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# The Crisis in Children's Environmental Health Policy Implications

*Among the most vulnerable to environmental health hazards are the youngest members of society – children. Damage to children's health is an unacceptable byproduct of our heavy dependence on fossil fuels, coupled with environmental standards that fail to take into account children's unique physiology or routes of exposure. Policymakers need to consider the smaller body weight of children, their particular habits, and their increased sensitivity to environmental contaminants when drafting environmental regulations. Preventing illness and chronic disease in youth will result in substantial health cost savings. Moreover, initiatives that promote cleaner forms of energy and alternative transportation can protect children's health by minimizing exposure to hazardous constituents and maximizing opportunities for exercise.*

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Every day children breathe in fine particles, ground-level ozone, and other air pollutants; eat food contaminated by mercury and other toxic metals; and are exposed to petrochemicals – all the result of our heavy dependence on fossil fuels to power our homes, businesses and transportation network. Pound for pound, children drink more water, eat more food and breathe more air than adults, making them especially vulnerable to the health hazards associated with these pollutants. Young people are frequently exposed to contaminants at levels considered acceptable for adults but due to lower body weights are not safe for children. In fact, a large percentage of chemicals found in daily use lack basic available data on potential health impacts for children.

Many of the factors and behaviors that predispose a person to disease are established early in life making it critical that policymakers take immediate steps to reduce the environmental health risks facing children. Moreover, because children's environmental health overlaps several policy areas (e.g., energy, transportation, land-use, air quality), it is important to think holistically when seeking solutions. Recent attempts to combat rising obesity levels provide an interesting case for pursuing broad solutions. Weight problems in children and adults have led to recommendations for increased physical activity– yet studies show that increased exercise in regions with polluted air leads to an increase in the rate of childhood asthma. Children deserve comprehensive and coordinated environmental health policy solutions that consider the multiple risks they face.

This fact sheet highlights some the most critical environmental health problems facing children and steps policymakers can take to reduce these risks.

### *Why are Children at Greater Risk from Environmental Hazards?*

- **Exposure to chemical pollutants begins in utero** when substances cross the placenta and affect a developing fetus.
- **Children (less than 16 years of age) inhale more air per kilogram of body weight than adults.** Health damage from air pollution is related to the amount of pollutants inhaled in

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relation to body weight. Children breathe more quickly than adults and tend to do so through their mouths – which bypass the natural filters in the nose and allow large amounts of polluted air to go directly into their lungs.

- **Children's organs are still developing and are less able to defend the body from airborne pollutants compared to adults.**
- **Children are active outside, playing and exercising, during the summer when ozone levels are highest.** Studies have reported significant reductions in lung function in children who are active outdoors.<sup>1</sup> This is ironic since physical activity is promoted for children.
- **The places where many children play** (in city parks and schoolyards near high traffic areas), **put them at greater risk of inhaling pollutants.**
- **Rapid lung development occurs in children between ages of 10 and 18 years** - most boys double their lung function, and girls increase theirs by about two-thirds. Studies indicate that air pollution hampers lung function development significantly.<sup>2</sup>

<i>Health Condition</i>	<i>Pollutant Associated with Health Condition</i>	<i>Source of Air Pollutant</i>
Slowed lung growth	Nitrogen Oxide (NOx) , Particulate Matter (PM <sub>10</sub> , PM <sub>2.5</sub> )	Coal-fired power plants; motor vehicles.
Asthma causation	Ozone	Chemical reaction of NOx and Volatile Organic Compounds (VOC) that come from motor exhaust, industrial emissions, gasoline vapors, and chemical solvents.
Asthma exacerbation	Nitrogen Oxide, Particulate Matter (PM <sub>10</sub> , PM <sub>2.5</sub> )	Motor vehicles, power plants, wood burning.
Acute respiratory illness	Ozone	Chemical reaction of NOx and VOC that come from motor exhaust, industrial emissions, gasoline vapors, and chemical solvents.
Impaired neurological development	Mercury	Coal-fired power plants.

### *Asthma and Air Pollution: The Number One Chronic Disease of Children*

- **Asthma affects more than 20 million Americans, including 9 million children.**<sup>3</sup>
- **Air pollution can bring on asthma attacks.** When traffic congestion was reduced in Atlanta during the Olympic Games, there was a decreased traffic density which was associated with a reduction in pollution and lower rates of childhood asthma events.<sup>4</sup> A study by Yale University researchers in 2003, found that children with asthma were particularly vulnerable to ozone even at levels below EPA's current 8-hour ozone standard.<sup>5</sup>

- **Air pollution can cause asthma not just exacerbate it.** A study by the University of California found that children who participated in sports in communities with high concentrations of ozone were more likely to develop asthma.<sup>6</sup>
- **A recent study found that one in four children in New York's Harlem neighborhood had asthma** — double the rate researchers expected.<sup>7</sup>
- **Asthma keeps children home from school more than any other ailment.** Nationally, students miss more than 14 million school days per year due to asthma-related illnesses, according to the Center for Disease Control. Rates for asthma-related deaths and hospitalizations are routinely higher for African-American children. **The presence of asthma in children has been associated with poorer academic performance** and limitations on physical activity. Asthmatic children have twice the need for special education programs when compared to non-asthmatic children.
- **In the United States the estimated cost of treating children with asthma is almost three times more in health care expenses per year compared to children without asthma.**<sup>8</sup> The estimated cost of treating asthma in those younger than 18 years of age is \$3.2 billion per year.<sup>9</sup>

### *Gasping for Breath!*

1. Knoxville (TN)
2. Memphis (TN)
3. Louisville (KY)
4. Toledo (OH)
5. Washington DC
6. St. Louis (MO)
7. Allentown (PA)
8. Springfield (MA)
9. Grand Rapids (MI)
10. Scranton (PA)

Cities were ranked based on annual air quality, prevalence of asthma, number of prescriptions and asthma specialists per capita.

The Asthma and Allergy Foundation of America's 2005 ranking of the top 5 most challenging places in America for people living with asthma.

### *Air Emissions from Power Plants and Transportation Sector Expose Children to Unnecessary Risks*

In addition to asthma, children suffer from other health problems brought on by air pollution from coal-fired power plants and motor vehicles. Over 600 existing coal-fired power plants are 30-50 years old and are up to 10 times dirtier than new power plants built today.<sup>10</sup> In 2002, the transportation sector was responsible for 82 percent of total carbon monoxide (CO) and 56 percent of total NO<sub>x</sub> emissions, with highway vehicles (cars, buses and trucks) emitting 75 million tons of CO (62 percent of total transportation emissions) and 8 million tons of NO<sub>x</sub> (37 percent of total emissions).<sup>11</sup>

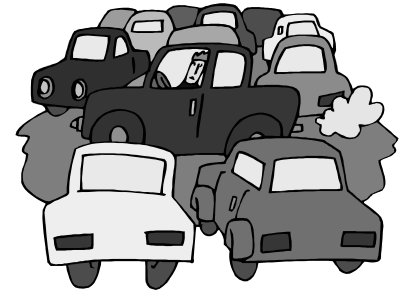


- The Environmental Protection Agency (EPA) attributes the **premature deaths of over 64,000 Americans to air pollution** annually.<sup>12</sup>
- Young people are especially vulnerable to adverse effects of automobile use. Notable are the effects of poor air quality, including poor air quality inside the vehicles they travel in and poor air quality arising from the overall level of automobile use in the community.<sup>13</sup>

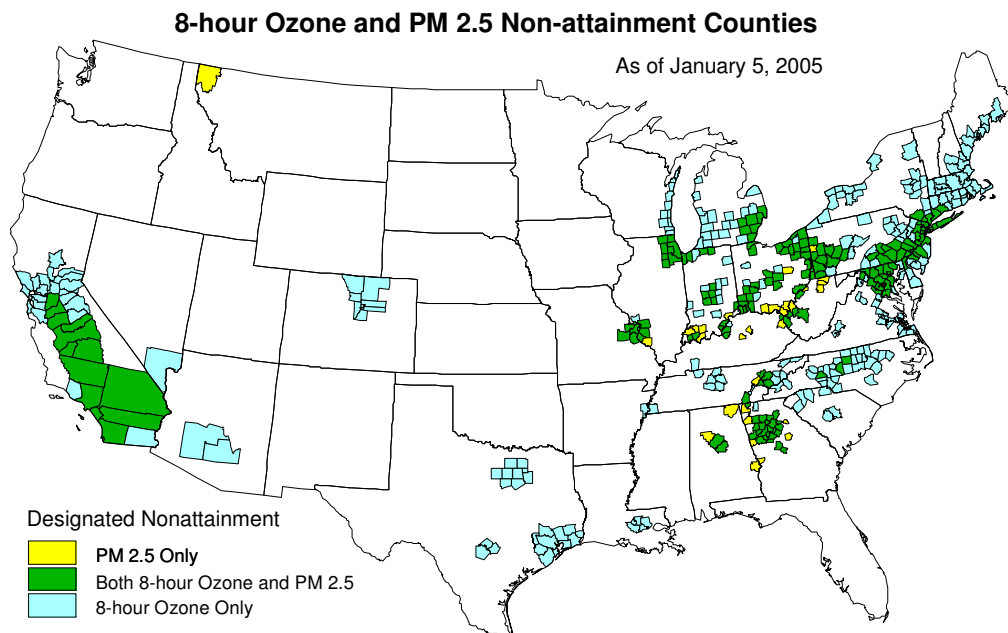
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- **A study in the New England Journal of Medicine provides definitive evidence that smog limits the development of healthy lungs in children.**

The study, conducted by a team of University of Southern California researchers, tracked lung development in nearly 1,800 students living in the Southern California region from 4<sup>th</sup> grade until high school graduation. Lung development was shown to be slower in children living in highly polluted communities, while lung function improved when children move to less-polluted communities.<sup>14</sup>



- **On a yearly basis, school buses in America release 3,000 tons of particulate matter, 95,000 tons of smog forming pollutants, 11 million tons of greenhouse gas emissions and dangerous carcinogens.**<sup>15</sup> More than 24 million children in the US ride a bus to and from school every day.<sup>16</sup> Increased exposures from commuting by school bus are estimated to increase a child's lifetime cancer risk by approximately 4 percent or 30 per million.<sup>17</sup>
- **Pollution produced from diesel exhaust may be responsible for over 125,000 additional cancers in the U.S. over a lifetime of exposure.**<sup>18</sup> The South Coast Air Quality Management District (SCAQMD) in California estimates that diesel pollution contributes to 70 percent of the state's cancer risk due to airborne pollution.<sup>19</sup> Diesel fuel powers approximately 90 percent of the 617,000 school buses on the road.<sup>20</sup>



The Environmental Protection Agency (EPA) classification of areas in non-attainment of federal air quality standards for particulate matter and ozone indicates that many densely populated urban areas have poor air quality exposing millions of children to hazardous air pollutants. 55 percent of the total US population lives in these areas

- **Studies have linked chronic exposure to particle pollution to slowed lung function growth in children and teenagers.**<sup>21,22</sup>
- **Findings published in the journal *Pediatrics* have linked fine particle pollution exposure in pregnant women with an increased occurrence of lower birth weights.** The joint study conducted by the Center for Disease Control (CDC) and EPA examined birth weights of 18,247 babies in California in 2000. It concluded that pregnant women living in areas with high levels of particulate matter pollution were more likely, on average, to give birth to babies weighing 30 grams (1 ounce) less than normal.<sup>23</sup>
- **New findings from a study of New York City newborns suggests that prenatal exposure to air pollution may be linked to genetic changes associated with an increased risk of cancer.**<sup>24</sup> This is the first time researchers have seen evidence that air pollutants can change chromosomes in utero.
- **New preliminary estimates from the EPA suggest that approximately 630,000 newborns each year may have increased risk of learning disabilities associated with methyl mercury exposure inside their mothers' wombs.** Nearly 16 percent, or one in six women of childbearing age, may have mercury levels above what is considered safe by the EPA.<sup>25</sup> These figures are almost double EPA's earlier estimates of newborns and women at risk.<sup>26</sup> Mercury can have adverse effects on the developing cardiovascular systems, blood pressure regulation and heart rate variability. Mercury also threatens the brain, kidneys, liver, and central nervous system.<sup>27</sup> **Coal-fired power plants contribute 40 percent of total mercury emissions.**<sup>28</sup>

### Childhood Obesity and Physical Inactivity - The Need for a Holistic Solution

- Nearly one-third of children ages 6 to 11, are overweight and 15 percent are obese.<sup>29</sup> Seventy to 80 percent of obese adolescents will remain obese as adults. Obese children have higher average blood pressure, heart rate and cardiac output compared to non-obese children.<sup>30</sup>
- Lack of physical activity and a poor diet are significant contributors to the occurrence of obesity among children. Studies have show a significant decline over the past 20 years in the number of children aged 5 to 15 who walk or bike to school. In 1969, 35 percent of students lived within a mile of school and 87 percent of those walked to school, according to the CDC. Today, only 20 percent of students live within a mile to school and only about a third of those walk.

The CDC and many other organizations are promoting increased physical activity for children, including measures to redesign communities to promote increased walkability and bikeability. However, poor air quality can hamper the success of such efforts, by endangering children that are most active. Children's health needs a holistic solution.



### *Clean School Bus Programs Faces Funding Shortfall that Slows Down Dirty Bus Cleanup*

The Environmental Protection Agency's (EPA) new diesel regulations require the use of diesel with 15 parts per million (ppm) sulfur content in "on road" vehicles beginning in 2006 and for "off-road" vehicles beginning in 2010. Currently, sulfur content in diesel is approximately 500 ppm. EPA also requires diesel engines beginning with model year 2007 to meet stricter standards for particulate matter and nitrogen oxides. However, **these rules do not address the impact of existing buses.** Federal, state and private retrofit and replacement programs are tasked with the challenge of dealing with the impacts of existing diesel vehicles.

EPA's **Clean School Bus USA** program is a public-private partnership that seeks to reduce children's exposure to air pollution from diesel school buses through bus retrofits and clean fuels, bus replacement, and anti-idling strategies. **In 2003, EPA received more than 120 applications requesting nearly \$60 million in funds. In 2004, Congress allocated only \$5 million for school bus retrofit and replacement - leaving a \$55 million funding gap. In 2005, Congress allocated the Clean School Bus USA program \$7.5 million - leaving a \$52.5 million gap, and the Administration's 2006 Budget requested \$10 million for this program, leaving a \$50 million funding gap just from 2003 clean school bus applicants, not taking into account additional programs seeking funds**



In November 2004, the Clean Buses for Kids Program, which was undertaken in connection with a \$20 million settlement of enforcement action under the Clean Air Act, received **423 Expressions of Interest** for funding the purchase and installation of emissions control equipment and to offset the costs of using ultra low sulfur diesel (ULSD) fuel. Sixty-two school districts were selected for assistance, leaving **361 proposals not funded.**

### *Policy Recommendations*

Damage to children's health is an unacceptable byproduct of our heavy dependence on fossil fuels. Inadequate environmental standards fail to protect children from these risks. Policymakers should consider the smaller body weight of children, their unique habits, and their increased vulnerability to environmental contaminants when drafting environmental regulations. Moreover, initiatives that promote cleaner forms of energy and alternative transportation modes can bolster children's health in several ways. Key policy solutions are listed below.

- Existing environmental regulations should be evaluated to determine if they are adequately protecting vulnerable populations like children. Environmental standards need to be strengthened to consider the smaller body weight of children and their susceptibility to environmental health risks.

- New children's environmental health protection legislation, modeled along the principles of the California Environmental Health Protection Act, should be implemented to provide a more comprehensive way to identify, assess, and reduce key environmental health risks to children posed by the ambient environment.
- Strengthen funding for air quality improvement and cleaner transportation programs like Congestion Mitigation and Air Quality Improvement (CMAQ) Program, EPA's Clean School Bus program, and other alternative fuel transportation projects to aid the transition to cleaner fuels.
- Strengthen fuel economy standards to increase energy efficiency, and decrease greenhouse gas emissions and fossil fuel consumption.
- Federal transportation policies need to encourage walkable communities, active living and active transportation for children, proximity to public transportation, and the use of alternative cleaner, alternative technologies and fuels in the transportation sector.
- Stronger policies to address the impact of mercury pollution from power plants and prevent unnecessary exposure to mercury.
- The nation's energy policy needs to reflect a sustained commitment to energy efficiency and conservation and the use of cleaner forms of energy including solar, geothermal, biomass, hydro and wind reducing reliance on old, dirty coal-fired power plants.

### *The Children's Environmental Health Protection Act*

In 2001, the California legislature passed the **California Environmental Health Protection Act**. It required the state to review all existing health-based ambient air quality standards to determine whether the standards adequately protected the health of the public, including infants and children, and to revise the highest priority air quality standards. It also required the establishment of a list of up to five specific toxic air contaminants that may impact infants and children especially susceptible to illness. The state would need to revise any control measures adopted for those toxic air contaminants, to reduce exposure to children. Evaluation of current monitoring methods and expansion of monitoring in communities in non-attainment, including installing monitors near schools, day care centers and children recreational centers is also required.

Based on the review of standards, in 2002, California Air Resources Board (CARB) adopted **stricter standards for PM<sub>10</sub>, and a new standard for PM<sub>2.5</sub>**.

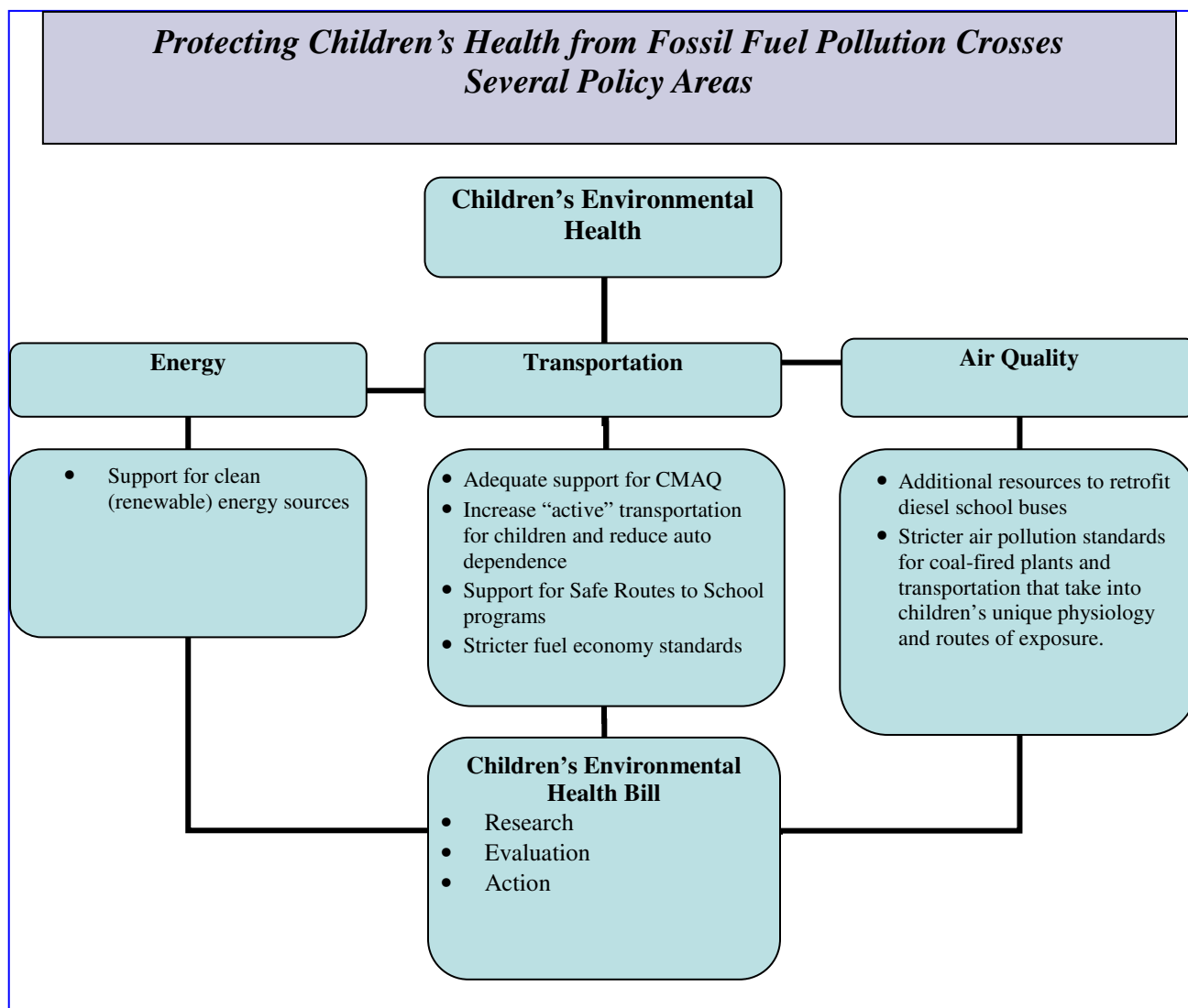
- **PM<sub>10</sub>** annual-average standard of **20 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ )**, not to be exceeded. **The EPA standard is 50  $\mu\text{g}/\text{m}^3$ .**
- A new annual-average **PM<sub>2.5</sub>** standard of **12  $\mu\text{g}/\text{m}^3$** . **The EPA standard is 15  $\mu\text{g}/\text{m}^3$ .**

Based on CARB staff recommendations, **new standards for ozone were adopted in April 2005:**

**Ozone 8-hour-average standard** – Strengthen the standard to **0.07ppm**. **The current EPA standard is 0.08ppm.**

A NO<sub>x</sub> review report will be released in 2005.

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## ENDNOTES

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