



## *Advocacy, Education & Outreach*

*50 years of service to individuals with disabilities and their families*

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Representative Frank I. Smizik, Chair  
Senator Pamela P. Resor, Chair  
Joint Committee on Environment, Natural Resources & Agriculture  
State House, Room 473F  
Boston, MA 02133

Dear Representative Smizik, Senator Resor & members of the Committee,

We are writing in support of H1286 and S553, An Act for a Healthy Massachusetts: Safer Alternatives for Toxic Chemicals (sponsored by Representative Jay Kaufman & Senator Steven Tolman), and to urge the committee to give this bill a favorable report.

For over 50 years, The Arc of Massachusetts has represented the interests of over 120,000 children and adults with cognitive disabilities in the Commonwealth. Our organization reaches out to individuals with information and education, much of it through 21 affiliates in towns and cities throughout the state. We provide information and consultation to state agencies, legislators, municipalities and help shape national policies through The Arc U.S., in areas such as special education, employment, housing and health care.

Our membership is particularly concerned about the impact toxic substances have in the prevalence of birth defects, learning and developmental disabilities in Massachusetts.

Birth defects affect about one in every 33 babies born in the United States each year. They are the leading cause of infant deaths, accounting for more than 20% of all infant deaths. Babies born with birth defects have a greater chance of illness and long term disability than babies without birth defects. Most common are heart defects, followed by spine and brain defects. (CDC web site)

The US Census Bureau estimates that 12 million US children (17%) suffer from one or more developmental, learning or behavioral disabilities. The National Academy of Sciences estimated that about 3% of developmental and neurological defects in children are caused by exposure to **known** toxic substances (including drugs, cigarette smoke and chemicals such as lead, PCBs, mercury) – hence 360,000 US children. Most chemicals on the market have never been tested for their developmental effects. EPA estimates that 28% of all chemicals in commerce could have the potential to be neurotoxic.

Over half of top 20 chemicals incorporated in products in Massachusetts are known or suspected neurotoxins (MA DEP data). The **National Academy of Sciences** has concluded that an additional 25% of all developmental and neurological defects are caused by environmental factors working in combination with a genetic predisposition.

150,000 children (age 3 to 21) enrolled in special education (MA Department of Education, 2001) – of those 2,898 had neurological disabilities and 3,451 had autism.

Based on these numbers and estimates of the environmentally-attributable fraction, Ackerman estimated the costs of care, education and foregone future earnings in MA due to environmental exposure to be between \$103 and 412 million dollars for only 3 categories of neurobehavioral disorders. This does not include exposure to lead.

### **The Scope of the Problem<sup>1</sup>**

In the United States nearly 12 million children under 18 years of age (17%) suffer from deafness, blindness, epilepsy, speech deficits, cerebral palsy, delays in growth and development, emotional or behavioral problems, or learning disabilities.<sup>2</sup> Learning disabilities alone affect 5-10% of children in public schools.<sup>3</sup> Attention deficit hyperactivity disorder (ADHD) conservatively affects 3-6% of all school children.<sup>4</sup> A recent survey from the Centers for Disease Control and Prevention (CDC) reports that parents of approximately 1.6 million elementary school-aged children (7 percent of children 6-11 years of age) reported ever being told by a doctor or health professional that their child had ADHD.

The incidence of autism may be as high as 2 per 1,000 children. The number of children entered into the California autism registry increased by 210% between 1987 and 1998, and the rate in increase continues to rise.<sup>5</sup> According to the California Department of Developmental Services, the latest figures show that autism accounted for 36% of all the intakes during the first quarter of 2002. Improved reporting and differing diagnostic definitions undoubtedly explain some of the increases in disorders of neurological development (neurodevelopmental disorders) but do not explain for the entire pattern.<sup>6</sup>

### **Brain Development and Impact of Chemicals**

Brain development begins early in embryonic life and continues well beyond birth into adolescence. Interference with any stage of this cascade of events may alter subsequent stages, so that even short-term disruptions may have long-term effects later in life. For this reason, the timing of exposure to neurotoxic chemicals is as important as the size of the exposure. Even a relatively small exposure to a toxic chemical during a window of vulnerability can have a permanent impact that might not occur if the same exposure happened at another time.

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<sup>1</sup> **Developmental disabilities—impairment of children’s brain development and function: the role of environmental factors** by Ted Schettler, MD (<http://www.protectingourhealth.org/newscience/learning/2003-02peerreviewlearningbehavior.htm>)

<sup>2</sup> Boyle C, Decouffle P, Yeargin-Allsopp M. 1994. **Prevalence and health impact of developmental disabilities in US children.** *Pediatrics* 93(3):399-403.

<sup>3</sup> Parrill M. 1996. **Research implications for health and human services.** In: *Learning Disabilities, Lifelong Issues* (Cramer S, Ellis W, eds). Baltimore, MD: Paul W. Brookes Publishing.

<sup>4</sup> Goldman L, Genel M, Bezman R, Slanetz P. 1998. **Diagnosis and treatment of attention deficit hyperactivity disorder in children and adolescents.** *J Am Med Assoc* 279(14):1100-1107.

<sup>5</sup> California Department of Developmental Services. 1999. **Changes in the Population of Persons with Autism and Pervasive Developmental Disorders in California’s Developmental Services System: 1987 through 1998.** A Report to the Legislature March 1, 1999. Sacramento CA: California Health and Human Services Agency. <http://www.dds.cahwnet.gov/Autism/main/incidencrptfinal.pdf> [cited 26 October 2001].

<sup>6</sup> Byrd, RS, 2002. **The Epidemiology of Autism in California: A Comprehensive Pilot Study.** Report to the Legislature on the Principal Findings.

The vast majority of chemicals to which people are commonly exposed, however, have never been examined at all for their impacts on the developing brain. Given the vulnerability of the developing brain to chemical exposures, this lack of information is extremely unfortunate and keeps us from more fully understanding the magnitude of the public health threat.

## **Lead**

The impacts of lead on the developing brain have been studied for many years. Lead exposures during infancy and childhood cause attention deficits, hyperactivity, impulsive behavior, IQ deficits, reduced school performance, aggression, and delinquent behavior.<sup>7</sup> A historical review of our understanding of the impacts of lead on the developing brain shows that exposure levels that were once thought to be “safe” are actually associated with brain damage when children are carefully studied. Levels as low as 5 mg/dL blood.

## **Flame retardants**

Polybrominated diphenyl ethers (PBDEs) widely used as flame retardants in consumer products and are detected in increasing concentrations in human breast milk and fat tissue. Animal tests show that PBDE exposures during brain development cause hyperactivity and interference with memory and learning when the animal grows up.<sup>8</sup>

## **Pesticides**

Limited data describe the effects of exposures to neurotoxic pesticides on the developing brain. In laboratory rodents a single low-level exposure to an organophosphate pesticide or a pyrethroid on day 10 of life causes permanent changes in the brain and hyperactivity when the animal is tested at 4 months of age.<sup>9</sup> Organophosphate and pyrethroid pesticides are among those most commonly used in the home and on gardens as well as in commercial agriculture. A study of Mexican children exposed to a mixture of agricultural chemicals showed impacts on motor skills, memory, attention, and learning.<sup>10</sup>

Over 90% of children have detectable urinary residues of just one of the neurotoxic organophosphate pesticides. Specimens analyzed for residues of 30 pesticides showed that >50% of the population contained at least six.<sup>11</sup> One study examined the meconium (first baby bowel movement) of newborns and found residues of organophosphate pesticides in each of them, documenting fetal exposure during critical periods of brain development.<sup>12</sup>

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<sup>7</sup> Rice DC. 1998. **Developmental lead exposure: neurobehavioral consequences.** In: **Handbook of Developmental Neurotoxicology** (Slikker W, Chang LW, eds). San Diego, CA:Academic Press.

Needleman HL, Reiss JA, Tobin MJ, Biesecker G, Greenhouse J. 1996. **Bone lead levels and delinquent behavior.** JAMA 275:363-369.

<sup>8</sup> Ahlbom J, Fredriksson A, Eriksson P. 1995. **Exposure to an organophosphate (DFP) during a defined period in neonatal life induces permanent changes in brain muscarinic receptors and behavior in adult mice.** Brain Res 677:13-19.

<sup>9</sup> Ahlbom J, Fredriksson A, Eriksson P. 1995. **Exposure to an organophosphate (DFP) during a defined period in neonatal life induces permanent changes in brain muscarinic receptors and behaviour in adult mice.** Brain Res 677:13-19.

<sup>10</sup> Guillette EA, Meza MM, Aquilar MG, Soto AD, Enedina I. 1998. **An anthropological approach to the evaluation of preschool children exposed to pesticides in Mexico.** Environ Health Perspect 106:347-353.

<sup>11</sup> Needham L, Hill R, Ashley D, Pirkle J, Sampson E. 1995. **The priority toxicant reference range study: interim report.** Environ Health Perspect 103(suppl 3):89-94.

<sup>12</sup> Whyatt RM, Barr DB. 2001. **Measurement of organophosphate metabolites in postpartum meconium as a potential biomarker of prenatal exposure: a validation study.** Environ Health Perspect 109(4):417-20.

As we have hoped to demonstrate through this testimony, The Arc is committed to insuring the present and future needs of individuals with cognitive disabilities and their families. This includes a balance of advocacy for sufficient programmatic funding and important prevention initiatives such as An Act for a Healthy Massachusetts: Safer Alternatives for Toxic Chemicals. We are grateful to the Committee for its consideration of this testimony and stand willing to offer any assistance or answer any questions related to our interest in this legislation.

Sincerely,



André Blanchet, M.D.  
President



John Thomas  
Deputy Director

**Local ARC Affiliates:** Berkshire • Brockton Area • Cape Cod • Central Middlesex • Charles River • East Middlesex • Franklin & Hampshire  
Greater Boston • Greater Fall River • Greater Lawrence • Greater New Bedford • Greater Plymouth • Greater Waltham • Minute Man AHS  
Northern Bristol • North Central • North Shore • Northern Essex • South Middlesex • South Norfolk • South Shore • Southern Worcester