



**The Urgent Need for Federal Policy Interventions to Prevent Diseases of
Environmental Origin in American Children**

Testimony to U.S. Senate Environment and Public Works Committee

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Good morning, Madam Chairwoman and Members of the Committee.

I am Dr. Leonardo Trasande. I am a pediatrician and Assistant Professor of Community & Preventive Medicine and Pediatrics at the Mount Sinai School of Medicine. I co-direct the Children's Environmental Health Center, the nation's first academic policy center devoted to the protection of children against environmental threats to health.

Children are uniquely vulnerable to many of the 90,000 chemicals that are released into the environment every day:

* One important reason why children are so vulnerable to environmental chemicals is that they have disproportionately heavy exposures. Pound per pound of body weight, children drink more water, eat more food, and breathe more air than adults, and so they take proportionately more of the toxins in water, food and air into their little bodies. Small children's exposure is magnified further by their normal behaviors – their play close to the floor, and their hand-to-mouth activity, which we pediatricians call “normal oral exploratory behavior.”

* A second reason for their great susceptibility to chemical toxins is that children do not metabolize, detoxify, and excrete many toxins in the same way as adults; thus the chemicals can reside much longer in children's bloodstreams and cause more damage.

* A third reason is that children are undergoing rapid growth and development, and those very complex developmental processes are easily disrupted.

* Finally, children have more future years of life than most adults and thus have more time to develop chronic diseases that may be triggered by early environmental exposures.

Over the past thirty years, chronic diseases of environmental origin have become epidemic in American children, and are the diseases of greatest current concern. These include:

* Asthma, which has more than doubled in frequency since 1980 and become the leading cause of pediatric hospitalization and school absenteeism;

* Birth defects, which are now the leading cause of infant death. Certain birth defects, such as hypospadias, have doubled in frequency;

* Neurodevelopmental disorders - autism, dyslexia, mental retardation, and attention deficit/hyperactivity disorder (ADHD). These conditions affect 5-10% of the 4 million babies born each year in the United States. Reported rates of autism are increasing especially sharply - more than 20% per year.

* Leukemia and brain cancer in children and testicular cancer in adolescents. Incidence rates of these malignancies have increased since the 1970s, despite declining rates of mortality.

* Testicular cancer has risen by 55%, and primary brain cancer by 40%. Cancer is now the second leading cause of death in American children, surpassed only by traumatic injuries; and

* Preterm birth, which has increased in incidence by 27% since 1981.

These rapidly rising rates of chronic disease threaten the health of our children and the future security of our nation. Indeed, concern is strong among the pediatric community that rapidly rising rates of chronic disease may create a situation unprecedented in the 200 years of our nation's history, in which our current generation of children may be the first American children ever not to enjoy a longer life span than the generation before them.

Evidence is increasing that many environmental chemicals contribute to the causation of disease in children. Lead, mercury, polychlorinated biphenyls (PCBs) and certain pesticides have been shown to cause brain damage and to contribute to learning disabilities and to disruption of children's behavior. Benzene, 1,3-butadiene, and pesticides have been associated with childhood malignancies. Ambient pollutants - airborne fine particulates, ozone, oxides of nitrogen, and diesel exhaust also have been shown to increase incidence of asthma and to trigger asthmatic attacks. Although many of the causes of developmental problems in children are still not known, a recent National Academy of Sciences study suggests that at least twenty-eight percent of developmental disabilities in children -- dyslexia, attention deficit disorder and mental retardation -- are due to environmental causes.

Diseases of environmental origin in American children are also extremely costly to our nation. Four of the leading diseases of environmental origin in American children – lead poisoning, childhood asthma, neurodevelopmental disabilities and childhood cancer – have been found to cost our nation \$54.9 billion annually. Mercury pollution has been found to cost our nation \$8.7 billion annually as a result of lost economic productivity, and an additional 1566 cases of mental retardation have been associated with mercury pollution. Each of these cases is associated with additional special education and health care costs that are disproportionately borne by the American taxpayer.

Federal regulation of environmental chemicals has proven successful in the reduction of childhood disease and disability. Reductions in lead exposure associated with the elimination from lead in gasoline in the United States resulted in IQs among preschool aged children in the 1990s that were 2.2-4.7 points higher than they would have been if those children had a distribution of blood lead levels found among children in the 1970s. Before the US Environmental Protection Agency (USEPA)'s phase out of diazinon and chlorpyrifos, these two pesticides were frequently detected in the cord blood of New York City children and associated with decrements in birth weight and length. After these phaseouts, the pesticides and the association with predictors of cognitive potential were no longer detected.

In the past, the United States has taken a more proactive approach to protecting children from hazardous chemical exposures. The use of chlorofluorocarbons in aerosols was banned in 1977, several years before several European countries interceded. Manufacture of polychlorinated biphenyls was banned in 1977 in the federal Toxic Substances Control Act. Diethylstilbestrol was outlawed as a growth promoter in beef as early as 1972, well before the European Union banned its use in 1977. The Food Quality Protection Act of 1996, which was passed by unanimous vote of both houses of Congress, requires that standards for agricultural pesticides be set at levels sufficiently strict to protect the health of infants and children, and directs the EPA to use an additional tenfold safety factor in assessing the risks to infants and children to

take into account the potential for pre- and postnatal toxicity, particularly when the toxicology and exposure databases are judged to be incomplete.

Despite compelling evidence that further efforts are needed to prevent further increases in disease and disability of environmental origin among American children, major gaps remain in the regulatory approach taken by the Environmental Protection Agency to protect children. These include:

*** Enforcement of the Clean Air Act would prevent mercury emissions from coal-burning power plants from poisoning the next generation of America's children.** Mercury emissions from coal-fired power plants and other industrial sources leads to fish contamination with methylmercury. Nearly one-sixth of women are childbearing age have been documented to carry enough mercury in their bloodstream to affect the learning and development of their children. Under the Clean Air Act, coal-fired power plants were required to limit emissions to five tons per year by 2008. The Administration gutted those regulations in the Clean Air Mercury Rule, permitting twenty-six tons through 2010, needlessly exposing newborns to brain damage from this preventable exposure. Mercury pollution costs America \$8.7 billion annually in lost economic productivity, and has been associated with 1,566 cases of mental retardation annually. The costs of placing filters on older coal-fired power plants do not necessarily outweigh the long-term benefits to our children and our economy.

*** The Toxic Substances Control Act (TSCA) still fails to reflect children's unique vulnerability and ensure that chemicals are safe before they are allowed to be introduced into our environment.** The current regulatory approval system for chemicals grandfathered in 62,000 chemicals, essentially approving them with little or no safety data. EPA has only 60 days to review new chemicals for their safety, and as a result between one and three thousand new chemicals are introduced each year with little or no safety data. Of the 3,000 most highly used chemicals, fewer than half have any toxicity testing data and fewer than one-fifth have been tested for their impact on developing children. The European Union recently instituted a more modern regulatory system for chemicals that ensures that safer alternatives are instituted as they become available. In the absence of such a system in the US, as studies document the health effects of bisphenol A and other toxins, families are forced to choose products with incomplete information about their safety, and placed into panic when studies are released documenting their health effects. Legislation like the Kids Safe Chemicals Act would empower EPA to ensure pre-market testing of chemicals that are used in consumer products, and broader reform of TSCA is needed to ensure that gaps do not remain in testing of chemicals in all products. It can take fifteen or even more years for epidemiologic studies to determine whether children are harmed by these exposures after the fact, and this approach represents an ongoing unsafe and unnatural experiment on America's children.

*** Failures of enforcement of existing environmental law have resulted in lost golden opportunities to prevent childhood disease.** The EPA has been failed to control some toxins in drinking water, such as arsenic and perchlorate, thereby exposing children to dangerous levels of these pollutants. Clean air standards that regulate pollutants known to cause or worsen

childhood respiratory diseases have been weakened, and new research suggest that the existing standards require further strengthening. Despite the fact that 10 million children live within four miles of Superfund sites containing high levels of known toxic chemicals, the Administration has consistently under-funded the Superfund program. As a result, the average number of Superfund sites cleaned up per year has dropped from 87 in the late 90's to 40. The Food Quality Protection Act represented Congress's explicit attempt to set food safety standards that account for children's unique exposures and vulnerabilities to pesticides. For many of the most dangerous pesticides, the EPA has failed to incorporate an additional child safety factor in setting the amount of pesticides that may remain in foods. In other cases, it has allowed some pesticide manufacturers to drag their feet in producing the health risk assessments necessary to protect children.

The National Children's Study -- Safeguarding the Health of Our Children

Finally in this testimony, I wish to point out the critical need for funding the National Children's Study, which will unearth so much information about the safety of chemicals widely used in the environment, and provide the foundation for appropriate and scientifically grounded policy.

The National Children's Study is a prospective multi-year epidemiological study that will follow 100,000 American children, a nationally representative sample of all children born in the United States, from conception to age 21. The study will assess and evaluate the environmental exposures these children experience in the womb, in their homes, in their schools and in their communities. It will seek associations between environmental exposures and disease in children. The diseases of interest include all those listed above. The principal goal of the Study is to identify the preventable environmental causes of pediatric disease and to translate those findings into preventive action and improved health care. The National Children's Study was mandated by Congress through the Children's Health Act of 2000. The lead federal agency principally responsible for the Study is the National Institute of Child Health and Human Development. Other participating agencies include the National Institute of Environmental Health Sciences, the Environmental Protection Agency, and the Centers for Disease Control and Prevention. By working with pregnant women and couples, the Study will gather an unprecedented volume of high-quality data on how environmental factors acting either alone, or in combination with genetic factors, affect the health of infants and children. Examining a wide range of environmental factors – from air, water, and dust to what children eat and how often they see a doctor – the Study will help develop prevention strategies and cures for a wide range of childhood diseases. By collecting data nationwide the study can test theories and generate hypotheses that will inform biomedical research and the care of young patients for years to come. Simply put, this seminal effort will provide the foundation for children's healthcare in the 21st Century.

Six aspects of the architecture of the National Children's Study make it a uniquely powerful tool for protecting the health of America's children:

1. *The National Children's Study is prospective in its design.* The great strength of the prospective study design is that it permits unbiased assessment of children's exposures in real time as they actually occur, months or years before the onset of disease or dysfunction. Most previous studies have been forced to rely on inherently inaccurate retrospective reconstructions of past exposures in children who were already affected with disease. The prospective design obviates the need for recall. It is especially crucial for studies that require assessments of fetal and infant exposures, because these early exposures are typically very transitory and will be missed unless they are captured as they occur. The National Children's Study will also adhere to the highest ethical standards to ensure that participation is completely voluntary, that environmental and health concerns are reported as soon as they are detected, and that families are empowered to protect themselves against known harmful exposures.
2. *The National Children's Study will employ the very latest tools of molecular epidemiology.* Molecular epidemiology is a cutting-edge approach to population studies that incorporates highly specific biological markers of exposure, of individual susceptibility and of the precursor states of disease. Especially when it is embedded in a prospective study, molecular epidemiology is an extremely powerful instrument for assessing interactions between exposures and disease at the level of the individual child.
3. *The National Children's Study will incorporate state-of-the-art analyses of gene-environment interactions.* Recognition is now widespread that gene-environment interactions are powerful determinants of disease in children. These interactions between the human genome and the environment start early in life, affect the health of our children, and set the stage for adult disorders. The heroic work of decoding the human genome has shown that only about 10-20% of disease in children is purely the result of genetic inheritance. The rest is the consequence of interplay between environmental exposures and genetically determined variations in individual susceptibility. Moreover, genetic inheritance by itself cannot account for the sharp recent increases that we have seen in incidence of pediatric disease.
4. *The National Children's Study will examine a nationally representative sample of American children.* Because the 100,000 children to be enrolled in the Study will be statistically representative of all babies born in the United States during the five years of recruitment, findings from the Study can be directly extrapolated to the entire American population. We will not need to contend with enrollment that is skewed by geography, by socioeconomic status, by the occurrence of disease or by other factors that could blunt our ability to assess the links between environment and disease.
5. *Environmental analyses in the National Children's Study will be conducted at the Centers for Disease Control and Prevention.* The CDC laboratories in Atlanta are the premier

laboratories in this nation and the world for environmental analysis. Because the testing will be done at CDC it will be the best available, and the results will be unimpeachable.

6. *Samples collected in the National Children's Study will be stored securely and will be available for analysis in the future.* New tests and new hypotheses will undoubtedly arise in the years ahead. Previously unsuspected connections will be discovered between the environment, the human genome and disease in children. The stored specimens so painstakingly collected in the National Children's Study will be available for these future analyses.

Congress has already laid a firm foundation for the National Children's Study. Between 2000 and 2008, the Congress invested more than \$200 million to design the study and begin building the nationwide network necessary for its implementation. Seven Vanguard Centers and a Coordinating Center were designated in 2005 at sites across the nation – in Pennsylvania, New York, North Carolina, Wisconsin, Minnesota, South Dakota, Utah and California – to test the necessary research guidelines –and another twenty-six centers were announced in September 2007. Eventually, the Study will expand the program to 41 states and 105 communities nationwide. The tough job of designing and organizing is nearly complete. We appreciate the foresight of the House and Senate Labor/Health and Human Services Appropriations Committees for their full funding of the Study, at \$192 million in their committee markups. Full funding for the Study this year will permit researchers to begin achieving the results that will make fundamental improvements in the health of America's children. To abandon the Study at this point would mean forgoing all of that dedication, all of that incredible effort, and all of the logistical preparation.

The National Children's Study will yield benefits that far outweigh its cost. It will be an extraordinarily worthwhile investment for our nation, and it can be justified even in a time of fiscal stress such as we face today. Six of the diseases that are the focus of the Study (obesity, injury, asthma, diabetes, autism and schizophrenia) cost America \$642 billion each year. If the Study were to produce even a 1% reduction in the cost of these diseases, it would save \$6.4 billion annually, 50 times the average yearly costs of the Study itself. But in actuality, the benefits of the National Children's study will likely be far greater than a mere 1% reduction in the incidence of disease in children. The Framingham Heart Study, upon which the National Children's Study is modeled, is the prototype for longitudinal medical studies and the benefits that it has yielded have been enormous. The Framingham Study was launched in 1948, at a time when rates of heart disease and stroke in American men were skyrocketing, and the causes of those increases were poorly understood. The Framingham Study used path-breaking methods to identify risk factors for heart disease. It identified cigarette smoking, hypertension, diabetes, elevated cholesterol and elevated triglyceride levels as powerful risk factors for cardiovascular disease. These findings contributed powerfully to the 42% reduction in mortality rates from cardiovascular disease that we have achieved in this country over the past 5 decades.

The data from Framingham have saved millions of lives – and billions of dollars in health care costs. The National Children’s Study, which will focus on multiple childhood disorders, could be even more valuable. We do not need to wait 21 years for benefits to materialize from the national Children’s Study. Valuable information will become available in a few years’ time, as soon as the first babies in the Study are born.

Consider, for example, data on premature births. The rate of U.S. premature births in 2003 was 12.3%, far higher than the 7% rate in most western European countries. Hospital costs associated with a premature birth average \$79,000, over 50 times more than the average \$1,500 cost for a term birth. Just a 5% reduction in rates of prematurity would cut hospital costs by \$1.6 billion annually. Within just two years, that savings would match the full cost of the Study.

The Study enjoys a broad group of supporters, including The American Academy of Pediatrics; Easter Seals; the March of Dimes; the National Hispanic Medical Association; the National Association of County and City Health Officials; the National Rural Health Association; the Association of Women’s Health, Obstetric and Neonatal Nurses; United Cerebral Palsy; the Spina Bifida Association of America; and the United States Conference of Catholic Bishops, just to name a few. This broad and diverse group recognizes the overwhelming benefits this Study will produce for America’s children.

The National Children’s Study is an investment in our children – and in America’s future, and will give our nation the ability to understand the causes of chronic disease that cause so much suffering and death in our children. It will give us the information that we need on the environmental risk factors and the gene-environment interactions that are responsible for rising rates of morbidity and mortality. It will provide a blueprint for the prevention of disease and for the enhancement of the health in America’s children today and in the future. It will be our legacy to the generations yet unborn.

In summary, policy improvements are urgently needed to improve the health of our children and economic security of our nation. Efforts to reduce mercury emissions from coal-burning power plants are needed to ensure that future generations of children can achieve their fullest health and economic potential. The Toxic Substances Control Act (TSCA) should more accurately reflect children’s unique vulnerability and ensure that chemicals are safe before they are allowed to be introduced into our environment. Enforcement of existing environmental law will go far to prevent costly diseases of environmental origin among American children. In addition to these policy actions, we also need sustained funding for the National Children’s Study if we are to develop effective methods of preventing diseases of environmental exposure among American children.

Thank you. I look forward to the opportunity to answer any questions you might have.



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Leonardo Trasande co-directs the Children's Environmental Health Center at the Mount Sinai School of Medicine (www.cehcenter.org), where he holds a joint appointment as an Assistant Professor in the Department of Pediatrics and the Department of Community and Preventive Medicine. Dr. Trasande serves on the Board of Scientific Counselors for the National Center for Environmental Health at the Centers for Disease Control and Prevention. His research interests span medicine and policy. He is best known for his analyses of the economic impact of environmental toxins on child health, and is embarking on a series of analyses that document the immediate health and economic consequences of childhood obesity. Dr. Trasande is also a leading investigator in the *National Children's Study*, a longitudinal cohort study of 100,000 children that will identify the preventable and environmental factors that contribute to asthma, obesity and other chronic conditions in childhood.

Dr. Trasande earned a Master's degree in Public Policy from Harvard's Kennedy School of Government, and an M.D. from Harvard Medical School. He completed a pediatrics residency at Boston Children's Hospital, a Dyson Foundation Legislative Fellowship in the office of Senator Hillary Rodham Clinton, and a fellowship in environmental pediatrics at the Mount Sinai School of Medicine. His work has been featured on the CNN documentary *Planet in Peril* and in *National Geographic*, and frequently appears on national media, including NBC's Today Show, ABC's Evening News and National Public Radio. Dr. Trasande is a Fellow of the American Academy of Pediatrics, and continues to practice clinically.