

## *Children's Health Protection Advisory Committee*

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August 30, 2005

Stephen L. Johnson, Administrator  
 United States Environmental Protection Agency  
 1200 Pennsylvania Avenue  
 Washington, D.C.

RE: Children's Environmental Health and Climate Change

Dear Administrator Johnson:

The Children's Health Protection Advisory Committee wishes to call to your attention the children's environmental health aspects of global climate change and to offer recommendations for EPA action to address this pressing problem. EPA has been a leader on children's environmental health issues, both domestically and internationally; leadership on the children's environmental health aspects of climate change would extend the agency's track record. In this letter, we make several key points about climate change as an issue of children's environmental health:

- Climate change is real, and requires urgent, effective responses.
- Climate change will affect children's environmental health, in some cases disproportionately.
- Current EPA efforts to address the overall problem of climate change and specific impacts on children's environmental health need to be substantially strengthened.

EPA should use all available authority to reduce greenhouse gases (GHGs) to avoid an irreversible course of global climate change with attendant harm to children. We offer several recommendations for EPA action, related to greenhouse gas mitigation, research, outreach and education, and leadership at the national and international levels.

**Climate change is real, and requires urgent, effective responses.**

There is little question that global climate is changing, with a warming of the mean surface temperature already observed; that anthropogenic emissions account for some of this change; that climate change has a range of potential effects on human and ecological health; and that climate change has considerable momentum (see Appendix). Our Committee notes that the United

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States signed a communique at the July, 2005 G8 meeting in Gleneagles acknowledging these facts. It reads, in part,

“Climate change is a serious and long-term challenge that has the potential to affect every part of the globe. We know that increased need and use of energy from fossil fuels, and other human activities, contribute in large part to increases in greenhouse gases associated with the warming of our Earth’s surface. While uncertainties remain in our understanding of climate science, we know enough to act now to put ourselves on a path to slow and, as the science justifies, stop and then reverse the growth of greenhouse gases.”

Urgent action is necessary both to mitigate the effects of global climate change and to adapt to those that cannot be avoided. Insufficient action now risks locking the planet—and America’s and the world’s children—into a future of irreversible climate change.

**Climate change will affect children’s environmental health, in some cases disproportionately.**

Climate change potentially places all people at risk, both in the U.S. and globally. Children are especially vulnerable because of their developing organ systems, their high risks of certain exposures, and other reasons (Patz et al., 2000a; Balbus and Wilson, 2000; Bunyanavich et al., 2003; Martens and McMichael, 2002; Haines and Patz, 2004). Major children’s environmental health risks impacted by climate change include:

- Infectious diseases
- Air pollution
- Direct effects of heat
- Interruptions of food supply
- Threats to water quality and quantity
- Allergies
- Weather-related disasters
- Disruption of social systems and displacement of populations

We believe that these hazards to children constitute “danger” in the sense anticipated by the United Nations Framework Convention on Climate Change, which defines the long-term objective of that agreement as stabilization of greenhouse gas at a level that avoids “dangerous anthropogenic interference” with the climate system. While danger in this context has conventionally been defined by reference to ecological damage (O’Neill and Oppenheimer, 2002), surely a global situation that places children at serious risk of harm should be considered “dangerous.”

Climate change is not only an issue for today’s children; it is a long-term multi-generational issue. Given current life expectancies, today’s newborns will on average live until 2082, by which time climate change will be far advanced unless we take immediate and effective action now. The legacy of our decisions and actions will rest on

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the shoulders of today's children, and their children, as they live out their lives in coming decades. Any actions we take to mitigate the health impact of climate change will benefit today's children, their children, and future generations (Waterston and Lenton, 2000).

**Current EPA efforts to address the overall problem of climate change and specific impacts on children's environmental health need to be substantially strengthened.**

The Children's Health Protection Advisory Committee acknowledges the efforts to address climate change currently underway at EPA, both in the Global Climate Research Program (GCRP) at the Office of Research and Development (ORD), and in several parts of the Office of Air and Radiation (OAR). This work is described in the Appendix to this letter. Despite current budgetary pressures, it is essential that these and additional efforts receive continued support. However, these efforts neither reflect the urgency of the issue nor have any explicit focus on the children's environmental health implications of climate change. No regulatory action is underway, and the timetable for action on GHG emissions does not account for the severity of the problem facing the globe and the world's children. Moreover, voluntary efforts until now have been insufficient; U.S. GHG emissions continue to rise. The Committee believes that EPA can and should take a variety of steps to address this issue more aggressively and effectively.

#### **Recommendations for further EPA activity.**

We urge EPA to lead the nation in recognizing climate change as a threat to children both today and in the future, and to undertake a series of actions to protect children's environmental health. Our recommendations can be divided into four main areas: reducing GHG emissions; research; outreach and education; and domestic and international leadership.

Climate change mitigation is urgently needed and EPA can move promptly and aggressively to **reduce GHG emissions**.

1. EPA should use existing regulatory authority to require mandatory controls on U.S. GHG emissions. This Committee believes that EPA possesses authority under the Clean Air Act to regulate GHG emissions. In particular, section 202(a)(1) authorizes the agency to regulate "any air pollutant" that may adversely affect "public health or welfare" and the Act's definitions section (section 302(h)) provides that the effects on "welfare" include effects on "weather" and "climate." Like other harmful pollutants that EPA currently regulates pursuant to Clean Air Act authority, GHG emissions are a direct and immediate threat to the "public health or welfare" of American citizens, and in particular to American children.
2. EPA needs to explore regulatory and other actions, alone and in partnership with the Department of Transportation, to reduce GHG emissions from mobile sources. This can be accomplished by mandatory reduction targets, improved fuel efficiency requirements, transportation demand management measures, and enhanced investments in alternative transportation modes including mass transit and foot and bicycle paths.

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3. In addition to regulatory action, EPA should continue to promote voluntary reductions in GHG emissions through such programs as Energy Star, the Green Power Partnership, and the recently announced partnership with the Department of Energy and the Department of Housing and Urban Development on Home Energy Efficiency.
4. EPA should expand development of new technology through the Climate Change Technology Program, economic incentives, and other means, including technologies in energy generation, domestic and commercial energy use, mobile sources, manufacturing, and waste generation and management.

EPA should support **climate change research** on both mitigation and adaptation, with a focus on children's environmental health.

5. As the GCRP reviews its research agenda, children's health should be explicitly designated a priority issue. Intramural and extramural research on adaptations to minimize children's morbidity and mortality related to climate change should be a high priority.
6. EPA should champion a focus on children's environmental health within the U.S. Climate Change Science Program, of which EPA is a part.
7. The Climate Change Science Program should continue its current research focus on "decision support," as described in the Appendix, and explicitly target decision-makers relevant to children's health such as policymakers, pediatricians, children's hospitals, and health departments.
8. EPA should support including metrics of climate change and its expected outcomes in the National Children's Study, and should include such metrics in the Report on the Environment, and in the "America's Children and the Environment" report.

EPA should support **outreach and education** on climate change and its effects, including effects on children's environmental health.

9. The Office of Children's Health Protection should include the links between climate change and children's health in its outreach and education efforts.
10. The Office of Air and Radiation should emphasize the children's health benefits of GHG mitigation as it reaches out to various stakeholders.
11. EPA should target schools and hospitals as large facilities in the centers of thousands of communities that can "walk the talk" and adopt and showcase cleaner and more efficient energy systems and sources. (OAR's Energy Star program provides an example of this targeted outreach.) These efforts will help save money and serve as local role models of GHG emission reductions.
12. EPA should educate the public about the connections between consumer choices and the contributions of mobile sources to GHG emissions.

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EPA should exercise **domestic and international leadership** on climate change mitigation.

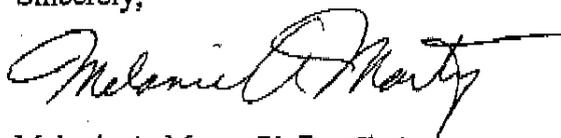
13. EPA should play a *domestic* leadership role in calling attention to climate change and by leading efforts to mitigate it. EPA's leadership should have an impact on other Federal agencies, the GCRP, state and local governments, the private sector, academia, civil society, and the public.
13. EPA should work with other U.S. agencies (State, Energy, Commerce, the office of the U.S. Trade Representative, and others) to play an *international* leadership role in reducing GHG emissions promptly and on a multilateral basis, through such strategies as technical assistance to developing nations. Appropriate support for developing nations, as well as their full participation, is crucial to the success of any international emissions trading scheme.
14. EPA should collaborate with international agencies such as the World Health Organization in pursuing global research and education on the health effects of climate change, including effects on children.
15. EPA should champion the consideration of children's environmental health at upcoming international climate change meetings.

### Conclusion

Climate change threatens human health in ways that are serious and potentially irreversible. The scientific consensus that anthropogenic climate change is already occurring and that current emissions will contribute to climate change for decades to come compels urgent action. Our recommendations emphasize the critical importance of primary prevention—reducing GHG emissions—as a means of protecting children's environmental health. We urge EPA to exercise its regulatory authority to require prompt, mandatory reductions in U.S. GHG emissions. We also call on EPA to expand voluntary efforts to mitigate climate change and to promote technology innovation to reduce GHG emissions. We recommend EPA support for research that will help understand and respond effectively to climate change, vigorous outreach and education efforts, and domestic and international leadership in addressing climate change.

Thank you for your consideration of our recommendations.

Sincerely,



Melanie A. Marty, Ph.D., Chair  
Children's Health Protection Advisory Committee

Cc: Bill Wehrum, Acting Assistant Administrator, Office of Air and Radiation  
Tim Oppelt, Acting Assistant Administrator, Office of Research  
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Joanne Rodman, Designated Federal Official, CHPAC

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## Appendix

### The Science of Climate Change

The concentration of carbon dioxide (CO<sub>2</sub>), a principal greenhouse gas (GHG), has risen from an estimated 280 ppm before the industrial revolution to around 380 ppm today, and computer models forecast future levels that may reach 700, 800, or even 900 ppm. Other GHGs such as nitrous oxide and methane have also increased in concentration, the latter by more than twofold. In parallel with these atmospheric changes, the earth's mean surface temperature has increased (by about 0.6 degrees C) over the last century, and the Intergovernmental Panel on Climate Change (IPCC) believes it will continue to do so, rising between 1.4 and 5.8 degrees C during the 21st century. These changes may have profound effects on earth systems, including melting of polar ice masses, rising ocean levels, alterations in ocean currents, more frequent and severe precipitation in some places, and others (McCarthy et al., 2002; Watson, 2002).

The vast majority of scientists who have studied these issues agree that climate is changing, and that this is due at least in part to anthropogenic emissions of GHGs. There does remain uncertainty regarding the extent and pace of future changes. Nevertheless, it is clear that even if human emissions of greenhouse gases stabilized or decreased today, the momentum of global climate change would continue; this unavoidable temperature increase is estimated to be one degree C if all GHG emissions were to stop today, and several degrees higher given more realistic scenarios (Meehl et al., 2005; Wigley, 2005). While more research is needed on many aspects of climate change, enough is known to compel action now.

There is a need for urgent and effective responses. It is estimated that to avoid serious social and environmental impacts, society should aim to stabilize atmospheric concentrations of CO<sub>2</sub> at around a doubling of pre-industrial levels, or 500-550 ppm. Full protection of children may require an even lower CO<sub>2</sub> stabilization level. Some observers have called for profound reductions in GHG emissions, in the range of 70% (Gelbspan, 2004). The stabilization of GHG concentrations at a level that will protect our children and avoid serious damage to our environment will require action be taken across the globe.

### Children's Environmental Health Impacts of Climate Change

Children are especially susceptible to several of the anticipated health effects of climate change. These effects, and the nature of children's risks, are reviewed below.

- **Infectious diseases:** Several aspects of climate change, especially rising temperatures and changing precipitation patterns, are expected to contribute to the spread of vector-borne diseases in many areas (Epstein, 2000, 2001; Gubler et al., 2001; Patz et al., 2000b). More precipitation and more accumulation of water favor the breeding of mosquitoes, and higher temperatures result in accelerated mosquito maturation and increased feeding. Mosquitoes are the vector for malaria, dengue fever, encephalitis, and other tropical diseases. Several emerging diseases, such as Hantavirus and West Nile virus, have also been linked to changing climate. Children are especially vulnerable to many of these diseases. For example, malaria primarily kills children

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between 3 months and 5 years of age because they have little immunity and are subject to complications such as cerebral malaria (Krause, 2000). Children are also especially prone to mosquito and tick bites because they play outside and close to the ground, where these insects gather (Bunyanavich et al., 2003).

- **Air pollution:** Air pollution is expected to worsen with advancing climate change. First, warmer temperatures are associated with increased ozone levels. Second, warmer temperatures increase the demand for electric power, causing electric power plants to increase output, raising emissions of particulates, oxides of nitrogen, oxides of sulfur, and other pollutants (Bernard et al., 2001). These problems target children preferentially, because of their immature lungs, narrow airways, high respiratory rates, tendency to play outdoors, and high baseline prevalence of asthma (American Academy of Pediatrics, 2004).
- **Heat:** A warmer climate will cause more heat waves. Children are at risk because they need more fluid per pound of body weight than adults need and are less able to control their immediate environs and fluid balance, especially during severe heat waves (McGeehin and Mirabelli, 2001).
- **Interruptions in food supply:** Agricultural production is affected by climate change through alterations in local and regional weather patterns (McMichael, 2001; Rose et al., 2001). Many crops grow less productively, and insects, weeds, and plant disease may thrive, diminishing crop production further. This may result in increased pesticide use, introducing further exposure risks to children. Livestock may also be affected, especially in warm climates, with such responses as decreased milk production, decreased reproduction, and increased susceptibility to parasites. A food supply that is compromised, even temporarily, could threaten the nutrition of children, who are especially dependant upon a regular supply of nutritious food to ensure healthy growth and development.
- **Threats to water quality and quantity:** Climate change accelerates the hydrologic cycle, melting sea ice, accelerating evaporation from sea and other surface waters, increasing the frequency and intensity of precipitation in some areas, and triggering drought in other areas. Severe weather events are discussed below. In the specific context of drinking water, ground and surface water supplies can run short due to drought, and rising sea levels can cause salt water intrusion into groundwater near coastal areas. Storms and floods can compromise supplies of clean water. Water scarcity threatens children, who need to consume more fluids per unit of body weight than do adults, and water contamination increases the risk of infectious gastrointestinal disease, to which children are especially vulnerable (Curriero et al., 2001).
- **Allergies:** Certain pollen-producing plants, such as ragweed, thrive under conditions of higher carbon dioxide and heat (Emberlin, 1994). The production of allergens from these plants is expected to increase, and weather patterns may favor the dispersion of these allergens. Development of allergies is strongly associated with exposure to allergens during critical periods of childhood (Wahn et al., 1997). Therefore, climate change poses a risk of allergic illness for children, both during childhood and persisting into adulthood.

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- **Weather disasters:** Severe weather events such as hurricanes and floods are highly disruptive, displacing families from their homes and causing injuries, drowning, gastrointestinal disease, and psychological trauma. Such events are predicted to increase in frequency and severity with climate change in some parts of the U.S. (Easterling et al, 2000, McCarthy, 2001). Children are especially susceptible to many of these conditions, especially waterborne gastrointestinal diseases.
- **Disruption of social systems and displacement of populations:** In addition to food shortages, water shortages, and severe weather events, all described above, climate change is predicted to result in rising sea levels and inundation of some heavily populated coastal areas. These changes, while difficult to predict quantitatively, could result in major disruption of social systems, and could require substantial displacement of populations resulting in "environmental refugees." Some writers have even predicted civil strife in relation to climate change effects (Homer-Dixon, 1999; Klare, 2001). Children suffer greatly during periods of social disruption, population displacement, and civil strife.

### **Current EPA Activities on Climate Change**

The Global Climate Research Program (GCRP), in the Office of Research and Development, focuses on scientific research related to climate change, and generally does not address policy issues. Its focus is on assessing the impacts of climate change and clarifying options for adaptation, rather than on mitigation (what health scientists would call primary prevention). GCRP research assesses the potential impacts of global change (especially climate variability and change) on four sectors: 1) air quality, 2) water quality, 3) ecosystems, and 4) human health. The health research undertaken to date has focused on the potential consequences of global change on 1) weather-related mortality and morbidity; 2) water- and vector-borne diseases; and 3) health consequences of changes in ambient air pollution. The GCRP is currently undergoing a review of its scientific research agenda by the Board of Scientific Counselors, which will result in an updating of its 2001 agenda.

Climate change research at the EPA occurs within the larger context of the U.S. Climate Change Science Program (CCSP), and EPA's GCRP is closely coordinated with the CCSP Strategic Plan. The CCSP coordinates and integrates scientific research on climate and global change supported by 13 Federal departments and agencies, from EPA to NOAA to DOE to NASA to HHS. The CCSP integrates the U.S. Global Climate Change Research Program (USGCRP) with the Administration's U.S. Climate Change Research Initiative (CCRI). While some health research has occurred in the Department of Health and Human Services, it has been limited to work on the effects of UV (at NIEHS), on certain infectious diseases (at CDC's Division of Vector-Borne Infectious Diseases), and on heat waves (at CDC's NCEH). An important feature of the CCSP research effort is an increasing emphasis on "decision support"—an effort to assure that climate change research is designed, and the results made available, in ways that optimally inform decision-making.

Climate change work also occurs at three locations within the Office of Air and Radiation. First, the Climate Change Division in the Office of Atmospheric Programs is responsible for developing the official U.S. inventory of greenhouse gases (GHGs) pursuant to the 1992 UNFCCC; conducting economic analyses of GHG mitigation;

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assessing long-term projections of climate change; and coordinating domestic and international policies relating to climate change. CCD also focuses on mitigation of non-CO<sub>2</sub> GHGs such as methane. Second, the Climate Protection Partnership Division works with businesses, organizations, governments, and consumers to reduce GHG emissions by promoting energy efficient and other cost-effective technologies. It has a wide range of programs including Energy Star, Green Power Partnership, the Heat Island Reduction Initiative, and others. Third, the Office of Transportation and Air Quality has a small group working on transportation-related climate change issues, such as promoting cleaner transportation technology. These efforts all feature a strong emphasis on voluntary, cooperative solutions to GHG emissions.

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