Environmental Contributors to Autism: The Pediatrician's Role

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There is increasing evidence suggesting that exposures to environmental contaminants contribute to autism spectrum disorders. Indeed, the National Research Council (NRC) affirmed this notion when it documented that 28% of developmental disabilities are of environmental origin.[1] There are multiple plausible contributors including air pollutants, metals as well as persistent and nonpersistent organic contaminants.[2,3] As the NRC commented, many of these developmental disabilities occur as the byproduct of interactions of environmental exposures with genetic predisposition, or through epigenetic changes.

Although additional research is needed to better unravel specific factors, prevention of these environmental risks is clearly warranted. Pediatricians interested in advocating on behalf of autism prevention should note that the 1976 Toxic Substances Control Act has substantial flaws, allowing new chemicals to be introduced into commerce without testing for potential toxicity to developing organ systems.[4] This allows new chemical exposures, which may actually further increase risk for autism, to occur in an uncontrolled fashion.[5]

In discussing the need for regulatory action to prevent environmental exposures that contribute to autism, it is worthwhile for the pediatrician to communicate that autism is well known to be costly, with a $3.2 million in societal costs over the lifetime.[6] Although lost economic productivity and adult care were substantial drivers of those costs, others included additional direct medical care and special education services, which are borne by state, local, and federal agencies. In 2011, we documented that the environmentally attributable costs of autism in 2008 were on the order of $7.9 billion, based on an incidence of 1 in 110 children.[7] It should be noted that this estimate predated the more recent estimates of autism prevalence (1 in 68 children) in the United States,[8] and a more recent economic cost estimate reflective of newer prevalence data would be much higher.

These large economic costs of autism attributable to environmental chemicals beg the question why they occur in the first place. Economists use the term externality to indicate when entities gain economically from activities that result in harm to others.[5] In environmental health, exposures produced by industrial activities produce health hazards that affect lives of people who are not involved in the economic activity. Externalities introduce market inefficiencies in that harms occur to parties who did not participate in the economic activity resulting in overproduction of certain products at lower cost than the societal cost.

Although pediatricians should recognize the inequities produced by environmental health hazards, pediatricians can point out to policy makers the large scope of possible economic benefits of prevention. The removal of lead from gasoline continues to provide economic benefits in the United States on the order of hundreds of billions of dollars annually[9]; globally, the recent eradication of lead from gasoline was estimated to provide annual economic benefits of 2.45% of global Gross Domestic Product.[10] Pediatricians can use these types of examples to remind policy makers that the economic benefits of prevention must be considered alongside the economic costs of pollution prevention.[11]

The pediatrician may also be asked by a parent of a child with autism how to interpret population-based

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studies with respect to the degree that individual environmental pollutants contributed to their child's condition. It cannot be emphasized how much abundance of caution should be applied in directly attributing an individual's autism to environmental factors. Parents should not seek out testing of a child's hair for metals or other contaminants, as validity of the results is a major issue.[12] In addition, such measurements are unlikely to influence clinical decision making, especially because there are substantial and adverse neurodevelopmental effects associated with chelation. The pediatrician should instead emphasize the opportunity to prospectively prevent ongoing exposures that may have adverse neurodevelopmental and other health effects, both for their child and for other members of the family.

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