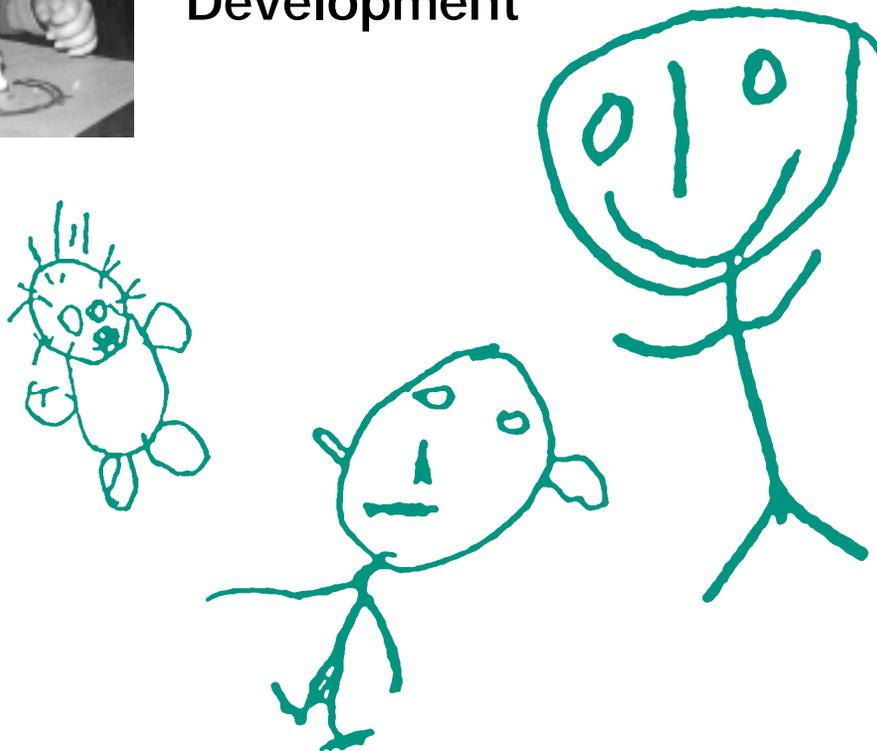




In Harm's Way:

Toxic Threats to Child Development

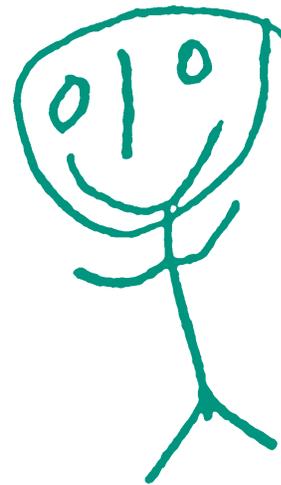


A REPORT BY
*Greater Boston Physicians
for Social Responsibility*

Prepared for a Joint Project
with Clean Water Fund

In Harm's Way:

Toxic Threats to Child Development



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MAY, 2000

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ORGANIZATIONS

Greater Boston Physicians for Social Responsibility (GBPSR) is an affiliate of Physicians for Social Responsibility, a national organization of over 15,000 physicians, health care professionals and supporters who are committed to the elimination of nuclear and other weapons of mass destruction, the preservation of a sustainable environment, and the reduction of violence and its causes. PSR is the national affiliate of International Physicians for the Prevention of Nuclear War, recipient of the 1985 Nobel Peace Prize. GBPSR's Human Health and the Environment Project (HHEP) was one of the first in the organization nationally to focus on the public health consequences of environmental pollution. Since 1992 the HHEP has been active in educating the medical community on the linkages between environmental exposures and health, activating members to work to protect public health, assisting grassroots groups with technical and scientific issues relating to human health and environment issues, and participating in public policy debates. In addition to *In Harm's Way: Toxic Threats to Child Development*, current projects include *Generations at Risk: Reproductive Health and the Environment*; the *Boston Sustainable Hospitals Project of Health Care Without Harm*, an organization that is working internationally to prevent pollution and the use of toxic products in the health care industry; and *No Room to Breathe*, focusing on the health effects of air pollution. For information on other reports and materials available from GBPSR, please see our web site at <http://www.igc.org/psr/>

Clean Water Fund (CWF) is a national nonprofit research and educational organization, with locally staffed environmental and health protection programs serving communities in over twenty states. CWF's mission is to develop strong grassroots environmental leadership and to bring together diverse constituencies to work cooperatively for changes that improve their lives, focused on health, consumer, environmental and community problems. Since 1978, CWF has helped people campaign successfully for cleaner and safer water, cleaner air, and protection from toxic pollution in our homes, neighborhoods and workplaces. Organizations and coalitions formed and assisted by CWF have worked together to improve environmental conditions, prevent or clean up health-threatening pollution in hundreds of communities and to strengthen policies locally and nationally. CWF's programs build on and complement those of Clean Water Action, a 700,000-member national organization which has helped develop, pass, strengthen and defend the nation's major water and toxics laws such as the Clean Water Act, Safe Drinking Water Act, Superfund and others, including their state-level counterparts.

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Foreword

The intersection between environmental chemicals and child development is a new area of public health science. It is only in the past few years that we have begun to grasp the potential health effects of even slight disturbances in child development. So much hinges on understanding the effects of environmental chemicals on these processes: developmental disabilities, including attention deficit/hyperactivity disorder, autism, and related neurodevelopmental diseases, affect millions of American children. The consequences of these disorders are often tragic. The familial, societal and economic costs are immense, and the disabilities can be life-long.

In the last two decades there has been an explosion of neurobiological research into attention, memory and other cognitive functions. In addition, the patterns and stages of normal brain development are now well understood. This new knowledge has given us a better understanding of the special vulnerability of the developing nervous system to the internal chemical environment. It is now clear from studies of animals and children

that subtle changes in the concentrations of normally occurring chemicals such as hormones—as well as the presence of toxic agents like lead, mercury or PCBs—can produce profound and permanent changes in the developing nervous system. These changes can lead to decrements in mental performance and alterations of the reproductive system.

A picture is unfolding supported by a variety of laboratory, clinical and epidemiological research that suggests that neurotoxic chemicals in the environment may play a role in developmental disabilities. The implications of this notion are profound. If we can understand the role of environmental chemicals in neurodevelopmental disorders, we can take concrete steps toward the prevention of these disorders. By reducing and eliminating exposures to specific environmental chemicals through the use of regulatory bans, development and promotion of alternative agents and exposure minimization, we may, in time, be able to reduce the occurrence of neurodevelopmental disability. We may even be able to prevent some disabilities from ever again limiting a child's potential, an extraordinary prospect.

Yet such potential is often obscured by a voluminous and at times confusing scientific literature. *In Harm's Way* is an analysis of that literature. Ted Schettler and his co-authors have prepared a text on neurodevelopmental disorders and environmental chemicals that makes a complex body of scientific information accessible to health professionals and the scientifically literate general public.

The authors elucidate the evidence for specific scientific claims and help readers understand what is known and what is conjectured. They begin with two linked observations: (1) that developmental disabilities are common in American children; and (2) that the causes of these disabilities are largely unknown. *In Harm's Way* presents an elegant discussion of normal brain development and explores why these developmental processes are so vulnerable to environmental insult. It goes on to highlight a series of case studies describing chemicals in the environment that are known to disrupt brain development in laboratory animals and in children.

One of the difficulties in talking about neurodevelopmental disabilities is that these disorders are not easily defined. They do not lend themselves to simple diagnostic tests like blood sugar in diabetes or the EEG in epilepsy. They are defined in loose clinical or behavioral terms and often present as a range or spectrum of behaviors. At what point is difficulty learning diagnosed as a

learning disability? When does inattention qualify as attention deficit hyperactivity disorder? While clinicians have devised ways of answering these and other similar questions, the labeling problem remains at the heart of efforts to understand patterns of neurobehavioral disabilities. The most basic of public health research efforts—a simple count of the number of cases—persists as a stumbling block, fraught with contested assumptions and rival criteria.

As one example of its eminently trenchant analysis, *In Harm's Way* carefully reviews the labeling problem such that clinicians, basic scientists, policy makers, advocates, and parents can forge shared understanding. Such is the usefulness of *In Harm's Way*. Throughout, it identifies some of the areas of greatest confusion in this new field, and delineates the underlying logic and lines of evidence. As a result, this book is sure to inform discussions among representatives of widely varying disciplines.

We stand at the brink of an era that will almost certainly see the identification of the causes of a wide range of neurobehavioral disorders. It will also enable preventive measures to be taken. *In Harm's Way* has clarified a starting point for this next era of environmental health.

Not-for-profit health advocacy organizations are now major players in health and environmental policy making. The successful passage of the Clean Air Act Reauthorization in 1996 was

achieved by the efforts of advocacy groups supporting the EPA. The same organizations, known in the United Nations as non-governmental organization (NGOs), are now participants in international treaty negotiations. Previously excluded from environmental health discussions in the UN and the World Health Organization, NGOs in the last 10 years have achieved a place at the negotiating table. To accomplish this, the not-for-profit advocacy organizations have become more effective politically and more professional scientifically.

The best of these organizations are able to provide scientifically credible information as an alternative point of view to government and industry. They can synthesize and review data in what are often emerging fields with contradictory signposts. Nowhere are the benefits of this capability more evident than in the field of environmental health. Experts from advocacy organizations now sit as scientific peers with representatives of government, academia and industry, as, for example, on the EPA's recently concluded Endocrine Disruptor Screening and Testing Advisory Committee.

Physicians for Social Responsibility (PSR) is an NGO at the forefront of efforts to establish for both the public and for policy makers the present state of the science in environmental health. In 1994, PSR released *Critical Condition: Human Health and the Environment*,



edited by Eric Chivian, which gave a broad overview of the connection between health and global environmental change. In 1999, Ted Schettler and Maria Valenti, along with Gina Solomon and Annette Huddle, authored *Generations at Risk: Reproductive Health and the Environment*, in which they analyzed the science of reproductive health damage by chemical pollution. In other professional capacities physicians associated with PSR have participated in scientific analysis of the health effects of global warming and reemerging infectious disease as well as of biodiversity and species loss. With *In Harm's Way*, PSR lends its characteristic clarity to the field of children's environmental health. PSR—both the Greater Boston Chapter and its National Office—is to be commended for commissioning this important work.

The present situation of environmental health argues for precaution. We have apparently increasing incidence of significant

developmental disabilities. We have plausible biological mechanisms connecting environmental toxicants with health effects, as demonstrated in laboratory animals. We have accumulating evidence of neurotoxic damage to children by environmental agents, such as lead and PCBs. The authors of *In Harm's Way* provide compelling, scientifically documented arguments laying out the next steps we as a society must take:

we must increase our understanding of the neurotoxicity of chemical agents now in the environment, and we must adopt public health policies that limit the exposure of fetuses and children to environmental chemicals. ☺

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