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The Next Generation of Every Child By Two

Scientific Studies on Thimerosal and Autism

Publication	Study	Lead Researcher	Objective	Method/Design	Conclusion*	Funding
The Lancet November 2002	"Mercury concentrations and metabolism in infants receiving vaccines containing thiomersal: A descriptive study"	Michael Pichichero, MD, Dept. of Microbiology/Immunology, University of Rochester Medical Center	To measure concentrations of mercury in blood, urine and stools of infants who received thimerosal-containing vaccines to determine if the mercury from thimerosal accumulates or is excreted and the rate of excretion.	Researchers at the University of Rochester measured the presence of mercury in the blood, urine and stools of 61 New York infants (2 and 6-month-olds) that received thimerosal-containing vaccines to evaluate the metabolism of thimerosal.	**Administration of vaccines containing thimerosal does not seem to raise blood concentrations of mercury above safe values in infants. Ethylmercury was eliminated from the body rapidly via the stools after administration of thimerosal-containing vaccines.**	National Institutes of Health
Pediatrics March 2003	"Thimerosal and Autism?"	Karen Nelson, MD, National Institute of Neurological Disorders and Stroke and Margaret Bauman, M.D., Harvard Medical School	To examine similarities and differences between the physical manifestations of autism and mercury poisoning as well as similarities and differences in brain pathology between the two conditions.	Physical symptoms were compared based on published literature on the two syndromes; brain autopsy tissue from autistic individuals and those who had died from mercury poisoning were compared.	**The physical symptoms of autism and mercury poisoning were not the same. Likewise the brain tissues were not the same.**	Not applicable
Journal Of American Medical Association July 2003	"Evidence of Brain Overgrowth in the First Year of Life in Autism"	Eric Courchesne, PhD* Ruth Carper, PhD* Natacha Akshoomoff, PhD** *Departments of Neuroscience and **Psychiatry, School of Medicine, University of California, San Diego, La Jolla; and Center for Autism	To determine whether pathological brain overgrowth precedes the first clinical signs of autism spectrum disorder (ASD) and whether the rate of overgrowth during the first year is related to	Head circumference (HC), body length, and body weight measurements during the first year were obtained from the medical records of 48 children with ASD aged 2 to 5 years who had participated in	**The clinical onset of autism appears to be preceded by 2 phases of brain growth abnormality: a reduced head size at birth and a sudden and excessive increase in head size between 1**	National Institute of Neurological Disorders and Stroke

		Research, Children's Hospital Research Center, San Diego.	neuroanatomical and clinical outcome in early childhood.	magnetic resonance imaging studies.	**and 2 months and 6 to 14 months. Abnormally accelerated rate of growth may serve as an early warning signal of risk for autism.**	
American Journal of Preventive Medicine August 2003	"Autism and Thimerosal-Containing Vaccines: Lack of Consistent Evidence for an Association"	Paul Stehr-Green, DrPh, MPH, Dept. of Epidemiology, University of Washington	To test the hypothesis that increases in autism rates in Sweden and Denmark can be linked to exposure to ethylmercury through thimerosal in childhood vaccines.	Compared incidence of autism in Sweden and Denmark relative to exposure to thimerosal-containing vaccines.	**Swedish and Danish data showed that autism rates continued to rise even after use of ethylmercury in vaccines ceased.**	National Immunization Program, Centers for Disease Control
Pediatrics September 2003	"Thimerosal and the Occurrence of Autism: Negative Ecological Evidence from Danish Population-Based Data"	Kreesten M. Madsen, M.D., Dept. of Epidemiology and Social Medicine, University of Aarhus, Denmark	To determine whether discontinuing the use of thimerosal-containing vaccines in Denmark led to a decrease in the incidence of autism.	Health registry records of all children born in Denmark between 1971-2000 were examined for diagnosis of autism.	**Researchers found no decrease in autism rates after 1992, when Denmark eliminated the use of thimerosal in vaccines. In fact, autism cases continued to rise.**	Stanley Medical Research Institute
Journal of the American Medical Association October 2003	"Association Between Thimerosal-Containing Vaccine and Autism"	Anders Hviid, MSc, Danish Epidemiology Science Centre, Dept. of Epidemiology Research, Statens Serum Institut	To determine whether vaccination with a thimerosal-containing vaccine is associated with development of autism.	Reviewed records of nearly 500,000 children in Denmark and compared those given thimerosal-containing pertussis vaccine with children given thimerosal-free vaccine.	**The authors found that the risk of autism and other autistic-spectrum disorders did not differ between the groups of children who had received no thimerosal-containing vaccine versus those who had received one, two, or three doses of thimerosal-containing vaccine.**	Danish National Research Foundation and Danish Medical Research Foundation

Pediatrics November 2003	"Safety of Thimerosal-Containing Vaccines: A Two-Phased Study of Computerized Health Maintance Organization Database"	Thomas Verstraeten, MD, Epidemic Intelligence Service Program Office, Centers for Disease Control and Prevention; Vaccine Safety and Development Activity, Epidemiology and Surveillance Divisions, National Immunization Program, Centers for Disease Control and Prevention	To assess the possible toxicity of thimerosal-containing vaccines (TCVs) among infants.	A 2 –phased retrospective cohort study was conducted using computerized health maintenance organization (HMO) databases. Phase I screened for associations between neurodevelopmental disorders and thimerosal exposure among 124,170 infants who were born during 1992 to 1999 at 2 HMOs. In phase II, the most common disorders associated with exposure in phase I were reevaluated among 16, 717 children who were born during 1991 to 1997 in another HMO.	**No consistent significant associations were found between TCVs and neurodevelopmmental outcomes. Conflicting results were found at different HMOs for certain outcomes. For resolving the conflicting findings, studies with uniform neurodevelopmental assessments of children with a range of cumulative thimerosal exposures were needed.**	Centers for Disease Control
Molecular Psychiatry, June 2004	"Neurotoxic effects of postnatal thimerosal are mouse strain dependent"	M Hornig, MD, Jerome L and Dawn Greene Infectious Disease Laboratory, Department of Epidemiology, Mailman School of Public Health, Columbia University	Hypothesized that autoimmune propensity influences outcomes in mice following thimerosal challenges that mimic routine childhood immunizations.	***Nonhuman data** Exposed mice of differing MHC (H-2) backgrounds to thimerosal in doses and timing equivalent to the pediatric immunization schedule.	**Autoimmune disease-sensitive SJL/J mice showed growth delay; reduced locomotion; exaggerated response to novelty; and densely packed, hyperchromic hippocampal neurons with altered glutamate receptors and transporters. Strains resistant to autoimmunity, C57BL/6J and BALB/cJ, were not susceptible. These findings implicate genetic influences and**	Supported by grants from UC Davis M.I.N.D. Institute, Coalition for Safe Minds, The Ellison Medical Foundation and NIH HD 37546

					provide a model for investigating thimerosal-related neurotoxicity.	
Pediatrics September 2004	"Thimerosal Exposure in Infants and Developmental Disorders: A Retrospective Cohort Study in the United Kingdom Does Not Support a Causal Association"	Nick Andrews, MSc, Statistics Unit and Immunisation Department, Health Protection Agency, Communicable Disease Surveillance Centre, London.	After concerns about the possible toxicity of thimerosal-containing vaccines in the United States, this study was designed to investigate whether there is a relationship between the amount of thimerosal that an infant receives via diphtheria-tetanus-whole-cell pertussis (DPT) or diphtheria-tetanus (DT) vaccination at a young age and subsequent neurodevelopmental disorders.	A retrospective cohort study was performed using 109 863 children who were born from 1988 to 1997 and were registered in general practices in the United Kingdom that contributed to a research database.	**With the possible exception of tics, there was no evidence that thimerosal exposure via DTP/DT vaccines causes neurodevelopmental disorders.**	World Health Organization
Pediatrics September 2004	"Thimerosal Exposure in Infants and Developmental Disorders: A Prospective Cohort Study in the United Kingdom Does Not Support a Causal Association"	John Heron, PhD and Jean Golding, DSc; and the ALSPAC Study Team, part of the World Health Organization initiated European longitudinal study of pregnancy and childhood.	There is an established link between exposure to mercury and impaired childhood cognitive developmental and early motor skills. Thimerosal, a preservative, used in a number of children's vaccines, contains ethylmercury, and there has been concern that this exposure to mercury may be of some detriment to young children. The aim of this research was to test in a large United Kingdom population-based cohort	Used population data from a longitudinal study on childhood health and development. The study has been monitoring > 14000 children who are from the geographic area formerly knows as Avon, United Kingdom, and were delivered in 1991-1992.	**No convincing evidence was found that early exposure to thimerosal had any deleterious effect on neurologic or psychological outcome.**	Financial Support for the establishment of the ALSPAC cohort was provided by the Medical Research Council, the UK Department of Health

			whether there is any evidence to justify such concerns.			
Environmental Health Perspectives April 2005	"Comparison of Blood and Brain Mercury Levels in Infant Monkeys Exposed to Methylmercury or Vaccines Containing Thimerosal"	Thomas M. Burbacher, PhD, Departments of Environmental and Occupational Health Sciences, Washington National Primate Research Center, and Center on Human Development and Disability	Study was initiated to provide a direct comparison of the blood levels of mercury in infant nonhuman primates exposed orally to methylmercury or via i.m. injections of vaccines containing thimerosal.	Compared the systemic disposition and brain distribution of total and inorganic mercury in infant monkeys following thimerosal exposure with infants exposed to methylmercury.	**The current study indicates that methylmercury is not a suitable reference for risk assessment from exposure to thimerosal derived mercury. Knowledge of toxicokinetics and developmental toxicity of thimerosal is needed to afford a meaningful assessment of the developmental effects of thimerosal-containing vaccines.**	Supported by funds from the National Institutes of Health.
American Journal of Medical Genetics May 2007	"Lack of Association between Rh Status, Rh Immune Globulin in Pregnancy and Autism"	Judith H. Miles, T. Nicole Takahashi at the Thompson Center for Autism and Neurodevelopmental Disorders, and Department of Child Health, University of Missouri Hospitals and Clinics, Columbia, Missouri	Study was designed to determine whether thimerosal in Rh Immune Globulin administered during pregnancy corresponded with autism in the child. The researchers also attempted to identify any subgroup of children who were hyper-sensitive to ethylmercury.	Assessed Rh status and ante partum thimerosal exposure of mothers and children who came to a statewide, dedicated autism clinic.	**The results showed that in children with autism, Rh negative status was no higher in their mothers than in the general population, that exposure to RhIg (preserved with thimerosal) before birth was no higher and that pregnancies were not more likely to be Rh incompatible.**	Funded by Johnson and Johnson Company and Leda J. Sears Trust
New England Journal of Medicine September 2007	"Early Thimerosal Exposure and Neuropsychological Outcomes at 7 to 10 Years"	William W. Thompson, PhD, the National Center for Immunizations and Respiratory Infections, Influenza Division	Study was designed to determine whether early exposure to thimerosal is associated with	1047 children between the ages of 7 and 10 were evaluated for 42 neuropsychological outcomes. Exposure to	**The authors concluded that their study did not support a causal association between early**	Supported by the CDC

			neuropsychological deficits in children.	thimerosal was determined by medical records, immunization records and parent interviews.	**exposure to mercury from thimerosal-containing vaccines and immune globulins and deficits in neuropsychological functioning at the age of 7 to 10 years.**	
Archives of General Psychiatry January 2008	"Continuing Increases in Autism Reported to California's Developmental Services System"	Robert Schechter, MD, MSc, Immunization Branch, California Department of Public Health	Study was designed to determine whether trends in DDS autism client data support the hypothesis that thimerosal exposure is a primary cause of autism.	Study of time trends in the prevalence by age and birth cohort of children with autism who were active status clients of the DDS from January 1, 1995, through March 31, 2007.	**The DDS data do not show any recent decrease in autism in California despite the exclusion of more than trace levels of thimerosal from nearly all childhood vaccines. The DDS data do not support the hypothesis that exposure to thimerosal during childhood is a primary cause of autism.**	Supported through the California Department of Public Health
Public Library Of Science (PLoS One)	"Lack of Association between Measles Virus Vaccine and Autism with Enteropathy: A Case-Control Study"	Mady Hornig. MD, MA, Center for Infection and Immunity, Mailman School of Public Health, Columbia University, New York, New York	Study was designed to determine whether children with GI disturbances and autism are more likely than children with GI disturbances alone to have MV RNA and/or inflammation in bowel tissues and if autism and/or GI episode onset relate temporally to receipt of MMR.	The sample was an age-matched group of US children undergoing clinically-indicated ileocolonoscopy. The temporal order of onset of GI episodes and autism relative to timing of MMR administration was examined.	**This study provides strong evidence against association of autism with persistent MV RNA in the GI tract or MMR exposure. Autism with GI disturbances is associated with elevated rates of regression in language or other skills and may represent an endophenotype**	Supported through a CDC grant to AAP and by National Institutes of Health

					distinct from other ASD.	
Pediatrics February 2009	"Neuropsychological Performance 10 Years After Immunization in Infancy With Thimerosal-Containing Vaccines"	Alberto Eugenio Tozzi, Patrizia Bisiacchi, Vincenza Tarantino, Barbara De Mei, Lidia D'Elia, Flavia Chiarotti and Stefania Salmaso	Study was designed to compared the neuropsychological performance, 10 years after vaccination, of 2 groups of children exposed randomly to different amounts of thimerosal through immunization.	Children who were enrolled in an efficacy trial of pertussis vaccines in 1992–1993 were contacted in 2003. Two groups of children were identified, according to thimerosal content in vaccines assigned randomly in the first year of life (cumulative ethylmercury intake of 62.5 or 137.5 g), and were compared with respect to neuropsychological outcomes.	**Given the large number of statistical comparisons performed, the few associations found between thimerosal exposure and neuropsychological development might be attributable to chance. The associations found, although statistically significant, were based on small differences in mean test scores, and their clinical relevance remains to be determined.**	Supported in part by the US Centers for Disease Control and Prevention
Pediatrics September 2010	"Prenatal and Infant Exposure to Thimerosal From Vaccines and Immunoglobulins and Risk of Autism"	Cristofer S. Price, William W. Thompson, Barbara Goodson, Eric S. Weintraub, Lisa A. Croen, Virginia L. Hinrichsen, MS, Michael Marcy, Anne Robertson, Eileen Eriksen, Edwin Lewis, Pilar Bernal, David Shay, Robert L. Davis, and Frank DeStefano, MD	This study was designed to examine relationships between prenatal and infant ethylmercury exposure from thimerosalcontaining vaccines and/or immunoglobulin preparations and ASD and 2 ASD subcategories: autistic disorder (AD) and ASD with regression.	A case-control study was conducted in 3 managed care organizations (MCOs) of 256 children with ASD and 752 controls matched by birth year, gender, and MCO. Exposure to thimerosal in vaccines and immunoglobulin preparations was determined from electronic immunization registries, medical	**Prenatal and early-life exposure to ethylmercury from thimerosal-containing vaccines and immunoglobulin preparations was not related to increased risk of ASDs.**	This work was supported by a contract from the CDC to America's Health Insurance Plans and via America's Health Insurance Plans subcontracts to Abt Associates

				charts, and parent interviews. We used conditional logistic regression to assess associations between ASD, AD, and ASD with regression and exposure to ethylmercury during prenatal, birth-to-1 month, birthto-7-month, and birth-to-20-month periods.		Inc; Department of Population Medicine, Harvard Pilgrim Health Care Institute, Harvard Medical School; Southern California Kaiser Permanente, and Center for Vaccine Research, University of California Los Angeles; and Division of Research, Kaiser Permanente Northern California.

**It is important to note that each study has unique limitations. Science relies on replication of data and scientists draw conclusions not based on a single study but on the totality of the evidence collected.*