been rising steadily in the United States for several decades. In 2008, gas price increased by 25%–30% across the United States and many urban areas observed VMT reductions of 3%–5% compared with 2006. This study sought to determine if elevated gas prices were associated with reduced traffic-related air pollution in Atlanta, Georgia.

Methods: The daily average gas price (USD/gallon of unleaded gasoline) and ambient concentrations of carbon monoxide (CO), nitrogen oxides (NO_x), and fine particulate matter ($PM_{2.5}$) were obtained for 5 metropolitan Atlanta counties during 2006–2008; daily VMT was obtained during 2007–2008. Generalized estimating equations with an autoregressive correlation structure were used to model gas price as predictor of VMT using different lags and to model gas price as a predictor of pollutant concentrations, controlling for various temporal and meteorological variables.

Results: The association between gas price and VMT was strongest using an 11-day lag. In unadjusted analyses, gas price was negatively associated with CO and NO_x and positively associated with $PM_{2.5}$ ($P < 0.001$). Controlling for year and temperature, a 10% increase in gas price was associated with a 7% decrease in CO ($P = 0.002$) and 8% decrease in NO_x ($P = 0.13$) concentrations 11 days later; adjusted association with $PM_{2.5}$ was not significant. Results varied according to the degree of control for temporal variables. Issues related to choice of the most appropriate model will be discussed.

Conclusion: These preliminary data show an association between higher gas price and lower concentrations of traffic-related pollutants in

