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Statement of support for the Pennsylvania Clean Vehicles Program

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My name is Ken Brown and I am a retired physician, born in Erie, Pennsylvania, and a graduate of the University of Pennsylvania School of Medicine. Except for 4 years away at college in Illinois, 6 months in Pensacola in the US Navy, 3 years in San Diego, California, as a faculty member, 3 years in Ethiopia as a medical missionary and medical school faculty member, my professional career has been in Pennsylvania. My first encounter with air that was difficult to breathe was in California, when I went to Los Angeles in 1969 for the first time; it was to take an oral exam to practice medicine. When I arrived in downtown LA I was struck by the fact that I was short of breath and my eyes watered. My wife later reminded me that whenever I went out to cut the grass in San Diego, I was similarly affected.

After about three years we moved to Ethiopia in 1972 where the air for the most part was much cleaner. The main exception to this was in the homes or tukuls, which were the round huts made of poles bound together and covered with grasses. Inside, the families made a fire in the center and at night the children were allowed to sleep closest to the fire. This practice led to many burns and to an unacceptable incidence of lung disease.

It is on behalf of all Pennsylvanians but especially the children and the elderly of Pennsylvania that I requested this opportunity to ask for your strong **support of the implementation**, rather than the rolling back of the Pennsylvania Clean Vehicles Program. I attempted to read through the law which provides the basis for the implementation of practices that will better protect the air for our children and their children without substantial cost or inconvenience to the people who live in or visit Pennsylvania. I realized that I was not prepared to cope with all of the details, dates for implementation, etc. I will leave those to attorneys and others who have written the law and those who must implement it.

However, I believe that I understand enough of the law and its regulations as interpreted by those who must enforce it, to make the following comments:

The direct and indirect negative health effects of tailpipe emissions on human health are clear. These are not speculative, but well established cause and effect relationships. While some of the human data are best derived from epidemiologic studies only, there is a substantial body of data from animal studies that correlates well with the conclusions from studies in humans.

Thus, we know that when hydrocarbons [gasoline or petrodiesel fuel] are burned under pressure in the 'otto' engine, the standard 4 cycle internal combustion engine, the tailpipe emits the following chemicals or classes of chemicals that include but are not limited to:

Carbon dioxide Carbon monoxide
Oxides of nitrogen, known as NOX
Particulates of varying composition, known as PM
Volatile organic compounds known as VOC
Unburned hydrocarbons
Sulfur dioxide

The interaction of some of these tailpipe emissions in the presence of ultraviolet light [as sunlight] produces ozone.

Ozone at the proper altitude is an important filter for keeping harmful UV radiation from the earth. However when present in the air we breathe, ozone and products of combustion mentioned above combine to cause injury to various tissues of the respiratory tree and lungs and act as important triggers to asthma. In addition to asthma, ozone and PM contribute to other cardiovascular and cardio respiratory disease. Although there are many studies to support the need to do everything we can to keep ozone and PM levels down, I will summarize one such study and allude to two others that direct our attention to the need for the **full implementation** of the Pennsylvania Clean Vehicles Program. At then end of this testimony you will find abstracts of these studies containing the key data and conclusions.

To implement more convenient transportation and facility use and for better security for the 1996 Olympic games in Atlanta, that city chose to close down altogether some areas ordinarily available for vehicular traffic. The CDC [Centers for Disease Control and Prevention] used this opportunity to look for any possible correlation between automobile use, air quality, and the incidence of visits to hospital for the treatment of acute asthma attacks. The **control period** was 4 weeks before and 4 weeks after the games; the **active study period** [during the Games] was 17 days during which all but essential vehicular traffic was kept out of the restricted study zone [Reference 1].
The study demonstrated that during the Games visits for asthma-related events in children 16 years of age and younger decreased by 44.1%, 41.6%, 19.1% and 11.1% respectively in the four study sites, compared to their experiences in the control periods. By providing an enlarged area free of the usual vehicular traffic, the city was able to lower ambient ozone levels significantly and provide an important demonstration of the health benefits associated with those changes in ozone levels.

There are additional useful data that link higher PM 10 levels to both a higher incidence of admissions to hospital for **congestive heart failure** to hospital [Reference 2], and in a separate study [Reference 3], to an increase of **ischemic strokes** [caused by narrowed arteries or blood clots, not by bleeding]. The potential benefits to the health of our citizens by improving air quality are not insignificant or inconsequential. Why should something as simple and generally beneficial as improving air quality under existing law and current regulation be under debate?

There are two ways to insure the intended health benefits for Pennsylvanians by lowering harmful automobile emissions: decrease the number of vehicles on the road or require that the vehicles licensed for our roads emit lower levels of and fewer toxic gases and particles. For this we ask for your support-on behalf of our parents, our children, and their children.

Thank you for your attention to this import health matter.

"You can buy a "cleaner" car, but you cannot buy a "cleaner" pair of lungs"

References:
1. JAMA. 2001 Feb 21;285(7):897-905. Related Articles, Links

Impact of changes in transportation and commuting behaviors during the 1996 Summer Olympic Games in Atlanta on air quality and childhood asthma.

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CONTEXT: Vehicle exhaust is a major source of ozone and other air pollutants. Although high ground-level ozone pollution is associated with transient increases in asthma morbidity, the impact of citywide transportation changes on air quality and childhood asthma has not been studied. The alternative transportation strategy implemented during the 1996 Summer Olympic Games in Atlanta, Ga, provided such an opportunity. OBJECTIVE: To describe traffic changes in Atlanta, Ga, during the 1996 Summer Olympic Games and concomitant changes in air quality and childhood asthma events. DESIGN: Ecological study comparing the 17 days of the Olympic Games (July 19-August 4, 1996) to a baseline period consisting of the 4 weeks before and 4 weeks after the Olympic Games. SETTING AND SUBJECTS: Children aged 1 to 16 years who resided in the 5 central counties of metropolitan Atlanta and whose data were captured in 1 of 4 databases. MAIN OUTCOME MEASURES: Citywide acute care visits and hospitalizations for asthma (asthma events) and nonasthma events, concentrations of major air pollutants, meteorological variables, and traffic counts. RESULTS: During the Olympic Games, the number of asthma acute care events decreased 41.6% (4.23 vs 2.47 daily events) in the Georgia Medicaid claims file, 44.1% (1.36 vs 0.76 daily events) in a health maintenance organization database, 11.1% (4.77 vs 4.24 daily events) in 2 pediatric emergency departments, and 19.1% (2.04 vs 1.65 daily hospitalizations) in the Georgia Hospital Discharge Database. The number of nonasthma acute care events in the 4 databases changed -3.1%, +1.3%, -2.1%, and +1.0%, respectively. In multivariate regression analysis, only the reduction in asthma events recorded in the Medicaid database was significant (relative risk, 0.48; 95% confidence interval, 0.44-0.86). Peak daily ozone concentrations decreased 27.9%, from 81.3 ppb during the baseline period to 58.6 ppb during the Olympic Games ($P<.001$). Peak weekday morning traffic counts dropped 22.5% ($P<.001$). Traffic counts were significantly correlated with that day's peak ozone concentration (average $r = 0.36$ for all 4 roads examined). Meteorological conditions during the Olympic Games did not differ substantially from the baseline period. CONCLUSIONS: Efforts to reduce downtown traffic congestion in Atlanta during the Olympic Games resulted in decreased traffic density, especially during the critical morning period. This was associated with a prolonged reduction in ozone pollution and significantly lower rates of childhood

asthma events. These data provide support for efforts to reduce air pollution and improve health via reductions in motor vehicle traffic.

2: Am J Cardiol. 2006 Feb 1;97(3):404-8. Related Articles, Links

Particulate air pollution and hospital admissions for congestive heart failure in seven United States cities.

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The association between short-term elevations in ambient particulate air pollution and increased cardiovascular morbidity and mortality is well documented. Ambient particles may also trigger acute decompensation in patients with congestive heart failure (CHF), but this hypothesis has not been evaluated in a systematic manner. This study evaluated the association between daily levels of respirable particulate matter of aerodynamic diameters < or =10 microm (PM10) and the rate of hospitalization from the emergency room for CHF in Medicare recipients (age > or = 65 years) in 7 United States cities from 1986 and 1999. The time-stratified case-crossover design was used to separately estimate the effect of a 10 microg/m3 increase in PM10 in each city. A combined random-effects estimate was then obtained from the city-specific effect estimates. There were 292,918 admissions with primary diagnoses of CHF during the observation period. Overall, a 10 microg/m3 increase in PM10 was associated with a 0.72% (95% confidence interval 0.35% to 1.10%) increase in the rate of admission for CHF on the same day. The effect of PM10 appeared to be less in patients with secondary diagnoses of hypertension. There was no consistent effect modification by age, gender, race, or any other secondary diagnosis evaluated. In conclusion, these results support the hypothesis that elevated levels of particulate air pollution, below the current limits set by the United States Environmental Protection Agency, are associated with an increase in the rate of hospital admission for exacerbation of CHF.

Related Articles, Links

3: Stroke. 2005 Dec;36(12):2549-53. Epub 2005 Oct 27.

Air pollution and hospital admissions for ischemic and hemorrhagic stroke among medicare beneficiaries.

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BACKGROUND AND PURPOSE: The association between short-term elevations in ambient air particles and increased cardiovascular morbidity and mortality is well documented. Ambient particles may similarly increase the risk of stroke. METHODS: We evaluated the association between daily levels of respirable particulate matter (aerodynamic diameter < or =10 microm, PM10) and hospital admission for ischemic and hemorrhagic stroke among Medicare recipients (age > or =65 years) in 9 US cities using a 2-stage hierarchical model. In the first stage, we applied the time-stratified case-crossover design to estimate the effect of PM10 in each city. We used a 3-day unconstrained, distributed lag model to simultaneously estimate the effect of PM10 0 to 2 days before the admission day and controlled for meteorological covariates in all of the models. In the second stage, we used random-effects metaanalytic techniques to combine the city-specific effect estimates. RESULTS: Ischemic (n=155,503) and hemorrhagic (19,314) stroke admissions were examined separately. For ischemic stroke, an interquartile range increase in PM10 was associated with a 1.03% (95% CI, 0.04% to 2.04%) increase in admissions on the same day only. Similar results were observed with CO, NO2, and SO2. For hemorrhagic stroke, no association was observed with any pollutant 0 to 2 days before admission. CONCLUSIONS: These results suggest that elevations in ambient particles may transiently increase the risk of ischemic, but not hemorrhagic, stroke. Studies with more accurate assessment of timing of stroke onset are necessary to confirm or refute these findings.

4. The following website illustrates changes in air quality over the course of a day for a single region [EPA data].

http://cfpub.epa.gov/airnow/index.cfm?action=airnow.showmap&pollutant=OZONE&domain=bw&map=archives&date=7/21/2005&standard=US&language=EN