

Experts call for global overhaul of industrial chemical regulations

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In a Review published in *The Lancet Neurology*, two of the world's leading experts on the link between environment and children's health are sounding the alarm on the dangers of industrial chemicals.

They are calling on countries to transform their [chemical](#) risk-assessment procedures in order to protect children from everyday toxins that may be causing a global "silent epidemic" of brain development disorders.

Findings from the Review indicate that in the past 7 years, the number of recognised chemical causes of neurodevelopmental disorders has doubled from six to 12, while the list of chemicals that are known to damage the human brain, but are not regulated to protect children's health, has also expanded from 202 to 214. These hazardous chemicals are found in everyday items such as clothing, furniture, and toys.

"Current chemical regulations are woefully inadequate to safeguard children whose developing brains are uniquely vulnerable to toxic chemicals in the environment", explains Dr Philippe Grandjean from Harvard School of Public Health in Boston. "Until a legal requirement is introduced for manufacturers to prove that all existing [industrial chemicals](#) and all new chemicals are non-toxic before they enter the marketplace, along the lines of the European Union's reformed chemicals law REACH, we are facing a pandemic of neurodevelopmental toxicity."

Neurodevelopmental disorders such as autism, attention deficit disorder (ADHD), dyslexia, and cerebral palsy affect one in six children worldwide. Growing evidence strongly links childhood exposures to [hazardous chemicals](#) such as mercury, lead, and certain solvents and pesticides to higher rates of these [neurodevelopmental disorders](#) and suggests that more stringent controls could generate billions of dollars in

savings. The estimated yearly costs of [childhood lead poisoning](#) in the USA, for example, are about US\$50 billion, and the annual costs of methylmercury toxicity are roughly US\$5 billion.

Worryingly, say Grandjean and co-author Dr Philip Landrigan from Mount Sinai School of Medicine in New York, this might only be the tip of the iceberg: "The vast majority of the more than 80 000 industrial chemicals in widespread use in the USA have never been tested for their toxic effects on the developing foetus or child. Exposure to these chemicals during early development can cause brain injury at levels much lower than those affecting adults, and the real impact on children's health is just beginning to be uncovered."

The two main obstacles impeding efforts to restrict chemicals that threaten children's health are the large gaps in testing chemicals for neurodevelopmental toxicity and the huge amount of proof required before regulation is enacted.

"The only way to reduce toxic contamination is to ensure mandatory developmental neurotoxicity testing of existing and [new chemicals](#) before they come into the marketplace", says Landrigan. "Such a precautionary approach would mean that early indications of a potentially serious toxic effect would lead to strong regulations, which could be relaxed should subsequent evidence show less harm."

The authors propose a new international prevention strategy that would put the onus on chemical producers instead of government to demonstrate that their products are low risk using a similar testing process to pharmaceuticals, and a new international regulatory agency to coordinate and accelerate these measures.

They conclude, "The total number of neurotoxic substances now recognised almost certainly represents an underestimate of the true number of developmental neurotoxicants that have been

released into the global environment. Our very great concern is that children worldwide are being exposed to unrecognised toxic chemicals that are silently eroding intelligence, disrupting behaviours, truncating future achievements, and damaging societies, perhaps most seriously in developing countries."

More information: "Neurobehavioural effects of developmental toxicity," Philippe Grandjean, Philip J. Landrigan, *Lancet Neurology*, online February 15, 2014.

[www.thelancet.com/journals/laneur/article/PIIS1474-4422\(13\)70278-3/abstract](http://www.thelancet.com/journals/laneur/article/PIIS1474-4422(13)70278-3/abstract)

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