

Study of Children in the Environment

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Summary

From the website burnbarrel.org website on the Health link there is an abstract that speaks to environmental pollutants and disease in American children. This study fits well with both the environmental and health component of this workgroup. The panel of experts acknowledged that many of the changes in childhood diseases are caused by many factors and specifically evaluated what fraction of the whole could be attributable to the environment. The four categories of childhood disease that were evaluated were lead poisoning, asthma, cancer, and developmental disorders. This summary will speak only to asthma.

An environmentally attributable fraction (EAF) model was used to examine the three of four categories of childhood illness, lead poisoning, asthma, and cancer. Neurobehavioral disorders were based on data from the National Academy of Science (NAS).

Definition: “Environmental toxins were defined as chemical substances of human origin in environmental media – air, food, water, soil, the home, and community.” Prevention and pollution control of these toxins therefore is possible.

What has changed in the environment? According to this study, more than 80,000 new synthetic chemicals compounds have been developed over the past 50 years with an additional 2000 – 3000 new chemicals requesting an EPA review prior to manufacturing. Children are the most susceptible to the high volume chemicals that have the greatest potential to be dispersed in air, water, food crops, communities and homes. Only 43% of these chemicals have been tested for their potential human toxicity and 7% for possible effects on development.

Asthma is a major cause of childhood disease among American children with an incidence that has more than doubled. It is the leading cause of admissions of urban children to hospital resulting in over 200,000 hospitalizations annually according to this study. It has been well documented to be the leading cause of absenteeism from school. The causes of asthma are the result of not well understood interactions of genetic predisposition, respiratory infections, climate changes, indoor environment at school and home, second hand smoke, and ambient air pollution.

What is unique about this study is that the panel of experts in environmental and pulmonary medicine estimated the fraction of asthma specifically attributed to toxic exposures in the environment. Only outdoor, non-biological pollutants from sources that could be prevented or controlled (i.e. vehicular exhaust and emissions from stationary sources) were considered. Using this definition it was determined that a range of 10% to 35% of asthma cases are environmentally related. The environmentally attributable annual cost was judged to be 30% (range 10% - 35%) or \$2.0 billion dollars annually. Refer to Table 2 for a breakdown of costs from this study.

Table 2. Estimated Costs of Pediatric Asthma of Environmental Origin, United States, 1997

Medical Costs	<u>\$ Million</u>	
Hospital Care		
Inpatient	634	
Emergency Room	323	
Outpatient	154	
Physicians' Services		
Inpatient	54	
Outpatient	625	
<u>Medications</u>	2,809	
Subtotal: Medical Costs		\$4.6 billion
Indirect Costs		
School days lost	1,784	
Premature deaths	193	
Subtotal: Indirect Costs		\$2.0 billion
Total Costs of Pediatric Asthma		\$6.6 billion
Environmentally Attributable Fraction (EAF) = 30% (range 10% - 35%)		
Environmentally Attributable Costs		
of Pediatric Asthma		\$2.0 billion
		(range \$0.7 billion to \$2.3 billion)

The EAF in the analysis is the “percentage of a particular disease category that would be eliminated if environmental risks were reduced to their lowest possible level.”

In summary, a reduction of fine particulate matter (PM_{2.5}) air pollution in the United States could reduce the cost of asthma and other respiratory diseases across all age groups. A study by Ostro and Chestnut estimated the cost savings to be between \$14 billion and \$55 billion annually with a mean estimate of \$32 billion annually.