from many previous meta-analyses have shown the faults of using intelligence quotient (IQ) data from countries with highly polluted air and water; non-validated IQ tests; poor controls for parent IQ, socioeconomics, and other variables; and studying mega-doses in animals and in human beings.[3,4] By contrast with this review of Chinese studies, all of problematic methodological robustness, more than 3000 studies of the safety of water fluoridation stretch over 65 years. During this time, as fluoridation increased from 0% to 72% of US households, average US IQs have not decreased, but have instead increased by 15 points.[5]

The investigators also added manganese to their list of neurotoxicants writing that "might cause" or has been "linked to" neurological disorders: prenatal exposure to ADHD and postnatal exposure to parkinsonism. However, recent reviews have shown no link between manganese and ADHD or parkinsonism.[6,7]

Their assumption that "neurotoxicants might lurk undiscovered" behind even low doses of all chemicals can't be disproved. But it denies dose-response concepts. By seeing manganese and fluoride alongside repeated analogies to lead, a reader would naturally associate these elements with the situation with lead, in which no safe level of exposure exists. Manganese, however, as a trace element, does have a safe level.

Paediatricians appreciate careful neurodevelopment research. But many question the reality of such an expanding 'pandemic'. Besides rising IQs, findings from large surveillance studies from the National Health Interview Survey and Metropolitan Atlanta Developmental Disabilities Surveillance Program showed stable-to-falling rates of mental retardation and cerebral palsy between the 1990s and 2005.[8] Even researchers who see a possible increase in neurodevelopmental disorders attribute it to increases in screening, preterm births, survival of children with genetic or congenital defects, multiple births (from assisted reproduction), and school funding for children with medical diagnoses.[9] Table 3 ignores all such factors except prematurity, instead they reference their own studies and those of a frequent co-author, David Bellinger. Bellinger proposed[10] an interesting, but unproven model of IQ points lost from environmental versus other causes. He admitted, however, that for factors such as fluoride and arsenic, available meta-analyses are not suitable for calculating IQ points lost.

The investigators' conclusion asks scientists to reanalyse the strength of evidence needed to constitute proof for designating substances as neurotoxicants. Their limitless precautionary principle is inferior to the present continual analysis of data by the US Environmental Agency, the US Centers for Disease Control and Prevention, and other existing health organisations.

I declare no competing interests.

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In their Review, Grandjean and Landrigan expressed concern about the neurodevelopmental toxicity of methylmercury,[1] but did not assess the dangers of serious and widespread inhalation exposures to elemental mercury vapour ($Hg^0$) from its magico-religious uses in some Caribbean and Latino communities and the presumptive associated latent epidemic of developmental neurotoxicity this constitutes.

In the belief that it attracts good and repels evil, practitioners of folk magic and Caribbean religions including Espiritismo, Santería, and Voodoo, sprinkle mercury on floors and furnishings where it accumulates levels of mercury vapour, about 80% of which is inhaled or absorbed. The $Hg^+$ ion is the toxic moiety in methylmercury. Mercury vapour, like methylmercury, is lipophilic and readily crosses the placental and blood–brain barriers and enters breast milk.

The mean weight of mercury sold by botanicas for ritualistic use is about 10 g. Mercury spilt during ritualistic ceremonies that permeates flooring and furnishings can persist for decades, during which time it continually produces mercury vapour. Hence, most exposures are probably second-hand, from ritualistic spills by previous occupants of an individual's dwelling.[2,3] Unlike methylmercury

ingested in seafood, occupants of such contaminated dwellings cannot control their inhalation exposure and will be unaware of the neurotoxicity of residual mercury in flooring.

Mercury sales in The Bronx in New York (USA), where many people of Caribbean origin live, suggest that in 1995 alone,[4] between 25 500 and 155 000 homes might have been contaminated with mercury and data from similar Caribbean communities in New Jersey showed that at least 2% of apartments had mercury vapour consistent with its cultural use.[5]

Environmental health scientists, long aware of the hazards posed by ritualistic mercury use and its probable neurodevelopmental sequelae, have not put into action the "precautionary approach that emphasizes prevention and does not require absolute proof of toxicity" advocated for by the authors.[1] Despite Grandjean's previous observation that in "some ethnic groups, metallic mercury is used for magical purposes that may cause substantial exposure to mercury vapor",[6] these exposures and their neurodevelopmental affects are not routinely assessed.

That ritualistic mercury exposure contributes to the "silent pandemic of neurodevelopmental toxicity"[1] is suggested by a case of acute magico-religious mercury poisoning in a 3-year-old Puerto Rican girl, apparently due to ritualistic mercury spills by the previous Dominican occupants of the apartment in which she lived.[2,3]

Despite more than two decades of awareness of these ritualistic practices and a variety of research on ritualistic mercury sales, use, and reported environmental and clinical mercury levels, the authors' observation that recognition of widespread subclinical toxicity often did not occur until decades after the initial evidence of neurotoxicity is exemplified by the failure of government agencies and the environmental medical community to substantively assess these exposures.

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The American Association for Community Dental Programs' primary goal is to support the efforts of those serving the oral health needs of vulnerable populations at the community level. In view of our commitment to preventing oral diseases and improving access to services for the public, we read with interest Grandjean and Landrigan's Review on neurobehavioral effects of developmental toxicity.[1]

In their Review, Grandjean and Landrigan claim that fluoride might cause neurodevelopmental harm, a claim based on only one paper,[2] of which Grandjean is a coauthor. The study methodology contains several flaws that undermine its credibility and calls into question its applicability to the community water fluoridation programme in the USA.

The study[2] is a meta-analysis of 27 cross-sectional studies done in poor, rural communities in China, Mongolia, and Iran, countries where the drinking water contains high levels of naturally occurring fluoride. The 27 original studies did not adequately control for a variety of intervening and confounding variables that could have affected intelligence quotient (IQ) scores, such as parents' education and socioeconomic status and air and water pollution. It is unfortunate that Grandjean and Landrigan did not mention these limitations.

Additionally, they did not clearly state that the reference groups in their article[2] use water fluoridated at about the recommended level. Thus, another interpretation of their analysis could be that communities fluoridated at the recommended level have a higher IQ.

No credible scientific studies show a relation between fluoride consumption and IQ levels; however, several have shown that fluoride ingested at recommended levels is not harmful. Grandjean and Landrigan did not acknowledge the animal study[3] that showed no evidence of a neurotoxic effect of fluoride, even at levels up to 230 times the recommended concentration; an earlier study showing that fluoride causes no harm to children;[4] two formal reviews that delineate weaknesses in the Chinese fluoride and IQ studies;[5,6] and the conclusion by one of these sets of investigators[6] that biological plausibility for a link between fluoridated water and IQ has not been established.

Unfortunately, Grandjean and Landrigan's Review has been aggressively and improperly used by antifluoridationists to frighten the public about the effects of fluoridation, a well-established public health measure that has been shown to be cost-effective and safe. As a result, the public's oral health, especially that of the most vulnerable people, is put in jeopardy.

As advocates for better oral health and for serving the public's best interest, we are pleased that *The Lancet Neurology* is providing a forum for credible experts and organisations to reaffirm the safety and cost-effectiveness of fluoridation—a proven public health measure.