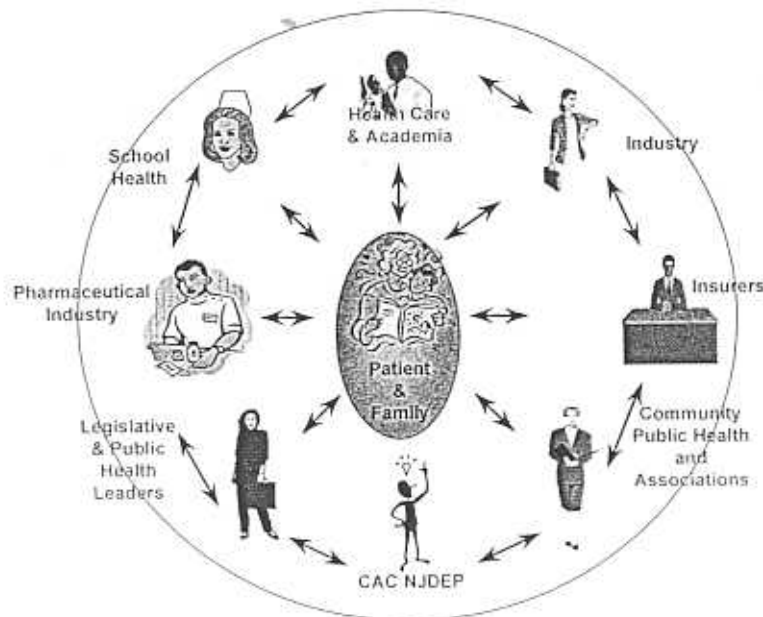


# AIR POLLUTION - EFFECTS ON PUBLIC HEALTH, HEALTH CARE COSTS, AND HEALTH INSURANCE COSTS



New Jersey Clean Air Council  
2005 Annual Public Hearing  
Report

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**AIR POLLUTION - EFFECTS ON PUBLIC HEALTH, HEALTH  
CARE COSTS, AND HEALTH INSURANCE  
COSTS**

Public Hearing April 13, 2005

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**"Clean Air is a Gift, Not a Commodity" Reverend Fletcher Harper**

**"The more we know about controlling and avoiding asthma triggers, the more we  
can prevent asthma and asthma attacks," EPA Administrator Steve Johnson.**

Report Editor: Linda J. Bonanno, Ph.D.

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## **SCOPE**

In the past 30 years, New Jersey has made significant progress in reducing ambient air pollution. However, scientific evidence indicates that additional reductions in ambient air pollution are necessary to protect the health of those who live and work in New Jersey. Scientists and economists are now working together to show that air pollution not only causes adverse health effects but increases the costs of health care, which in turn has an unfavorable impact on the economy which adversely affects the individual, employers, taxpayers and the state of New Jersey. This adverse economic impact is partly due to the cost of health care associated with treating conditions caused or aggravated by air pollution, such as lost school and work days, lost productivity, and citizens having to use the hospital systems because they do not have health care coverage.

New Jersey's Clean Air Council (Council) held a public meeting on April 13, 2005 to solicit testimony from the scientific community and the public to assist the Council when it advises the Commissioner of the New Jersey Department of Environmental Protection (NJDEP) and New Jersey legislators on air pollution control matters. After considering the testimony received at the April 13, 2005 hearing, the Council prepared this report to serve as an advisory document to the NJDEP, the NJDEP Commissioner and state legislators.

## **BACKGROUND**

Scientific research over the past three decades has found associations between poor air quality and increased incidence of adverse health effects, e.g., asthma attacks, heart attacks, and premature death. Many studies have demonstrated the positive association between Particulate Matter (PM) and mortality (Dockery DW et al., 1993; Pope CA et al., 2002; Samet JM et al., 2000; Schwartz J., 2002). Morbidity has also been found to be positively associated with pollutant levels. For instance, Pope et al., 1999, found heart rate variability to be associated with particulate air pollution. Other cardio-pulmonary effects that have been linked to ambient levels of air pollution include myocardial infarction (Peters A et al., 2001), cardiac dysrhythmias, coronary atherosclerosis, pulmonary heart disease (Koken PJM et al., 2003) and changes in plasma viscosity (Peters A et al., 1997). Other adverse health effects include hospital admissions for heart and lung disease (Zanobetti A et al., 2000), acute respiratory visits to the hospital (Sinclair and Tolsma, 2004), adverse respiratory and cardiovascular effects for sensitive subpopulations (Brauer M et al., 2001), bronchitic symptoms (McConnell R et al., 1999), and asthma emergency room visits (Jaffe DH et al., 2002). Emerging research has also demonstrated decrements in the lung function of children who are exposed to ambient levels of air pollution (Gauderman et al., 2000, Avol EL et al., 2001). Additionally, scientists have found air pollution levels to be directly related to adverse birth outcomes such as low birth weight and length (Perera FP et al., 2003), preterm birth, and fetal death (Vassilev ZP et al., 2001).

Recently, the U.S. Environmental Protection Agency (USEPA) issued a report, "EPA's Asthma Research Results Highlights" (<http://www.epa.gov/ord/asthma>). The USEPA reported that exposure to air pollutants such as ground-level ozone can put both children and adults at a greater risk of developing asthma; people with asthma are more severely affected by ozone and

particulate matter than are people without the disease; and children may develop allergies that are strongly associated with asthma due to exposure to metals (such as copper and zinc which are found in particulate matter) and to pollutants such as ozone, particulate matter, carbon monoxide, nitrogen oxides, sulfur dioxide, and lead at levels below the National Ambient Air Quality Standards (NAAQS). In New Jersey it is estimated that: between 341,000 and 449,000 adults in New Jersey currently suffer from asthma; asthma hospitalizations represent about 1 in every 100 hospitalizations; between 1985 and 1999, the asthma hospitalization rate increased in the population under five years of age by almost 12%; in 1999 black non-Hispanic and Hispanic residents accounted for over half of all the hospital admissions for asthma (NJDHSS, 2/2003).

The association between poor air quality and adverse health effects is a significant public health issue, causing increased financial burdens on our economy, the individual, the employer and the State. For example, people who become sick or sicker due to poor air quality need medical care, the cost of which is constantly rising. These rising health care costs increase premiums for health insurance, which cut into personal income/spending and into profits for individuals and businesses. Furthermore, businesses experience declining productivity when employees miss work due to illnesses caused by poor air quality or when employees have to take time off to care for their children who are adversely impacted by polluted air. In addition, when employees suffer from long-term disabilities caused or worsened by polluted air, the costs of worker's compensation, liability and health care all increase, putting a further strain on business resources.

In part, because of the increased economic burden from air pollution on New Jersey businesses, fewer businesses are able to provide adequate health insurance for their workers. New Jersey has more than two million people under the age of 65 who lack health insurance. These citizens must then use New Jersey hospitals as their primary care facility. In addition, because they lack primary care, their health may worsen, which then sends them back to the hospitals. Such use of hospitals for primary care strains the state's budget and costs New Jersey taxpayers.

The link between poor air quality, adverse health effects and increased financial burden on all New Jersey citizens is illustrated by Environmental Justice communities. These communities are often located in our urban centers which experience higher levels of pollution due to the close proximity of numerous point, area and mobile sources of air pollution, in addition to the background levels of air pollutants such as ozone and PM that the rest of the state experiences. The NJDEP and USEPA define Environmental Justice as the fair treatment and meaningful involvement of all people regardless of race, color, national origin or income with respect to the development, implementation and enforcement of environmental laws, regulations and policies (<http://www.epa.gov/compliance/basics/ej.html>). Environmental Justice is a concept that addresses, in a crosscutting and integrative manner, the physical and social health issues related to the distribution of environmental benefits and burdens among populations, particularly in degraded and hazardous physical environments occupied by minority or disadvantaged populations. These urban areas, i.e., Environmental Justice communities, are home to many low-income people who do not have health insurance because they can not afford it and /or their employers no longer offer it. These communities are most in need of having breathable air that will not exacerbate existing illnesses or cause them to become ill. They are also the most likely to use hospitals to deal with their illnesses.

The State Department of Health data indicates that charity care reimbursements are increasing. From 2001 to 2004, there was a 30 million dollar per year increase. The State Fiscal Year 2005 allocated \$539,000,000 for charity care, which is only about half of the costs incurred by hospitals that provide charity care. The Environmental Working Group (EWG) released a report "California Schools and Ozone" (<http://www.ewg.org/reports/CASchoolsOzone/part4.php>) which estimated that for California, the total economic cost for some smog-related illnesses tops \$521 million per year. The Clean Air Task Force (CATF) estimated that the cost to society for health damages would total \$139 billion nationwide in the year 2010 from diesel particulate alone. Wong et al., 2004, estimated an approximate \$50 million savings nationwide from the reduction of asthma hospitalizations and emergency room visits by meeting the current ozone standard. Although these estimates rely on various assumptions and conditions, they illustrate how the price of adverse health effects from exposure to air pollution is very costly to society. Prevention of air pollution and corresponding protection of the public from conditions caused or exacerbated by air pollution will yield a return on the investment of environmental regulation through the reduction in charity care costs on the health care system.

## **RECOMMENDATIONS**

**The Council has discussed and reflected on the matters of concern to New Jersey's public health and economy that are outlined in the background section. After much consideration, the Council has arrived at the following recommendations for the NJDEP and its Commissioner:**

### **Public Awareness, Outreach and Education**

1989. General: School programs for the prevention, screening and treatment of asthma have been effective, and the formation of additional programs should be encouraged.
1990. General: The New Jersey Department of Environmental Protection's compliance assistance initiatives have been very effective, especially when coupled with the NJDEP outreach activities. These initiatives should be continued as long as they continue to improve air quality and the NJDEP has resources available.
1991. General: New Jersey should continue to encourage energy conservation in all appropriate areas. Energy efficient motor vehicles should be encouraged, along with increased public outreach to educate the public on the important impact of personal choice on energy efficiency and conservation.
1986. Specific: The Council supports the development of "**Health Alerts**" through the University of Medicine and Dentistry of New Jersey (UMDNJ) in cooperation with the NJDEP and New Jersey Department of Health and Senior Services (NJDHSS) by using the existing UMDNJ Asthma and Allergy Research Center to expand the existing daily media announcements on pollen and mold to include ozone and the pollution index developed by the NJDEP.

## **Indoor Air Quality**

5. General: Support appropriate legislation and initiatives on a smoking ban for all public places and all places of employment.
6. Specific: The Public Employees Occupational Safety and Health (PEOSH) program should be given additional financial, personnel and technical resources to investigate air quality complaints in governmental buildings.

1984. General: Indoor air quality appears to remain a large, inadequately addressed human health issue, both in the private and public sector. The Council supports the NJDEP Air Quality Workshop on June 29, 2005. At this workshop, emissions from varied sources of combustion such as wood burning, space heating and cooking smoke for homes and restaurants in addition to energy efficiency will be discussed by NJDEP, NJDHSS and New Jersey Department of Community Affairs (NJCA) staff. They will develop recommendations on how best to achieve emissions reductions. The Council recommends that additional governmental strategies and initiatives be developed to further address indoor air quality and energy efficiency. State and local agencies, e.g., NJDEP, NJDHSS, UMDNJ, NJCA, local and county health departments, should unite in an effort to assure the availability of public outreach and education as well as quality diagnostic and remedial services which rely heavily on the private market place.

## **Diesel Exhaust Reduction**

1985. General: The Council is convinced that unfiltered diesel exhaust is a significant source of harmful air pollution. The Council strongly supports practical, implementable legislation that would reduce diesel exhaust from mobile sources.
1986. Specific: Regulations which control the idling of diesel trucks and buses should be enforced rigorously, and special attention should be paid to the idling of school buses when loading and unloading passengers.

## **Health and the Environment**

1987. General: The Council strongly supports efforts that would accurately quantify the costs and benefits of environmental protection.
1988. Specific: Expand the existing statewide asthma directory with appropriate collaborations between NJDHSS, NJDEP and academia, e.g., UMDNJ.
1989. Specific: The Council continues to be in favor of “cap and trade” programs, as long as they are in compliance with all applicable regulations. However, the Council believes that while these programs may be acceptable for common pollutants such as

sulfur dioxide (SO<sub>2</sub>), carbon dioxide (CO<sub>2</sub>) and nitrogen oxides (NO<sub>x</sub>), they are not appropriate for hazardous air pollutants such as mercury, where without protections against local negative impacts, hotspots may be the result of a trading program.

### **Partnerships**

1990. General: The NJDEP **and** NJDHSS need to continue and expand their cooperative effort to investigate the impacts of air quality on public health.
1991. Specific: Interstate transport is an important contributor to New Jersey's air pollution problems. Interstate cooperation, such as is provided by the Ozone Transport Commission and by the joint efforts of the attorneys general of several states, has been very fruitful and such interstate activity is strongly supported by the Council.
15. Specific: The Medical Society of New Jersey should be asked to participate in NJDEP and NJDHSS initiatives to provide a conduit to other state medical societies in order to work together on public health issues on a regional basis.

### **The Clean Air Council considers the following to require immediate attention:**

- . Ban on public smoking (Rec. #5)
- . Reduction of diesel exhaust via school bus idling (Rec. #8 & 9)
- . Development of "Health Alerts" (asthma, allergy, ozone, biohazards, radiation) (Rec. #4)

## ORAL TESTIMONY

### Bradley Campbell

#### **Commissioner, NJ Department of Environmental Protection**

Previous work from the Council on diesel particulate matter illustrates how closely our air pollution challenges in New Jersey are linked to matters of public health. In New Jersey, we are not attaining new and more rigorous public health standards for soot and smog. Every citizen in New Jersey breathes unhealthy air for at least part of the year.

The costs to the public are significant in terms of the impacts on public health, quality of life, and the economy. As the Council's work reflected in the case of fine particulate pollution, we know that if we achieve the new tougher Federal standard for that one pollutant, we would avoid more premature deaths in the state than if we stopped every homicide or prevented every traffic fatality. In the case of mercury emissions, roughly ten percent or more women of childbearing age have unacceptable levels of mercury in their bloodstream. More than 5,000 children and infants born each year in New Jersey are exposed to unacceptable levels of mercury, which increases the risk in utero. Additionally, in areas of poor air quality, there are community impacts from increased emergency room admissions and increased absenteeism of schoolchildren due to exacerbations of asthma. These impacts from poor air quality point to the work that still needs to be done, including the current focus of the Council on assessing the health care impact, the health care costs, and economic costs to the public due to poor air quality.

We know that one of the most significant increases in costs for all businesses and public agencies is the increased cost of health care for workers. Included in these costs are the potentially significant costs from environmental exposure, particularly exposure to dirty air. At this point in our regulatory efforts, we are trying to focus more directly on the costs and benefits of environmental regulation. New Jersey leads the nation in setting strict public health standards, which are more than amply justified by the public health benefits, including the economic benefits. The current focus of the Council will contribute significantly to an understanding of what some of those impacts and costs are. This will lead to better regulation by the Department in terms of where we set our priorities, and possibly to more comprehensive and innovative approaches, like our efforts to control mercury.

In the case of clean air standards, we have one of the toughest rules in the country. For example, New Jersey's mercury rules, which reflect the requirements of the Federal Clean Air Act, will achieve a ninety-percent or better reduction of mercury emissions from power plants and incinerators. We have coupled that with the recognition that in some cases, the most cost-effective control is not necessarily at the smokestack. This is illustrated by recent legislation, advocated and signed by Governor Codey, for mercury switch removal from vehicles. We still have a long way to go in terms of mercury emissions, particularly given the position that the Federal government has taken under President Bush. This points to the challenges we face as a state and the Council's work of assessing the costs to the public from air pollution.

The epidemiology of air pollution and illness is complex because there can be many risk factors. The aggregate science has established that fine particulate pollution contributes to a range of cardio-pulmonary related illnesses. We understand that while there may be many risk factors, we know that air pollution is one of them, and there are reasonable ways to assess the impacts and costs of air pollution,

as the USEPA has done, subject to Office of Management and Budget (OMB) review, numerous times over. I caution the Council to be wary of suggestions that the epidemiology precludes a reasonable understanding of the health costs impact of air pollution. Secondly, I would urge the Council to look closely at the number of studies over the years that have documented that the benefits of air pollution control have far outweighed the costs, and to look particularly at understanding that the public health impacts of air pollution really warrants additional controls. OMB's analysis on USEPA's rules on interstate transport of air pollution made clear that there were billions of dollars of public health benefits left on the table because USEPA did not go far enough in protecting air quality. I urge the Council to consider helping the Department identify those unrealized benefits, and also how we might better capture them for New Jersey. Conversely, the Council should consider the range of potential competitive factors on businesses located in New Jersey and the range of costs that businesses face to put the cost of pollution control in perspective in terms of health care costs and the impacts of employee absenteeism so that a case can be made for more stringent controls and aggressive efforts. This is important as we undertake our diesel retrofit program to further protect air quality and to continue to seek, at a minimum, timely attainment of the Federal standards in the years ahead.

### **Valorie Caffee**

#### **Director and Organizer for New Jersey Work Environment Council and Chairperson of the Environmental Justice Advisory Council to the NJDEP**

#### **NJ's Air Quality and Environmental Justice.**

Environmental Justice (EJ) is the right to a safe, healthy, productive, and sustainable environment for all and demands fair treatment for all populations of people, with no group bearing a disproportionate share of negative environmental consequences. EJ addresses public health and socioeconomic issues related to the distribution of environmental benefits and burdens among populations, particularly in degraded and hazardous physical environments occupied by poor people of color. Many people of color and poor residents of every race suffer more from exposure to air pollution than their white, more affluent counterparts. There is a direct relationship between poor air quality in many areas of New Jersey (NJ) and the struggle for EJ.

Two examples of EJ communities in NJ include Camden Waterfront South (CWS) and the Trembly Point section of Linden. Both communities have multiple sources of air pollution, are racially diverse and have high rates of asthma. The high incidence of pediatric asthma is common in our cities. The Trenton Childhood Asthma Project found that asthma related emergency room visits and hospitalizations for children were 1,900 and 1,700 respectively between 1999 and 2001. A 2001 survey conducted by Trenton's Division of Health found that 25 percent of surveyed parents indicated that their children were diagnosed as asthmatic.

Asthma, chronic obstructive pulmonary disease, and heart attacks are the most serious short-term health effects from air pollution. Children, the elderly and those with preexisting disease are the most vulnerable to adverse health effects associated with poor air quality. Asthma is our nation's most common chronic disease among children, with African American children five times more likely to die from it than white children. Children of color and poor children are more likely to develop asthma. The American Heart Association recently stated that, "hospitalizations for several cardiovascular and pulmonary diseases acutely increases in response to higher ambient

PM concentrations". While the costs to health are great, so are the socioeconomic impacts. Many people who live in poor communities are using our emergency rooms as their personal physicians because they have no health care insurance. Many parents have to take time off from work to attend to a sick child and have no paid sick time and no health care insurance. Asthma alone accounted for 10 million lost school days, 1.8 million emergency room visits, nearly one-half million hospitalizations, and 15 million outpatient visits in 2000. The financial cost was 14.5 billion dollars and with the current trends, by the year 2010 lost workdays will total 2,400,000. The chronic diseases also cause severe emotional strain.

Communities with large populations of Latinos, African Americans and lower income residents suffer more from exposure to air pollution and associated adverse health effects than communities with large populations of white and wealthier residents. There is a strong relationship between NJ's air quality and EJ that requires aggressive action.

**Howard Kipen, M.D., MPH**

**Director & Professor of Occupational Health, Environmental & Occupational Health Sciences Institute, UMDNJ-Robert Wood Johnson Medical School**

**Particulate Air Pollution and Myocardial Infarction: Explaining the Connection**

High levels of blood fat, due to diet and genetics, can lead to the formation of plaque, i.e., arteriosclerosis. When these plaques rupture a clot forms which can block the passage of blood through the vessel leading to a heart attack. The vessels, inflammatory genes, proteins, platelets, smoking, lack of exercise and particulate air pollution all increase the risk of a heart attack.

Particles are classified based on size. The coarse fraction is also known as  $PM_{10}$ , the fine fraction is known as  $PM_{2.5}$ , and the ultrafine is called  $PM_{0.1}$ . Increasingly, research shows that the risk of heart disease is associated with smaller particles. There are some very sophisticated studies indicating how daily changes in respiratory and cardiovascular mortality and morbidity are associated with levels of particulate air pollution. The American Cancer Society's Cancer Prevention Study II showed about a 10% to 15% increase for all cardiovascular diseases, and up to 20% increase in mortality for people living in more polluted areas based on USEPA  $PM_{2.5}$  monitoring data. A meta-analysis by Pope et al., looked at daily changes in death rates and levels of air pollution. They found associations between cardiovascular death and changes in particulate air pollution. In the US, studies have shown that a  $10 \mu\text{g}/\text{m}^3$  change in  $PM_{2.5}$  was associated with a 25% increase in risk of death due to respiratory causes. Cardiovascular deaths were estimated at 11%. Other studies have found an increased risk for Myocardial Infarction (MI) related to exposure to elevated levels of  $PM_{2.5}$  within two hours of that person reporting that they had the symptoms of a heart attack. Another study found almost a 3-fold increased risk for getting a heart attack 1-2 hours after people had driven, walked or ridden a bus or a bicycle in traffic. The researchers adjusted for co-pollutants like ozone and carbon monoxide, etc. There is also extremely compelling rodent evidence. It was found that within 1-2 hours of placing particles in an animal's trachea there was an increase in clotting of the blood. It has also been well documented that the small particles create inflammation in the lung and pass directly through to the bloodstream, which is the predominant hypothesis of how particles contribute to the overall burden of heart disease. Another concept in cardiovascular risk is known as

dysfunction of the lining of blood vessels. We think it affects how the blood coagulates and it is very common in smokers, diabetics and those with heart disease. We think this dysfunction can occur due to exposure to particulate air pollution.

In 2003 in NJ, there were 22,000 heart attacks resulting in hospitalization. In 1997, the average hospital charge for a heart attack was \$15,000. This does not include the physician fees or indirect costs such as lost work time, increased home care, etc. That totals 350 million dollars. If we add in these other costs, that's probably 500 million dollars/year for MIs. If 1% of these MI were due to particulate air pollution that would be a minimum of 3.5 million dollars in direct health care dollars.

**Assemblyman Herbert C. Conaway, M.D.**  
**District 7, Burlington County**

The evidence suggests that high levels of air pollution are detrimental to human health. We see this effect in the increase in rates of asthma and other lung diseases. We also know that children and the elderly are more susceptible to these diseases.

Although we recognize that we are downwind from a lot of the sources, we need to look at the prevalence of diesel vehicles, generators and power plants in NJ. The Smith McKenna bill would bring increased regulatory oversight to diesel emissions and would empower the NJDEP to help protect public health. This bill will increase the regulatory framework to reduce diesel emissions from fleets of mobile vehicles over time. We expect environmentalists and people in the health care profession to weigh in on this legislation to make it better and stronger. This bill is a start and more work needs to be done.

Let us focus on school bus portion of this bill because there is a great deal of concern about the special susceptibility of children. We need to think about how we manage the ingress and egress from schools and make sure that the school buses are retrofitted. We also need to be careful about imposing mandates on the school systems that are costly. While this bill does establish a fund, we want to make sure that the fund is adequate to retrofit these school buses so that we can reduce the exposure of children to the harmful emissions from school buses. We need legislative activity to improve the air quality inside the schools to make sure that we are providing a healthy environment for our children.

If you look at our current air quality we find that far too many people, under the current standards, are living in unhealthy environments. We know that when pollution levels spike we see increased admission to hospitals, increased rates of upper respiratory infection and asthma. We need to get the Federal government to make sure that states in the Midwest are reducing pollution and to make sure that we are constantly pushing the envelope to improve air quality.

**David Peden, M.D.**

**Professor of Pediatrics & Medicine, Allergy & Immunology and Clinical Laboratory Immunology, University of North Carolina**

Patients often have four main questions regarding their asthma, allergies and lung disease. First, where do pollutants come from? Sources include, but are not limited to, wood burning stoves, power plants, mobile sources, diesel exhaust, industrial sources, and natural sources e.g., endotoxins, forest fires.

Second, does air pollution cause asthma or lung disease? Probable environmental agents that induce asthma, allergies and lung disease include Diesel Exhaust (DE) and Environmental Tobacco Smoke (ETS). Possible agents include ozone (O<sub>3</sub>), Nitrogen Dioxide (NO<sub>2</sub>) and other particles. Plausible agents include endotoxins. A recent study showed that daily levels of O<sub>3</sub> were significantly associated with respiratory symptoms and use of rescue medication among children, that a 50-ppb increase in 1-hour O<sub>3</sub> was associated with wheeze and chest tightness and that highest levels of O<sub>3</sub> were associated with shortness of breath and medication use. Another study found that when a steel mill in Utah closed, PM<sub>2.5</sub> levels were reduced and so were admissions to the hospital for bronchitis.

Third, how does air pollution worsen my asthma? Oxidative stress is a potential mechanism by which pollutants can make asthma symptoms worse. The pollutant itself (e.g., O<sub>3</sub>, metals, DE, ETS) may enhance the allergic response or allergic inflammation may increase the response to pollutants. Certain pollutants (O<sub>3</sub>, NO<sub>2</sub>/SO<sub>2</sub>, DE, ETS and endotoxins) have been shown to enhance the recall response to allergens. Allergic responses may modify the response to pollutants, e.g., asthmatics are more sensitive to O<sub>3</sub>, DE and endotoxins.

Fourth, is there anything I can do to protect myself from air pollutants? It is important to use the appropriate asthma therapy. Inhaled corticosteroids have been shown to decrease responses to endotoxins and ozone exposure. There is research that suggests that antioxidant vitamins, e.g., vitamin E and C, offer some protection to asthmatics from ozone induced decreased lung function. However, the most generally reliable public health approach to preventing asthma, allergies and lung disease is decreasing ambient pollution.

**David Brown, Sc.D.**

**North East States for Coordinated Air Use Management (NESCAUM)**

There is sufficient evidence that human health care costs can be associated to levels of PM<sub>2.5</sub> in the ambient air. I am in the process of developing a model using Connecticut data to examine this relationship. Four scaling factors are used 1) characterization of PM<sub>2.5</sub> exposures; 2) measurement of the incidence and prevalence of the disease; 3) plausible link between the exposures and disease; 4) a systematic tool to evaluate that relationship.

A number of studies have seen a positive association between ambient PM<sub>2.5</sub> and increased morbidity and mortality. A study by Dockery et al., 1993, found cardiopulmonary disease rates were significantly and positively associated with exposure to PM<sub>2.5</sub>. Another study found that an increase in PM<sub>2.5</sub> of 25 µg/m<sup>3</sup> caused an increase of people in the emergency room. Gent et al., found there was an increase in chest tightness that appeared to be occurring between 12 and 18 µg/m<sup>3</sup> PM<sub>2.5</sub>.

The data from PM<sub>2.5</sub> monitors in New Haven, Hartford and Waterbury show that the 24-hour PM<sub>2.5</sub> levels fall between 10 and 30 µg/m<sup>3</sup>. Although the average is about 10 µg/m<sup>3</sup>, we see many instances where there are increases over 30 µg/m<sup>3</sup> for a six-hour period. About 20 % of days we see an increase over 30 µg/m<sup>3</sup>.

In Connecticut we have about 8,000 heart attacks, 10,000 heart failures, 3,500 asthma attacks and about 8,000 chronic obstructive pulmonary diseases hospitalizations. The cost of each hospitalization is roughly \$10,000. The hospitalizations cost about 300 million dollars. Not all of these hospitalizations are due to PM<sub>2.5</sub>. If we estimate that 5% to 10% are from exposure to PM<sub>2.5</sub>, the estimated cost is between 15-30 million dollars. All these factors go into the model to estimate the savings we would see by decreasing levels of PM<sub>2.5</sub>. Although this is a work in progress, it shows the development of a systematic tool that can be used to evaluate policy decisions.

### **Bob Kelly**

#### **Regional Air Modeler, Air Programs Branch, USEPA, Region II**

The Clean Air Act (CAA) requires National Ambient Air Quality Standards (NAAQS) for pollutants that “may reasonably be anticipated to endanger public health and welfare... from numerous or diverse mobile and stationary sources”. “Primary” standards protect public health with an adequate margin of safety and “Secondary” standards protect public welfare and the environment (e.g., crops, wildlife, visibility, national monuments). NAAQS applies to O<sub>3</sub>, PM, carbon monoxide, lead, NO<sub>2</sub> and SO<sub>2</sub>. The CAA requires USEPA to review the scientific criteria and the standards at least once every five years with advice from the Clean Air Scientific Advisory Committee (CASAC). For setting the standards, health and environmental effects are considered and for achieving the standards, costs and time to attain standards are considered.

These are explained in a Criteria Document, which is an integrative assessment of published, scientific, peer-reviewed studies related to health and environmental effects. CASAC and the public review the Criteria Document. USEPA releases a Staff Paper, i.e., an assessment of relevant policy and recommendations, which is also reviewed by CASAC and the public. USEPA then proposes the standards. The public has a chance to comment on the proposed standards. After an interagency review, the USEPA makes its final decision. Standards include identification of an indicator, the averaging time period, the concentration of the standard and the number of times it can be exceeded.

Most standards were promulgated in 1971. For PM, Total Suspended Particulates (TSP) was set as an annual and a 24-hr standard. In 1987 a standard for PM<sub>10</sub> was developed. In 1997 standards

were proposed for PM<sub>10</sub> and PM<sub>2.5</sub>. The 1987 PM<sub>10</sub> standard was remanded back to the USEPA for review by the Supreme Court because of some confusion over double counting of PM<sub>10</sub> and PM<sub>2.5</sub> (PM<sub>2.5</sub> is a fraction of PM<sub>10</sub>). In October 2004, the final Criteria Document was released and the second draft staff paper was submitted to CASAC and is currently under review. By December 2005, USEPA is supposed to propose new standards and come out with a final rule by September 27, 2006. The Draft USEPA Staff Paper recommends an annual standard of 15 µg/m<sup>3</sup> and the 24-hr standard to be set between 25-35 µg/m<sup>3</sup>. For the fraction between PM<sub>10</sub> to PM<sub>2.5</sub>, a 24-hr equivalent to the current PM<sub>10</sub> standard should be between 65 to 85 µg/m<sup>3</sup>. There is support to get the standard as low as 30 to 35 µg/m<sup>3</sup>. An annual standard may also be supported. The secondary standard for PM<sub>2.5</sub> is based on visibility and would be 20-30 µg/m<sup>3</sup> over a 4-8 hour period.

The comment period closed May 2, 2005 for the Draft Criteria Document for O<sub>3</sub>. The most recent Criteria Document for lead was completed in 1986, supplemented in 1990 and is currently under review by. For SO<sub>2</sub>, States are reviewing the monitored 5-minute concentrations above 0.6ppm (a level of concern) and 2.0 PPM (endangerment level). In 1996, USEPA declined to set a short-term standard for NO<sub>2</sub>. The most recent Criteria Document for CO was completed in 2000.

NJDEP has been a national leader in getting air pollution information to the general public via a phone message system, TV and the Internet. Information can also be obtained from the USEPA website [www.epa.gov/airnow/](http://www.epa.gov/airnow/). With this information, the public can help protect themselves against the harmful effects of air pollution.

**Eddy Bresnitz, M.D.**  
**Deputy Commissioner, NJDHSS**

The impact of uncontrolled air pollution on the health of citizens throughout the United States, but particularly in NJ, has a long and tragic history. Ambient air pollutants, e.g., O<sub>3</sub>, NO<sub>2</sub>, PM, have been demonstrated in many studies to increase the risk of pulmonary disease and cancer. Many studies have also assessed the economic impact of treating these illnesses and the impact on loss productivity. Indoor air pollution is also burdensome on human health because people spend most of their time indoors.

The NJDHSS works actively to address ambient and indoor air pollution. Activities in NJDHSS include enhanced disease surveillance, education, scientific research, legislative initiatives, regulatory enforcement and coalition building. Major programs in the NJDHSS with responsibilities devoted to some aspect of air pollution include Public Employee and Occupational Safety and Health (PEOSH), Hazardous Site Health Evaluation, Cancer Epidemiology, Indoor Environments, Occupational Health Surveillance Program, Asthma, Lead, and the Comprehensive Tobacco Control Program.

In NJ, Environmental Tobacco Smoke (ETS) probably has the greatest adverse effect on public health. This year the NJDHSS has publicly advocated for smoke-free legislation, and it has the best chance ever to be enacted. The national campaign for Tobacco Free Kids estimates that

between 1,000 and 1,800 NJ residents die annually from the effects of second hand smoke, which is a Class A carcinogen. ETS causes more cancer deaths than asbestos, arsenic, radiation, benzene, vinyl chloride, pesticides, hazardous waste sites, etc., combined. Ten other states have initiated or instituted statewide smoking bans. Almost 2,000 U.S. municipalities and nine other nations have banned smoking in most venues.

Improving air quality is good for improving public health, it is good for employee's health, and it is good for business by reducing health costs and increasing customers. It is time to provide a smoke-free indoor air environment in NJ. Surveys in NJ have shown the overwhelming majority of the public demands that we take action. The Council's and NJDEP's support for this initiative is crucial to successful and comprehensive legislation. Prevention and control efforts must keep up with the scientific evidence.

**Samuel Wolfe**

**Assistant Commissioner for Environmental Regulation, NJDEP**

It is important to understand the complete picture of what exposure to air pollution is costing society. We have heard some very important statements on health effects that are associated with various types of air pollution, and information that links those health effects to increases in overall health care costs. This continues with a ripple effect on our economy because the increase in health care costs then increases health insurance costs, which in itself continues to have a ripple effect. For example, the New Jersey Chamber of Commerce has recently released a study that showed that last year on average, there was a 15% increase in health insurance premiums for 60% of employers who provide health coverage for their workers. There is reason to believe that more of the impact falls on the smaller businesses that are struggling to provide health care coverage because they have less leverage to negotiate better premiums. The New Jersey Business and Industry Association (NJBIA) has come out with a study which showed that between 2003 and 2004: there was a 4% decrease in the number of employers that offered health care coverage to their full-time employees; 75% of workers had higher co-pays and premiums; and NJ businesses paid an average of 11% more last year to provide health insurance, which was nearly four times the national inflation rate. In 2002 health insurance costs rose 15 % on average, in 2003 it rose 13% and it is anticipated that an increase of 12% will occur this year. This has an enormous compounding effect on costs that businesses are bearing in order to provide health insurance for their employees.

The impacts of employers not being able to provide health insurance for their employees are huge. The cost of providing health insurance for their workers is creating a barrier in hiring. In addition, as workers lose their health care coverage because their employers can't afford to provide it anymore, we are seeing larger numbers of the uninsured. Uninsurance or inadequate insurance is in itself having a ripple effect. The Institute of Medicine issued a report a few months ago and they found that the uninsured in this country have a higher risk of dying before 65 years of age than do people who have health insurance. Nationwide we are seeing about 18,000 premature deaths due to the lack of health insurance.

In summary, when we consider the cost of air pollution and the benefits of controlling it, we are missing the mark if we look only to the direct costs associated with providing health care to those whose conditions are due to or aggravated by air pollution. Those direct health care costs, and the burden of providing health care to those affected by air pollution, are just the beginning of costs that ripple throughout the economy.

**Clifford Weisel, Ph.D.**

**Professor and Deputy Director of the Exposure Measurement and Assessment Division of the Environmental and Occupational Health Sciences Institute, UMDNJ-Robert Wood Johnson Medical School and Rutgers University**

There are two main types of particulate matter. Primary particles are emitted directly into the atmosphere by local sources/emissions. These include dust, dirt, soot, smoke, and liquid droplets. Secondary particles are formed in the atmosphere from chemical reactions and combustion. These come from local and distant sources and can be transported thousands of miles in the atmosphere. In NJ there are a lot of out of state upwind sources, which we cannot control unless we have help from our regional friends in other states. Particles come in different sizes.  $PM_{10}$  generally comes from mechanical sources and direct emissions.  $PM_{2.5}$  comes from accumulation by coagulation, condensation, combustion and atmospheric reactions.  $PM_{0.1}$  comes from condensation, atmospheric reactions and combustion. The size and composition of the particles have important characteristics that can affect human health, e.g., causing respiratory and cardiovascular ailments, increased hospital admissions, missed school and workdays, puts our children and the elderly at risk and can cause premature death.

Particles larger than  $PM_{10}$  impact out on the walls of the upper respiratory system. The coarse mode PM (between the size of  $PM_{10}$  and  $PM_{2.5}$ ) will end up in the airways and bronchioles through impaction and sedimentation. The fine particles (between  $PM_{2.5}$  and  $PM_{0.1}$ ) end up in the branches of the bronchioles due to sedimentation. The ultrafine ( $<PM_{0.1}$ ) can diffuse to the alveoli.

Millions of Americans live in non-attainment areas, including the majority of New Jerseyans. Ozone and  $PM_{2.5}$  cause the most nonattainment days in NJ. They are formed in the atmosphere and transported from out of state sources. We have been able to reduce  $PM_{10}$  to reach the 24-hour standard for the most part. But the regulations and the procedures we took to meet  $PM_{10}$  will not necessarily be the same as what we need to meet  $PM_{2.5}$ . We need to phase in a series of different regulations to impact levels of the different sized particles. This is important because the Relationship of Indoor, Outdoor and Personal Air (RIOPA) study found that ambient PM emissions account for between 50% to 90% of the indoor PM exposures.

There has been a whole series of studies over the last couple of decades that looked at the health effects associated with exposure to PM and other criteria pollutants. The Six-City Study (Dockery et al., 1993) looked at the mortality and morbidity of a series of people in six different cities. They found that sulfates and PM were associated with mortality and fine PM had a clearer association with mortality than TSP. Pope et al, 2002 looked at the chronic effects associated with pollutants and found an increased risk of death from cardiopulmonary responses and lung

cancer for fine particles and sulfates. Newer multi-city studies have demonstrated the associations between  $PM_{10}$  and mortality. Several studies showed  $PM_{2.5}$  or  $PM_{10-2.5}$  were more significant than  $PM_{10}$  and had a higher excess risk per increase in PM. One major concern is that the effects attributed to PM could really be due to, or act synergistically with, gaseous co-pollutants. These results have been substantiated by independent reanalysis and updated with extended analyses using additional data. Total, cardiovascular and respiratory mortality have been associated with PM exposure and other criteria pollutants. Morbidity measures included stroke, dysrhythmia, pneumonia, COPD, and asthma. There is consensus among the studies. PM exposure is associated with premature death, increased hospital admissions and ER visits for people with heart and lung disease and work and school absences.

**Stanley Lane, M.D.**

**Chairman, Public Health Committee, NJ Medical Society**

Twenty-six years ago I suspected that there was a relationship between hospital admissions for respiratory disease and air quality. In 1979 I was instrumental in forming a group of physicians, computer experts and members of the American Lung Association which sponsored a 75-day study. Newark and Camden were chosen because they had the best air quality monitoring stations. There was a clear correlation between  $NO_x$  and hospital admissions and ozone levels and hospital admissions. Twenty-five years later in 2004, Gauderman, et al., found that compromised lung development in children was associated with levels of  $NO_2$ , small suspended particles, carbon particles and acid vapors. Dockery et al., 2003, found that cities with the highest levels of small particles had the lowest life expectancy. Similar articles have supported these conclusions. There is a very good review of various articles in *Circulation* 2004, Volume 109, pages 2655-71. Gent et al., 2003, demonstrated an association of low-level ozone and fine particles with respiratory symptoms in children with asthma. The levels of ozone were considerably below the standard and caused difficulty in breathing, wheezing, increased shortness of breath and increased use of rescue medication. In 2002, *Health Affairs Journal* published an article, which found considerably higher health care costs, particularly for the older population, in areas with higher levels of air pollution. The point is repeatedly made that not only the quality of life but health care costs and actual life expectancy is directly correlated with air quality. Much of the mortality associated with cardiovascular episodes involves inflammation, hypozemia, hypertension, cardiac arrhythmias, lung cancer and exacerbations of COPD. These effects occur from both acute and chronic exposures to higher levels of  $PM_{2.5}$ .  $PM_{2.5}$  can penetrate the lower airways and induce bronchial constriction and lung inflammation.  $PM_{2.5}$  can combine with pollen making the pollen grains more allergenic. Many smaller particles are also carcinogenic.  $NO_2$  can reduce alveolar macrophage function allowing small particles to more readily penetrate the lung.  $NO_2$  can cause morphologic changes in lung cells. Sources of  $PM_{2.5}$  and  $NO_2$  include fossil fuel combustion, oil refineries and power generation.

The standard for  $PM_{2.5}$  is an annual average of  $15 \mu\text{g}/\text{m}^3$  and up to  $65 \mu\text{g}/\text{m}^3$  daily. If standards are to reflect health effects, no acceptable standards can be established for the smaller size particles. They are dangerous at any level with a linear relationship existing between particle numbers and disease. Adverse health effects from both ozone and nitrogen oxides have occurred at much lower levels than their standards. By reducing the number of these small particles we

may be able to save over 20,000 lives which are lost due to cardiovascular complications and prevent over 40,000 hospitalizations from cardiovascular problems.

A great deal of work needs to be done. Some good legislation is currently being proposed to deal with power generating stations and diesel exhaust. States need to cooperate to reduce air pollution in NJ. Companies not in compliance with USEPA standards should not be able to purchase credits.

**Ronald Low, M.D.**

**Director of Emergency Medicine, Department of Surgery, NJ Medical School, UMDNJ**

I have looked at the relationship between the incidence of New York City hospital admissions due to asthma, ischemic stroke, otitis media (ear aches), myocardial infarctions and air pollution data from USEPA, weather data from the National Weather Service and pollen data from Dr. Bielory. The weather and air pollution data for NY and NJ are strongly correlated so the results from the NYC study are applicable to NJ.

The model, which assumes causality, is very conservative and ascribes changes in asthma rates to seasonality, then weather, then airborne allergens and lastly, levels of ambient air pollution. For asthma, the model shows a clear seasonal effect, i.e., high temperatures were associated with asthmatic exacerbations. As weed pollen counts got high we saw the effect even after the seasonal effect. With these variables in the model we still saw a clear and statistically significant effect of small particles. Extrapolating the results of the NYC work to NJ and using a rough estimate of the effect of small particles on NJ asthma, we see that there are 900 additional hospital admissions, and 3,000 additional Emergency Department (ED) visits due to PM. Ischemic stroke does not have as much of a seasonal time effect as asthma. The weekly and holiday effect are adjusted for before looking for a pollution effect. The model estimated an excess of 112 strokes due to levels of NO<sub>x</sub> that were measured in NJ during that same time period. Otitis media, like asthma, does have seasonal and weekly effects. The model also found a fairly marked effect of NO<sub>x</sub>. The model estimates a 2-8% reduction in otitis media visits if NO<sub>x</sub> is reduced. For Myocardial Infarctions (MI), as there was for all the previous analyses, the incidence on weekends is lower than weekdays. There is an increasing number of MI as the temperature drops and NO<sub>x</sub> seems to stand out as something that has exacerbating effects. These observational studies have some limitations such the range of the temperature and pollen counts, the diagnostic accuracy which is dependent upon clinicians and coders, pollutants are co-correlated with each other, weather, season and weekday traffic. These studies cannot prove causality and pollutant effects may be underestimated because the conservative model adds them in at the end.

Given these reservations, our data suggests that current levels of air pollution have some measurable relationship to asthma, otitis media, ischemic strokes and MI. NO<sub>x</sub> and PM have the most widespread association. If you assume causality, the health effects are significant.

**Stanley H. Weiss, M.D.**

**Professor Preventive Medicine, NJ Medical School UMDNJ**

We carried out a study to determine “Are peak expiratory flow rates of asthmatics impaired by levels of SO<sub>2</sub> in the EPA "safe" zone?” I think the answer is a very surprisingly strong yes. The purpose of this study was to determine if changes in Peak Flow expiratory Flow Rate (PEFR) among asthmatic school children were related to air pollution from SO<sub>2</sub>. We looked at 3 rural communities in Warren County, NJ, i.e., Belvidere, White Township and Harmony Township. The full study is currently draft and is undergoing review by the NJDEP.

This prospective study identified asthmatic students in grades 5-12 using questionnaires. A total of 47 eligible students participated in this study. The students were asked to fill out a web-based questionnaire on their symptoms, triggers, location, peak flow rates and medication use. There was a total of 5,601 student participation days on which symptoms and medication use were entered, 4,777 of those days also had PEFR data. Continuous air monitoring data for PM<sub>2.5</sub> and SO<sub>2</sub> was collected at three locations. Volatile Organic Compounds (VOC) data were also collected but it was not continuous and there were a limited number of sampling events.

A stepwise mixed model was developed to determine how much change in peak flow rate is related to other changes such as pollution, temperature and other factors. The model controlled for each individual subject, which was advantageous, because PEFR varies with a number of physiological variables such as height, weight, age and gender. The variables included in the stepwise assessment included: daily and daytime maximum and mean, hourly and 5-minute SO<sub>2</sub>; mean SO<sub>2</sub> (linear and non-linear terms), same day, 1 and 2 day lagged SO<sub>2</sub>, peak and mean same-day and mean lagged PM<sub>2.5</sub>, all from the 3 monitoring stations, mean daytime temperature, age, gender, same day controller medication use and pollen.

The best fit for the model was peak 5-minute daytime SO<sub>2</sub> from Belvidere, mean prior day SO<sub>2</sub> from Belvidere and daytime temperature. The same effect of SO<sub>2</sub> was also seen for White Township students. There was no statistical association for students in Harmony Township possibly because the air monitoring did not appropriately characterize the residents' exposure.

The model predicted that a 10 ppb increase in prior-day mean SO<sub>2</sub> cause an average decrement in PEFR of 1.1% for all 47 students. For the 2 most sensitive students, this effect was about 6 times greater, which could be of clinical significance. Overall the model predicted for the 47 students that for 100 ppb increase in peak same-day SO<sub>2</sub> there was an average decrease in PEFR of 0.69%. For the two most sensitive students, the effect nearly tripled.

In summary, we observed significant effects on peak flow rates at levels well below the federal 24-hour standard for SO<sub>2</sub>. Some asthmatics appear to be especially sensitive to SO<sub>2</sub>. Relatively low levels of SO<sub>2</sub> had an adverse impact on respiratory function, which raises clinical concern. Our data suggest that even more transient exposure to levels far below the guideline may pose a health threat to sensitive individuals.

**William H. Pettit, Sr.**  
**Mayor, Springfield Township, Burlington County**

We have experienced major odor problems in Springfield Township ever since March 2004 when Eastern Organic received permission from the NJDEP to begin composting and processing supermarket waste, yard trimmings, food processing residuals, food preparation waste, crop residue, paper, pulp, cardboard, animal manure/bedding, manufacturing residuals, and potable water residuals.

In 13 months there have been nearly 800 phone complaints to the NJDEP and the County Board of Health. The odor is sickening and has been detected as far as six miles from the site. Our local school is located four miles from this site and on one occasion children were pulled from the playground and classrooms because of the odor. On September 24, 2004, the school superintendent initiated action to close the school and relocate or dismiss students due to the overwhelming odor and the concerns of a possible health hazard. Several outdoor activities have been cancelled or shortened because of the sickening smell and sensations of nausea.

At Eastern Organic, large windrows of material are constructed and turned periodically with an introduction of additives to yield a product that is marketable to nurseries, golf courses and the general public. Several documents have been published in the United Kingdom and Wales attesting to the conclusion that windrow composting on a large scale is not a viable process. In all of the reports, odor control was the single most difficult obstacle and could never be totally attained. There are many studies which document that dust generated by the handling of compost material can convey microorganisms long distances through the air. To my knowledge, there have been no tests done regarding the human or animal health impact. We are concerned that exposure to Aspergillus and other commonly found fungal species in compost material could be detrimental to our health.

Residents have written numerous letters, made numerous phone calls and met with NJDEP Commissioner, enforcement, Burlington County Freeholders and other various levels of government to seek resolution. The results have been negative. I appeal to the Council for whatever help is available not only to address the noxious sickening odor that emanates from this facility and adversely affects our quality of life but most importantly to investigate any potential health risks to which our residents are exposed.

**Kim Gaddy**  
**Environmental Justice and North Jersey Organizer**

I am a resident of Irvington, NJ and the parent of three children, two of which have asthma. I am here today to put a NJ face on the findings and recommendations of the Clean Air Task Force (CATF) report, "Diesel and Health in America, The Lingering Threat". Using USEPA approved methodologies the CATF found that NJ has the second highest risk for individual lung cancer. Hudson County is the 5th worst county in the country and the worst in the state. Camden County and Mercer County are the second and third worst, respectively. Depending on which county you live in, your individual lung cancer risk is 246 to 394 times greater than what the USEPA

deems as acceptable risk, i.e., one in a million lifetime cancer risk. In NJ the impact of diesel particulates is almost eight times the cancer risk per million of all the other air toxics combined. This report also places NJ as the fourth worst for other diesel related health impacts, including premature death, nonfatal heart attacks, asthma, acute and chronic bronchitis, other respiratory symptoms, and lost work and school days. Asthma is the leading cause of school absenteeism and minor restricted activity days and leads to quality of life impairments and family financial crisis.

Clean Air Act regulations for diesel vehicles do not impact any of the 13 million diesel vehicles currently in use nationwide, some of which will put on 1 million miles over their typical 30-year life span. Children often travel on diesel infested busses, on average, 1.5 hours/day but it can be up to 4 hours/day round trip, 5 days a week for 12 plus years. Tail pipe and crankcase fumes hop on the bus through the front door when the bus makes a stop. Diesel levels on buses can be up to 10 times more than ambient levels, with levels higher in the front of the bus and worse in the winter when the windows are closed. NJ school busses are allowed by law to transport children for 10 to 20 years depending on their type and purchase date. This is an unnecessary risk. Off-the-shelf technologies are now readily available that could reduce diesel emissions by 90%.

While there is state diesel reduction legislation pending, its fate is unclear. We hope these findings will help bolster efforts to secure the most health protective policies because we cannot wait for the federal regulations.

**Donald Sico**  
**President, HealthSense, Inc.**

HealthSense is a coalition of almost 1400 small business owners and benefit managers who are concerned and alarmed about the high cost of health benefits. We often use the phrase "low hanging fruit". This is defined as those things that can be done quickly and easily to yield the greatest results. For health care costs that low hanging fruit is stopping Americans from smoking. Smoking is the number one cause of death and disease in the United States, triggering heart disease, cancer, stroke, emphysema, chronic obstructive pulmonary disease and other illnesses. Smoking kills more Americans than AIDS, alcohol, illegal drug use, car accidents, fires, murders and suicides combined. 430,000 Americans die from smoking every year. Another 38,000 Americans die annually from secondhand smoke. Per year smoking is responsible for 1 out of every 5 deaths in America. Lung cancer kills 27,000 more women than breast cancer every year. Smoking during a pregnancy or exposing babies and children to secondhand smoke has been linked to one in ten infant deaths. The total annual cost to society to treat illnesses caused by tobacco is estimated to be about \$85 billion/year. Related costs include another 1.4 to 4 billion dollars due to health and developmental problems of infants and children exposed to secondhand smoke during pregnancy or after birth.

Nothing this Council could recommend would do more for NJ and its citizens than to advocate stiffer restrictions on smoking. Nothing will save small business owners more on annual health care costs than reducing smoking. Currently there is a bill pending in the Legislature sponsored by Senator John Adler of Cherry Hill that would ban smoking in all indoor public establishments

in our state. I urge the Council to endorse this effort. While the aim of the legislation is to protect those innocent bystanders from secondhand smoke, the bill would do much more. If you make it more difficult for smokers, they will quit. If you want to save money and lives, include the Adler bill in your recommendations and ask the State to go even further. Smokers should be prohibited from smoking in any closed area when children are present. If the government does not protect children, who will? If America were able to recoup the health care costs from the smoking alone, we would be able to purchase health insurance for every poor and middle-income family in the entire nation.

**Reverend Fletcher Harper**  
**Executive Director, Green Faith**

GreenFaith is an interfaith environmental coalition based in NJ. We work with over 100 houses of worship to help them engage in issues of environmental stewardship and justice. We believe an attitudinal shift is fundamental to addressing issues of air quality.

In our view, the air that we breathe in this state is a gift. Gifts have the power to hold communities together and create life. They are unique because they share between people the essence of life and are necessary to maintain life. Our concern is that our society treats this gift as a commodity. There is a profound difference between gifts and commodities. We believe that this difference is fundamental to creating a long-term basis for healthy air. Commodities are resources that can be used up, discarded, bought and sold. They are morally neutral. Gifts, on the other hand, create relationships and embody bonds. They embody the spirit that holds people together. In the case of air as a gift, they make life possible between communities and between generations. Through the way that we handle our relationship with our air, we pass on to others and to future generations that the air reflects the way that we feel about them and see them. The air that we pass on to others in some sense reflects a judgment on us.

We need to shift from site by site air emission standards to health-based standards to ensure that the total amount of pollution released into our air remains below health threatening levels. This would shift our discussion in the way that we understand our relationship to our air away from air as a commodity towards air as gift. Secondly, I suggest that we monitor hot spots of bad air quality more carefully. We know that those hot spots are often found in the poorest, most vulnerable communities within our society, usually communities of color. Green Faith believes that it is our obligation to treat society's most vulnerable with care, dignity and respect. We need to turn the air in these communities back into a gift instead of the curse that it has too often become. I think if we see our air as a beloved and cherished gift, and have the hope and confidence in seeing our air in this way, we will learn to treat it well.

**Douglas O'Malley**

**Environmental Advocate, NJ Public Interest Research Group**

Diesel pollution in NJ is a public health menace that contributes to 880 premature deaths (CATF, 2/2005) over 1,300 heart attacks and close to 18,000 asthma attacks annually. NJ has 15 counties ranked in the top 100 worst nationwide for cancer risk from diesel emissions. Children, the elderly and those with pre-existing disease are particularly vulnerable to the effects from exposure to diesel exhaust. Children have experienced over 500 emergency room visits due to asthma attacks and over 1,200 cases of acute bronchitis. Close to 27,000 children suffer breathing problems due to upper or lower respiratory symptoms.

According to estimates by the NJDEP, the economic savings from proposed diesel legislation, which will reduce diesel emissions by 20%, found savings between \$1.5 billion to \$3.6 billion. There is a direct and positive health and economic benefit to reducing diesel pollution, the more lives we save, the more money we save in health care costs.

We have to embrace the Polluter Pays Principle. We need to retrofit public vehicles like school busses. School buses should be retrofitted with closed crankcases and particulate filters on the tail pipes and use Ultra Low Sulfur Diesel Fuel (ULSDF). It is the most important way to protect children who ride on those buses. NJ needs to monitor soot pollution in every county (8 counties currently have no monitors) and to target hotspot areas in urban cities. NJ should also implement a statewide asthma directory.

**Debbie Dicolo**

**West Windsor-Plainsboro Education Association President, educator and parent**

I represent 848 teachers in the district who have had problems addressing poor indoor air quality at our schools. When Public Employees Occupational Safety and Health (PEOSH) workers do an inspection, they can only uphold current laws and test for CO<sub>2</sub>, temperature, humidity and a visible inspection for mold. If there are no visible signs of a problem and the CO<sub>2</sub> levels are appropriate, then the building is said to meet the current air quality standards. PEOSH usually recommends that the district hire an independent consultant to investigate the causes of the health problems. Those recommendations are often not followed because of the costs and because those employees who called attention to the air quality problem are viewed as troublemakers rather than as concerned individuals.

Mold has been one of the most common and serious problems facing school districts. Districts are not required to report mold problems and are restricted by their budgets. They usually rely on custodial staff who are not properly trained to do the clean up and they are often not successful. There needs to be specific reporting, cleanup procedures and follow-up testing. Although mold outbreaks have been one of the most common causes of poor air quality, other allergens and airborne hazards invade our buildings.

We urge you to change the current laws and regulations governing the process of notification, the standards for air quality, the clean up procedures and follow-up testing. PEOSH should be given the authority to investigate complaints further. Decisions about technical, medical and scientific

concerns should not be left up to individuals who lack the proper training and education in the diagnosis and remediation of air quality hazards. When complaints are not resolved, those concerns should be addressed until there is a resolution. Employees should have the right to a safe work environment.

## GLOSSARY OF ACRONYMS

CAA	Clean Air Act
CASAC	Clean Air Science Advisory Council
CO	Carbon Monoxide
CATF	Clean Air Task Force
COPD	Chronic Obstructive Pulmonary Disease
CWS	Camden Waterfront South
DE	Diesel Exhaust
Fine PM	Particulate Matter 2.5 microns in aerodynamic diameter or less. These particles can reach deep into the lungs
ED	Emergency Department
EJ	Environmental Justice
ETS	Environmental Tobacco Smoke
IAQ	Indoor Air Quality
MI	Myocardial Infarction
NAAQS	National Ambient Air Quality Standards
NJ	New Jersey
NJBIA	New Jersey Business and Industry Association
NJDCA	New Jersey Department of Community Affairs
NJDHSS	NJ Department of Health and Senior Services
NO <sub>2</sub>	Nitrogen Dioxide
NO <sub>x</sub>	Nitrogen Oxides
O <sub>3</sub>	Ozone
OMB	Office of Management and Budget
PEFR	Peak Expiratory Flow Rate
PEOSH	Public Employees Occupational Safety and Health
PM <sub>2.5</sub>	Particulate Matter 2.5 microns in aerodynamic diameter or less. These particles can reach deep into the lungs
PM <sub>10</sub>	Particulate Matter 10 microns in aerodynamic diameter or less. These particles can deposit in the upper respiratory tract
PPM	Parts per Million
RIOPA	Relationship of Indoor, Outdoor and Personal Air
SO <sub>2</sub>	Sulfur Dioxide
TSP	Total Suspended Particulate
PM <sub>0.1</sub>	Ultra fine PM. Evidence that they can pass directly into the blood stream
ULSDF	Ultra Low Sulfur Diesel Fuel
UMDNJ	University of Medicine and Dentistry of NJ
VOC	Volatile Organic Compounds

## CAC PUBLIC HEARING HISTORY

7	Fine Particulate Matter in the Atmosphere <ul style="list-style-type: none"><li>• Health Impacts in NJ</li><li>• Need for Control Measures</li></ul>
2003	Moving Transportation in the Right Direction
2002	Innovative Solutions for Clean Air
2001	Air Quality Needs Beyond 2000
1980	Air Toxics in New Jersey
1979	The Impact of Electric Utility Deregulation on New Jersey's Environment
1977	Clean Air: Complying with the Clean Air Act: Status, Problems, Impacts, and Strategies
1976	Particulate Matter: The proposed Standard and How it May Affect NJ
1974	Clearing the Air Communicating with the Public
1973	Strategies for Meeting Clean Air Goals
1972	Air Pollution in NJ: State Appropriations vs. Fees & Fines
1971	Enhanced Automobile Inspection and Maintenance Procedures
1970	Impact on the Public of the New Clean Air Act Requirements
2004	Air Pollution Emergencies
1	Trucks, Buses, and Cars: Emissions and Inspections
7	Risk Assessment - The Future of Environmental Quality
7	The Waste Crisis, Disposal Without Air Pollution
7	Ozone: New Jersey's Health Dilemma
7	Indoor Air Pollution
7	Fifteen Years of Air Pollution Control in NJ: Unanswered Questions

- 7 The Effects of Resource Recovery on Air Quality
- 7 The Effects of Acid Rain in NJ
- 7 How Can NJ Stimulate Car and Van Pooling to Improve Air Quality
- 7 (October) Ride Sharing, Car – and Van-Pooling
- 7 What Are the Roles of Municipal, County, and Regional Agencies in the New Jersey Air Pollution Program?
- 1978 How Can NJ meet its Energy Needs While Attaining and Maintaining Air Quality Standards
- 7 How Can NJ Grow While Attaining and Maintaining Air Quality Standards?
- 7 Should NJ Change its Air Pollution Regulations?
- 7 Photochemical Oxidants
- 7 Clean Air and Transportation Alternatives to the Automobile and Will the Environmental Impact Statement Serve to Improve Air Quality in NJ?
- 7 The Environmental Impact on Air Pollution: The Relationship between Air Quality, Public Health, and Economic Growth in NJ
- 7 How Citizens of NJ Can Fight Air Pollution Most Effectively with Recommendations for Action
- 7 Status of Air Pollution From Mobile Sources with Recommendations for Further Action
- 1969 Status of Air Pollution Control in NJ, with Recommendations for Further Actions

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